BUILDING International Cooperation for Trustworthy ICT

European Commission
Information Society and Media

Building International Cooperation for Trustworthy ICT: Security, Privacy and Trust in Global Networks & Services

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BIC Partners

TSSG

Waterford Institute of Technology

TECHNISCHE UNIVERSITÄT DARMSTADT

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Atos

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EXECUTIVE SUMMARY

The EU FP7 BIC project[1] held its first Annual Forum on 29th November 2011 in Brussels. The main goal of the BIC Co-ordination Action project is to engender co-operation of EU researchers and program managers with their peers in emerging countries, namely Brazil, India and South Africa**.** The project is facilitating a technical and programme level catalyst for engagement, collaboration and networking activities internationally. In addition, the BIC project will provide continuity and bring together a truly global collaboration with the participation of the already established countries from the INCO-TRUST project, including the United States, Canada, Japan, Korea and Australia. One of the means in accomplishing this ambitious goal is the holding of a BIC Annual Forum on Trustworthy ICT.

The **mission** of the BIC annual forum is discussion and agreement on technological challenges/gaps of common interest amongst the countries, agree on what can and needs to be done internationally (who can contribute to what), and then work at an international level towards delivering on cooperation towards solving these joint technological challenges. The forum will enable the working towards the definition of tangible international activities, including success metrics and setting up global projects.

The **objectives** of the BIC Annual forum are:

- Identification of the technological challenges that really need and could be tackled in common between the countries so they can be elaborated clearly with the policy makers in the respective countries as a way forward;
- Highlighting the current bi-lateral (and potentially overlapping) country to country cooperation(s) into a more comprehensive unified global cooperation;
- From the insights of the researchers and programme managers, to explore how best to organise future International cooperation (INCO) research activities and its supporting programmes, together with the key challenges, issues and priorities.

Significant **momentum** amongst the participants to build an international research community focussing on mutually beneficial research topics in trust, security and privacy was noted throughout the forum. There was a strong message from the participants to forge ahead with the necessary cooperation towards building the communities around the identified thematic areas of priority from their countries. Hence, an important outcome of the Annual Forum was the establishment of three working groups (WGs), two technical and one logistical, that would be facilitated by BIC. It would be the intention of the BIC project to additionally form longer term action groups based on the successful outcomes of these WGs to ensure implementation and take-up. The established WGs are entitled: WG1. Human oriented/citizen security; WG2. Network Information security / Cybersecurity; and WG3. Programme/funding focus/ identify community.

The full report of the BIC Annual forum contains a high level summary of all of the results from the sessions; detailed summaries of the presentations can be found in the Annex II of the report.

[1] http://www.bic-trust.eu/

INTRODUCTION

The EU FP7 BIC project[2] held its first Annual Forum on 29th November 2011 in Brussels. The main goal of the BIC Co-ordination Action project is to engender co-operation of EU researchers and program managers with their peers in emerging countries, namely Brazil, India and South Africa**.** The project is providing a technical and programme level catalyst for engagement, collaboration and networking activities internationally. In addition, the BIC project will provide continuity and bring together a truly global collaboration with the participation of the already established countries from the earlier INCO-TRUST project that included the United States, Canada, Japan, Korea and Australia. One of the means in accomplishing this ambitious goal is the holding of a BIC Annual Forum on Trustworthy ICT.

To prepare for the Annual forum, a BIC session[3] dedicated to the planning of the forum was held in Amsterdam on 6th July 2011 during the SysSec workshop[4] in which a number of topics were already identified for inclusion that were carried forward to the agenda. In addition, contributions were invited from the research communities of ICT trust and security to put forward position papers on topics requiring international cooperation.

MISSION AND OBJECTIVES OF THE ANNUAL FORUM

The overall mission and objectives of the BIC annual forum are to bring together the wider and global trust and security communities to explore how best to organise future International Cooperation (INCO) research activities and its supporting programmes, together with the identification of the key challenges, issues and priorities to tackle together. The agenda was formed to cover the core objectives of the Annual Forum.

Objective 1. *Identification of the technological challenges that really need and could be tackled in common between the countries so they can be elaborated clearly with the policy makers in the respective countries as a way forward;* This objective was being covered by a presentation on identification of advantages for INCO and the trust and security technological challenges – BIC review of research topics already identified; and panel session 2: Human oriented approaches to security, privacy and trust and how international cooperation can benefit; and panel session 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits.

Objective 2. *Highlighting the current bi-lateral (and potentially overlapping) country to country cooperation(s) into a more comprehensive unified global cooperation;* This objective was being covered by the opening session on Setting the scene with DG INFSO views onINCO and Panel session 1: Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects.

Objective 3. *From the insights of the researchers and programme managers, to explore how best to organise future International Cooperation (INCO) research activities and its supporting programmes, together with the key challenges, issues and priorities.* This objective was being covered by Panel session 1. Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects; and panel session 2. Human oriented approaches to security, privacy and trust and howINCO can benefit; and panel session and 3. Digital ecosystems network and information security and howINCO can provide mutual benefits; and the closing session on planning and operations.

[2] http://www.bic-trust.eu/
[3] http://www.bic-trust.eu/events/event/bic-session-syssec-workshop/
[4] http://www.syssec-project.eu/events/1st-syssec-workshop-program/

AGENDA

9:00	**Welcome and Introduction** Jim Clarke, Waterford Institute of Technology, BIC Coordinator
9:10	**Setting the scene with DG INFSO views on International Cooperation.** Alvis Ancans, European Commission, DG INFSO, International Relations Unit Gustav Kalbe, European Commission, DG INFSO, Deputy Head of Unit F5, Trust and Security
10:00	**Panel session 1. Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects.** Projects (Panelists): EU – India Spirit (Tom Williamson), Synchroniser (Katja Legiša), EURASIAPAC (Fernando Kraus Sanchez), SECFUNET (Marcelo Pasin), BILAT/ACCESS4EU/SECAS (Rado Faletic).
10:30	**Identification of advantages for international cooperation and the trust and security technological challenges – BIC review of research topics already identified.** Michel Riguidel, Telecom Paris-Tech, ENST, France
11:00	**Coffee and networking break**
11:30	**Panel Session 2. Human oriented approaches to security, privacy and trust and how international cooperation can provide mutual benefits.** Chair: Priscila Solis Barreto, University of Brasilia, Brazil Panellists: Karima Boudaoud, France; Ioannis Krontiris, Germany; John Zic, Australia; Jan Eloff, South Africa; Fabio Martinelli, Italy.
13:00	**Lunch break**
14:00	**Panel Session 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits.** Chair: John C. Mallery, MIT, USA (for Karl Levitt, University of California, Davis, USA) Panellists: John C. Mallery, USA; Bart Preneel, Belgium; Abhishek Sharma, India; Hiroyuki Hishinuma, Japan; Razvan Gavrila, Greece.
16:00	**Coffee and networking break**
16:30	**Planning and operations session** Moderated by BIC partners
17:30	**BIC Annual Forum closing**

RESULTS OF THE ANNUAL FORUM

This section will summarise the results of each of the individual sessions. Please note that an extended outline of the individual talks can be found in Annex I. The presentations themselves can be found at http://www.bic-trust.eu/events/event/upcoming-event-bic-annual-forum/.

Taking into consideration the mission, objectives and inputs received for the annual forum, the programme was designed in a way to include a good mix of presentations, panel sessions and discussions. In summary, the programme outcomes consisted of the following elements.

The opening session of the Forum was an opportunity for the European Commission, in particular, **Alvis Ancans,** DG INFSO, International Relations Unit and **Gustav Kalbe,** DG INFSO, Deputy Head of Unit F5, Trust and Security, to set the scene for the BIC annual forum and present perspectives on INCO between the EU and other countries in the context of the ICT theme of EU's 7th Framework and the importance of INCO within ICT Trust and Security research. As part of this session, there were details presented on past, current and future activities in the pipeline already identified that are directly or even indirectly related to trust and security. During these two talks, the following points were highlighted:

- The Commission recognises the strong need to cooperate internationally, with the following objectives:
    - To jointly develop ICT solutions to major global societal challenges;
    - To jointly respond to major global technological challenges by developing interoperable solutions and standards;
    - To improve scientific and technological cooperation for mutual benefit.
- There are a number of targeted EU – Japan calls open presently in calls 8 and 9
    - Objective ICT-2011.1.1 Future Networks (Call 8);
    - Objective ICT-2011.1.2 Cloud Computing, Internet of Services and Advanced Software Engineering (Call 8);
    - Objective ICT-2011.3.1 Very Advanced Nanoelectronic Components (Call 8);
    - Objective ICT-2011 9.6 FET Proactive: Unconventional Computation (UCOMP) (Call 8);
    - Objective ICT-2011.5.2 Virtual Physiological Human (Call 9).

It is expected that there will be further joint calls in Work Programme 2013 that is under construction, including Brazil, Russia (currently under discussion; topics: high-performance computing and semantic web) and the possibility of coordinated Calls with Australia, South Africa, Mexico and Japan are in the pipeline – more likely in 2013 or later.

Panel session 1. Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects.

A panel session was comprised of a number of INCO-related projects with direct or indirect linkages to ICT trust and security aspects. The session was supported by the following projects - panellists:

Euro-India SPIRIT[5] project - Tom Williamson, European Research Consortium for Informatics and Mathematics, European Economic Interest Grouping) ERCIM EEIG. He is the project co-Ordinator of Euro-India SPIRIT project.

SYNCRONISER[6] project - Katja Legiša, an Italian consultant with seven years of experience in international and EU project management, promotion and support of research and development activities. Her professional and educational background is in Project Management, Public Relations and Communication. Since 2006, she is coordinating EU-India projects. She is now the Project Coordinator of the SYNCRONISER project.

EURASIAPAC[7] project - Fernando Kraus Sanchez, Director of the Foreign Affairs Sector within the Research and Innovation division of AToS in Spain. Fernando has over fifteen years of experience in participating in the implementation of ICT projects including the EURASIAPAC project. He has wide experience in the field of exploitation and marketing activities as a senior consultant both in the private and public sectors of different countries (Argentina, Azerbaijan, Brazil, Cameroun, Dominican Republic, Egypt, ..).

SECFUNET Project - Marcelo Pasin, Assistant professor at the University of Lisbon. Previously, he was a researcher at INRIA (France, 2007-2008) and tenured associate professor at the Federal University of Santa Maria (Brazil, 1991-2007). He has worked for CoreGRID, EGEE and EC-GIN in FP6, and is now working for TClouds and SECFUNET in FP7. SECFUNET is a project from within the recent EU-Brazil joint call held during Call 7 of FP7.

FEED/AUS-ACCESS4EU/SECAS - Rado Faletic's involvement with the Forum for European-Australian Science and Technology cooperation (FEAST) stems from his interest in promoting, encouraging and highlighting science and new ideas, along with the personal satisfaction he receives from facilitating individual collaborations.

The purpose of this session was to broaden the perspectives and to gain insights from other projects related to both INCO and trust and security. The format of session was the panellists were asked interactively to address key questions by the moderator and any other questions from the audience.

The following tables contain a condensed summary of the responses to the questions raised to the panellists (full responses are detailed in Annex II):

[5] http://www.euroindia-ict.org/
[6] http://euroindiaresearch.org/synchroniser/
[7] http://eurasiapac-fp7.eu/

Question 1	**How does your project contribute to International cooperation and trust and security?**
EU-India Spirit	• EU – India collaboration with working groups in ICT Addressing Societal Challenges; AudioVisual Media & Internet; and Emerging Technologies & eInfrastructures. • Trust and security: strong topic in all three working groups and hence, one of the umbrella themes.
SYNCRONISER	• Boosts impact of the policy dialogue by identifying EU-India research priority areas and recommendations on how to improve the cooperation. • one of identified research priority areas is *Security, Privacy & Monitoring* (data management system, secure storage system, person identification and tracking systems; for healthcare, governance and education).
EURASIAPAC	• Eurasiapac focuses on ICT research cooperation between the EC and the Asia-Pacific region, mainly Korea, Japan, Australia and New Zealand. • Trust and Security has been identified as one of the priorities among the topic of interest in ICT research in the countries participating in the project.
SECFUNET	• SECFUNET is a STREP in FP7, with EU and Brazilian partners. • It proposes to create a new generation in the Internet security that is very simple to use.
FEED/ AUS-ACCESS4EU/ SECAS	• *SECAS: Strategies for European ICT RTD Collaboration for Australia and Singapore* identified ICT thematic capabilities and areas of potential synergy, performed policy analysis and has made strategic recommendations for improved cooperation policies. • Trust and security topics are clearly identified in the final report, which is now available online.

Question 2	What are the benefits and expected impact to your project brought on by international cooperation?
EU-India Spirit	• The Indian partners have increased visibility and familiarity with Commission-funded projects, in particular, and EC processes in general as well as strong relationships with consortium members and related entities.
SYNCRONISER	• The project has provided a more practical, consultation approach to boost the impact of policy dialogues on Joint research priority areas. This will feed into the upcoming High level working group meeting in 2012. • Synchroniser uses a bottom up approach in which the project provides the EC with the evidence from the experts, on which they can make policy decisions.
EURASIAPAC	• The contacts and the fact that some main stakeholders in ICT research have been directly involved in the project has raised interest in launching joint calls with some of the countries. • Joint calls with Japan and Australia are under preparation and are being considered for the future.
SECFUNET	• SECFUNET's partners are very heterogeneous providing different yet complementary skills. Specifically from Brazil we get different perspectives, very different regulation frameworks and very different concerns and Brazilians also include a pioneer researcher in intrusion-tolerance and a national networking research laboratory. • SECFUNET also allows for leveraging previous cooperation, that would otherwise be impossible.
FEED/ AUS-ACCESS4EU/ SECAS	• Both FEED and AUS-ACCESS4EU have greatly contributed to the flow of information between Europe and Australia regarding overall funding modalities available for international collaboration, but more importantly have identified and developed strategies on how to most successfully use these mechanisms (including FP7, COST[8], ARC[9] and NHMRC[10]). SECAS has produced a concrete set of strategic recommendations, which are available in the final public report online.

[8] http://www.cost.eu/
[9] http://www.arc.gov.au/
[10] http://www.nhmrc.gov.au/

Question 3	**International cooperation is not an easy task and requires a lot of patience and time. What are the issues encountered and how did you address them?**
EU-India Spirit	• Difficulties in scheduling and organising face-to-face meetings are obviously magnified in international cooperation projects with such significant scale; • When involving external experts, need significant advance notice time for stakeholders.
SYNCRONISER	• The difference of viewing time and deadlines is different between the two countries, which brings to difficulties in carrying out joint activities. • The difference between Formal and Informal communications plays an important role in getting things done and especially when passing a message across.
EURASIAPAC	• Although the Eurasiapac project focuses on ICT cooperation between EC and the Asia-Pacific region, it's difficult to deal it as a homogeneous region because each participating AP country (Japan, Korea, Australia, New Zealand) has different characteristics, institutions and approach to ICT research. • In Europe, the EC FP7 creates a common approach to research, but it doesn't exist a similar common institutions in the Eurasiapac targeted countries. Each country needs to be dealt in a different way. • difficult working cooperation process due to time zone differences. • IPR is always an issue in international ICT research cooperation and needs to be dealt at a very early stage of the research process.
SECFUNET	• In time scales, although evaluated at the same time, the start times of projects were very different (by 6 months) and this caused significant start-up problems between the countries. • Cooperation projects in Brazil are not structurally the same as in EU. Brazilians operate in a more independent fashion and don't over-rely on meetings as we do in the EU. • The evaluation process is also very different between EU and Brazil. In Brazil, reporting is carried out mainly in the very end of the project, therefore, making it difficult to get things going in terms of a common progress reporting mechanism between the countries. Another example is Brazilians are not responsible for delivering to the EC. • These efforts need to be harmonised between the participants in the different countries.
FEED / AUS-ACCESS4EU/ SECAS	• One of the issues of most importance has been the persistent lack of understanding, particularly in Europe, regarding how to include third country partners on FP7 proposals. • FEED and AUS-ACCESS4EU have been working actively (through email alerts, but more affectively through targeted seminars and direct communication) to education both Australian and European researchers on *the facts* as well as *the realities* of including Australian partners on FP7 projects. This includes issues of funding support. • SECAS has identified issues ranging from abstract political ones (e.g. that policies need to be concrete, should also include technical content, and need follow-up actions) to practical ones at the researcher level (e.g. how to best work over long distances, the benefits of setting up joint labs, the challenges of researcher exchange, etc.).

Question 4	**In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy?**
EU-India Spirit	• The EU – India Spirit project is finishing at the end of December 2012 so it is difficult to plan a longer term strategy beyond this and it hasn't been built into the legacy planning. • In terms of BIC, it is highly recommended to continue the collaboration in the countries and it has been a highly mutual benefit to have a number of the BIC members involved in the working groups of EU – India Spirit from the very start.
SYNCRONISER	• Both the EU – India Spirit and Synchroniser projects have had long term planning problems due to the periodic postponements over the last 2 years of the main DIT/EU meeting. However, this same situation resulted in this very topic of long term planning to be included as a key recommendation being made by the project. • For liaising with other projects like BIC, this is also included in a recommendation that the follow up work can be directly or indirectly supported by other projects and/or other initiatives or channels. • Recommendations on improving the longer term cooperation between the countries via other means apart from the projects as projects have limited duration. Some examples in discussions include: Executive bodies, collaboration with EU based eTPs, forming India based eTPs, which would be discussed in more detail later. This approach came up as the project recognises that research priorities have a strong tendency to change from year to year and we need something more everlasting. This is what is missing now and needs to be addressed as a matter of urgency.
EURASIAPAC	• This is an issue that was highlighted and attempted by EURASIAPAC also but it was found to be incredibly difficult as even though the project's overall goal was to consider the cooperation between the EU and the entire ASIAPAC region as a whole, in actual fact, there are considerable differences between the countries involved and these always need to be factored into the discussions and cooperation models. • Therefore, a bi-lateral approach is absolutely necessary even if there are some common cooperation issues across the regions.
SECFUNET	• As a perspective for longer term exploitation, as it is a STREP project carrying out RTD that will have eventual exploitation value, SECFUNET have several industrial partners. We feel it is the combination of the companies that are going to do their development of their products within the projects in order for the project to have a longer term impact for both the partners and the project in general. • Examples: Twinteq wants to develop its products in near-field communication, EtherTrust and Implementa work with secure elements like SIM cards, and Infineon wants to boost its trusted components for the future networks. More generally, SECFUNET wants to establish a sound security infrastructure that could be used by anyone.
FEED / AUS-ACCESS4EU/ SECAS	• The issue of sustainability has been a very important one especially within the FEED/BILAT projects where they have started working already with what we call 'multipliers' to impart our knowledge and key ideas around Australia. For other projects, it is an issue. What can projects do during their lifetime so the work can continue? BIC can talk to the SECAS project to see if there is anything BIC can do to help create this value. • BILAT project, one of which just finished are putting together significant workshops on specific topics. BIC can help develop the content and identify the individuals who can contribute to this workshop. This can lead to more lasting co-operations.

Question 5	What are your recommendations for improving effectiveness?
EU-India Spirit	• Greater emphasis should be placed on widening the net of participating international partners, so as to ensure that consortia are to the greatest extent possible comprised of partners with the most appropriate competencies and not the limited pool of potential partners who are already familiar with the FP7 structure and have previously participated in projects. • In this regard, projects promoting international cooperation such as BIC, India-Gate and its equivalents for the other BRIC countries are crucially important.
SYNCRONISER	• Recommendations include setting up collaboration with ETPs and xETP Initiatives in order to launch the Indian Technology Platform Channel. • Recommendation to involve Indian experts in the ISTAG related activities: Search on the mechanism which would allow Indian experts to get involved in the relevant bodies shaping priorities and strategic directions of the FP7/Horizon 2020. • Another recommendation is to establish a JWG Action Group for executing JWG outcome: Proposal to establish a JWG Action Group that could execute the JWG outcome. The form could be flexible (nomination of officers by EU and India, Support Project, Tenders, ...). The Action Group would be a sort of executive office to undertake the decisions adopted by the JWG. • Another recommendation is a proposition of a Co-funding Model for DIT: *Analyse Energy and Biotechnology co-funding programmes (between EC & DST).*
EURASIAPAC	• Recommendation to create more agile processes to define, launch and approve ICT cooperation initiatives. Many of the Asia-Pacific institutions involved in the projects, mentioned that the period of time to create, prepare and launch a cooperation initiative should be shorter as the view is that EC processes take too long. • Understanding legal and administrative EC funding processes are not always easy for non EC institutions; simplified methods may enhance international participation.
SECFUNET	• As recommendations for improving effectiveness, better agreements with non-European authorities, with, for instance, better definitions in the commitments, and better synchronisation. It could include previous negotiation for project management standards, as, for example, how to deal with deliverables, project review and evaluation. • The European Commission should help the targeted applicants to have knowledge of its rules and evaluation standards, using, for example, concertation meetings in the targeted countries.
FEED / AUS-ACCESS4EU/ SECAS	• Recommendation for better coordination and information-sharing between the variety of INCO activities across FP7. Consideration should be given to this issue in future INCO calls. • Recommendation that activities be developed to facilitate the integration of activities amongst all INCO projects, particularly so that findings can be directly implemented into ongoing projects (rather than waiting for final reports, which in any case are rarely read by other INCO actors).

Keynote Presentation: Identification of advantages for international cooperation – BIC review of research topics already identified.

In this keynote presentation, Professor Michel Riguidel presented the key technological challenges and themes already identified from within BIC thus far and previously within the INCO-Trust project[11]. These findings would be used as a benchmark later on during the discussions. During the presentation, a number of points were highlighted including:

- The need for the international ICT trust and security community to collaborate on identifying both strategic and tactical recommendations and priorities[12];
- Four main themes have been highlighted for INCO in trust and security:

Theme 1: Digital ecosystem security (Network & Information security) oriented to the System. This theme involves protection and trustworthiness with the strengthening of infrastructure resilience and control crisis management, crisis management (CIP), Security and cyber-defence (incl. against the asymmetric challenge). It also includes securing the current and Future Internet, network/system security, securing cloud computing for enterprises, Mobile security, security for mobile connectivity. In addition, it deals with policy properties such as variety, scalability, reciprocity, diversity, complexity and interoperability.

Theme 2: Trust & Privacy (including personal data protection) oriented to the Humans, Users. It incorporates topics related to responsibility (Identity versus Anonymity), designing identity and accountability management frameworks, international Privacy friendly authentication and reputation assurance. It includes measurement and negotiation, repositioning trust infrastructure at the same level as security infrastructure and trust management. Other areas under this theme include secrecy, dignity, sovereignty designing digital sovereignty and dignity, and new privacy infrastructures, reconsidering privacy spaces, storage function areas; and, last but not least, usability creating a Human oriented and usable security for citizens.

Theme 3: Global Framework & International alignment oriented to principles & governance. This includes properties such as interoperability, openness, transparency and secrecy; the preparation of policy frameworks to enable global collaboration and interoperability; Knowledge and International Data exchange architectures for cybersecurity; and socio-economic aspects including data policy, governance and secure, trustworthy and viable ecosystems.

Theme 4: Methodology, tools and technical challenges oriented to the tools. Under this theme is expertise sharing in science, technology & engineering; methods to support metrics and standardization issues; software security to enable the engineering of secure and trustworthy software and systems; protection of data and information with cryptology (digital signature, etc.) and other upstream topics including the initiation of green security.

In conclusion, Professor Riguidel presented a table showing a summary of all of the countries interactions to date, showing the programme/funding agency contacts, research level contacts and a sampling of the priority research themes for

+ INCO in trust and security. The full table can be found on the next page.

[11] http://www.inco-trust.eu/
[12] http://www.inco-trust.eu/media/D3_1_report.pdf

Summary of interactions between INCO countries to date, showing the programme/funding agency contacts, research level contacts and priority research themes.

Country	Program Level	Research level	Priority research themes for INCO
USA	National Science Foundation Department of Homeland Security	Massachusetts Institute of Technology, Rutgers University, University of California, San Diego, University of California, Davis, University of Illinois , Others	CyberSecurity/Privacy: Technology and Usage Issues Trustworthy International information exchange including data transfer and sharing, Security models for the Future Internet.
Canada	National Science & Eng. Res. Council	Univ. of New Brunswick, Ecole Polytechnique Montreal	Industry driven projects on trust, security and privacy.
Korea	Ministry of Knowledge Economy, KEIT	SoonChunHyang University, Seoul National Univ. Others	Internationalisation of data (identity management, privacy, end to end trust metrics, ...); Countermeasures against Massive DDoS; Security of Cloud computing e.g. Security of Smart Grid; Security compliance management and information security assurance; Security for VoIP and Mobile communications; Future Internet.
Japan	Japan Science and Technology Agency, CREST programme, MIC	NICT, University of Tokyo, Tokyo Inst. of Tech, JAIST, Others	Dependability, Security, Privacy and Trust of embedded systems
Australia	Australian Research Council (ARC)	CSIRO, NICTA, Macquarie University, Univ. of Sydney, IIS Partners, many others	Communications Security, Trust and Privacy in the Future Internet; Formal approaches for trust and security.; Sensor networks.
Brazil	CNPq (National Research council), FUNTEL, State Research foundations ITI (Instituto Nacional de Tecnologia da Informação)	Universidad de Brasilia, Univ. of Sao Paulo, CPqD Serasa Experian, Others TBD	Future Internet, Wireless Technologies: Security, Privacy, Trust over ad-hoc networks, Quantum crypto, ID management.
South Africa	SA Dept. of Science and Technology SA Technological Innovation Agency	Council for Scientific and Industrial Research (CSIR) – The Meraka Institute, SAP, University of Pretoria, University of Johannesburg, University of South Africa, others	Wireless Technologies: Security E-infrastructures security and trust
India	Dept. of Information Technology (DIT), ERNET, EuroSpirit India Support action (FP7)	India Institutes of Technology (IITs), India Institute of Science (IISc), Universities - Hyderabad, Pune, Anna amongst others).	Data Center Security, Data Privacy, ID card, ID management.

Panel Session 2. Human oriented approaches to security, privacy and trust and how international cooperation can benefit.

The panel session was supported by the following researchers/presentations engaged in the panel session topic areas.

- Karima Boudaoud, University of Nice, France: "Human oriented and usable security management"
- Ioannis Krontiris, Goethe University Frankfurt, Germany: "Privacy-respecting Authentication"
- John Zic, Commonwealth Scientific and Industrial Research Organisation (CSIRO) ICT Centre, Australia: "Human-oriented approaches to trust, security and privacy and the role of international cooperation"
- Jan Eloff, SAP Meraka UTD / SAP Research Pretoria, South Africa: "Collaboration with Africa / BRICS [13] for human oriented approaches to security, privacy and trust"
- Fabio Martinelli, Istituto di Informatica e Telematica - IIT; National Research Council - C.N.R., Italy: "Network of Excellence on Engineering Secure Future Internet Software Services and Systems"

Based on these presentations and discussions at the end of the session, a number of research items for Human oriented approaches to security and INCO were elaborated by the participants.

Multi-disciplinary International cooperation amongst all stakeholders

Security management should be more accessible to all kind of users and especially non-security experts evolving towards a more human oriented security management vision. To address today's security issues, we need to: 1) move from the traditional technology-only oriented design of security solutions towards user-centric security management and 2) bring together experts from psychology, social science, economics, legal, technologists and security experts to address security and privacy from a user point of view and put her/him at the heart of problem. From an international point of view, we need:

- Collaboration between security experts and experts from other disciplines (psychology, social science, etc.) and from different countries, in addition to collaboration with international government institutions.
- Organisation of **multidisciplinary** and **international workshops** targeting wide public.
- Set up of **multidisciplinary** and **international working groups** in targeted countries.
- Collaboration with international standardization organisations.

Technological research can also greatly benefit from international cooperation when it comes to taking into consideration the human factors in designing technologies. The following questions should be examined:

- How people perceive technological solutions and how that affects the adoptability of the corresponding technologies?

[13] BRICS group of countries: Brazil, Russia, India, China, and South Africa

- How to best explain to people the potentials and features of the existing solutions?
- How to best design user-interfaces to encourage usability and adoptability?

The answers to these questions will vary for different cultures and by opening up research beyond the European borders. It would give us a great insight in these aspects and eventually help us design better technology.

To address the above challenges, collaboration opportunities should allow EU-project consortia to open up and include various kinds of actors in the international setting: user communities, governmental organizations, regulatory authorities, and research institutes. A framework for enabling such collaboration should encourage joint working groups, organization of public events with experts from both sides and collaboration in standardization activities.

Privacy concerns in an international setting

Currently, European RTD projects engaged in privacy research e.g. ABC4Trust are building architectures based on privacy requirements collected within the European setting (e.g. Greece and Sweden). However, privacy concerns differ in the international setting. These differences can be attributed to differences in cultural values and perception of privacy, differences in the familiarity with Web privacy practices, or even differences in regulations. In that respect, international cooperation could greatly help exchanging views with other cultures, collect different application scenarios and requirements from other cultures and effectively broadening the perspective of privacy-ABC architecture.

Privacy and information utility are conflicting requirements. As the level of privacy increases, the level of information utility decreases. This is because as we hide more information to preserve privacy, the usefulness of the released information decreases. Local context and culture also influence what information should be regarded as private, and what information is considered as useful. It is, therefore, an open research question to be discussed how privacy relevant processing with and in countries like Brazil, India or South Africa can be handled within the European context.

- How are concepts like proportionality, unlinkability, minimal disclosure etc. being perceived in other countries?
- How other legal systems outside Europe can be affected by and have effects on Privacy-ABCs?
- How to ensure an optimum balance between privacy and utility, taking into account local contextual needs and preferences?

The establishment of "Path-finder" projects

Establishing international co-operation is important in two respects. First, it offers collaborating partners increased access to potential receptors for ideas and cross-fertilisation of markets. Second, by definition, it builds a larger research community, and this in turn can enable future, potentially larger/more complex collaborative projects in trust, security and privacy. However, alignment and commitment is required at multiple levels, from the individual researchers to their respective organisations and to the participating governments. This complexity should be in the first instance address in a methodical manner.

First, identifying partners who are like-minded and interested in addressing similar, relatively small scale but concrete problems with real needs (addressing the information management and process requirements of the bio-security communities in the EU and Australia was used as an example). These can be regarded as "Path-finder projects", which stand a good chance of being identified, proposed and finally supported by the

broader community. Of course, any such project requires funding and commitment from each partner, and in the case of international co-operation, agreements need to be in place between the respective governments to allow the collaboration to proceed. This is particularly significant, as success requires the respective governments' policies and budgets to agree to participate in the international collaboration.

Actions that can be taken to build international co-operation include the development and building of local expertise and a community of users through such "Path-finder projects". The success of these is then used to promote further development of international collaborations to the broader community. Path-finder projects may also be used to build up international linkages on an incremental level, with the community of users developing internal and external trust in each other to be able to successfully work together. As part of the community building, the development and engagement of partners in formal forums (such as the Internet of Things Forum, for example) is very important, with regular face-to-face meetings (both formal and informal) occurring during these fora. Once again, as a part of the community building exercise, it is important that each potential partner is able to support the work through assuring some funding and resourcing is set aside specifically for this activity. Good will is necessary, but not sufficient, for ensuring a successful collaboration or community building exercise.

Secure software-services development

Security concerns must be addressed from the very beginning in system analysis and design, thus contributing to reduce the amount of system and service vulnerabilities and enabling the systematic treatment of security needs through the engineering process. In light of the unique security requirements the Future Internet will expose, new results will be achieved by means of an integrated research, as to improve the necessary assurance level and to address risk and cost during the software development cycle in order to prioritize and manage investments. To address this, the NESSoS project research covers several main areas: A first set of activities represents the traditional early stages of (secure) software-services development: from secure requirements over architecture and design to the composition and/or programming of working solutions. These three activities interact to ensure the integration between the methods and techniques that are proposed and evaluated. In addition, NESSoS research programme adds two horizontal activities that span the service creation process: Both the security assurance programme and the programme on risk and cost aware SDLC will interact with each of the initial three activities, drive the requirements of these activities and leverage upon, even integrate their outcome; finally, notice that all 5 research activities mentioned above will be inspired and evaluated by their application in specific FI application scenarios.

NESSoS has set up a Networking and Liaison Board (NaLAB) for international cooperation mainly aimed at representatives of Technical WGs in the topics of the NoE. The creation of the NaLAB is in progress right now and it is explicitly meant to collect researchers from outside Europe. Several NESSoS components would benefit the international cooperation: the NESSoS Common Body of Knowledge; the engineering tool workbench; open competition, research activities. NESSoS plans to identify the main stakeholders in the NESSoS topics world-wide and create connections among researchers/WGs especially using the NESSoS internal mobility programme. Some possible cooperation topics include comparison of tools and techniques; usage control of disseminated data; and focus on SLA with protection of information, possibly in cooperation with other projects as ASSERT4SOA and ANIKETOS.

Research and technology outputs

International collaboration should be based on context awareness. Traditional user-centred approaches for technology development do not consider cultural and contextual needs. This results in deriving user requirements that do not give a correct view of the real needs, leading to technology shortcomings. Examples of contextual factors that should be considered include:

- Cultural norms and tradition
- Appropriate tactics for community entry and engagement
- Appropriate research techniques that involve the users and communities
- Appropriate needs assessment practices
- Infrastructure capacity of the targeted community
- Solution maintenance and life-cycle costs

The technology developed should be advantageous from the viewpoint of the local users. Therefore, technology development should be based on an understanding of the real requirements as well as an understanding how existing technology can be adapted to meet contextual requirements. Lastly, solutions developed should be relevant to local users, their needs and the available infrastructure.

Enhanced Collaboration methodology

European funding opportunities (e.g. Framework Programmes) should encourage collaboration with partners in Africa / BRICS. European Project consortia should be more open to accept African / BRICS partners, which should not just provide use cases, but should also develop and adapt technology for their local needs.

We also recommend the following three areas of research topics for international cooperation with regards to security, privacy and trust.

International approaches to usable security

In Africa / BRICS, mobile phones are the most common ICT device used. Typical users of such devices may not fully understand the security vulnerabilities the use of these devices pose. Security configuration of such devices for most users will therefore be a challenge. Therefore, the research challenge to address with regards to facilitating usable security is: How to quantitatively analyze and design appropriate user interfaces for mobile devices to enable a typical user to make informed decisions about different security settings?

International approaches to Trust

In African communities, trust is influenced by social network position. Social position governs activities within rural communities. For example, the chief of a village can influence business collaborations. Rural communities, therefore, require a different approach to business due to unique social structures, social norms, and traditions. Therefore, the research challenge to address with regards to trust is: How to ensure that trust management takes into account concepts relevant to the target context?

In conclusion, by facilitating international cooperation to provide human oriented approaches to security, privacy and trust, we believe that both European and African / BRICS partners will benefit. The great potential of the Africa / BRICS market can be exploited, while at the same time, these markets will be provided with solutions that are appropriate, affordable and contextually-relevant.

Panel Session 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits.

The panel session was supported by the following researchers/presentations engaged in the panel session topic areas.

- John C. Mallery, Massachusetts Institute of Technology, USA, “International Data Exchange and A Trustworthy Host: Focal Areas For International Collaboration In Research And Education”
- Bart Preneel, Katholieke Universiteit Leuven, Belgium. “International Cooperation in Cryptology”
- Abhishek Sharma, NetEdge Tele-Solutions (P) Ltd., India, “Trust and Security for Mobile Communications Services”
- Raznan Gavrila, European Network and Information Security Agency (ENISA), Greece, “EU-US joint CIIP Exercise, Cyber Atlantic 2011”

Based on these presentations and discussions at the end of the session, a number of research items for Digital ecosystems network and information security and international cooperation were elaborated by the participants.

International Data Exchange architecture for Cybersecurity needed

A key message is the acknowledgement that international cooperation in Cybersecurity is nascent and a more global approach is urgently needed because there is ultimately just one, single, global information environment, consisting of the interdependent networks of information technology infrastructures, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers. It is essential that we have the ability to conduct comprehensive intelligence collection and evaluation on any developing situation that threatens our cyberspace activity, followed by near-simultaneous processing, exploiting and disseminating of the information. This depends on collaboration, data exchange and sharing (and also knowledge sharing) between countries. We need comprehensive research towards international *intelligence*, *surveillance*, and *reconnaissance* (ISR) in the cyberspace domain.

The challenges can be characterized as follows:

- **Problem:** Attackers can replay attacks across different countries without rapid international learning to defend against attacker innovations
- **Benefits:** International collaboration and coordination can rapidly reduce defensive gaps across the OECD and build crisis-response capacities
- **Leverage:** Bias work factors in favour of defence and against cyber attack
- **Approach:** Exchange data related to cyber crime, attack patterns and best defence practices
- **Research:** Motivate technical research via needs of realistic data sharing scenarios

An architecture for international and cross-sector sharing of cyber threat and attack data will ensure a more effective collective cyber defense than countries, sectors or organizations might otherwise achieve individually. A strawman architecture for an

international data exchange framework was presented that would enable the international cybersecurity community to securely carry out cyber data sharing and collaborative analysis as follows:

- Build shared awareness and understanding of cyber phenomena across countries
  - Employ shared data collection methodologies
  - Integrate measurements of phenomena across borders
  - Focus early on cyber crime and economic incentives
- Create comparable transnational data sets
  - Capture cyber breaches, attack patterns, best practices, defensive coordination
  - Include aggregate data on crime, black markets, economics, state-state interactions, long-term transformations
- Field a cyber data sharing framework that helps countries to:
  - Collect cyber data for compatible sharing
  - Fuse data to create common situational awareness
  - Manage national legal impediments to sharing via derived or aggregate data or by recommending harmonization steps
  - Exchange derived data in real time
  - Provide mechanisms for controlled drill down needed for law enforcement, advanced persistent threats (APT) or cyber emergencies
- Build shared collection, fusion, analysis, and response capabilities.

Open source trustworthy host platform for collaborative research and education

An open-source trustworthy host platform for collaborative research and education is required to address the following challenges:

- Problem: Attackers are subverting legacy architectures, which are inadequate for current threats
- Benefits: Development and evolution of a clean-slate trustworthy host will:
  - Create reference host architecture for computing, routers, cloud, embedded, wireless
  - Integrate best information assurance (IA) engineering from the open literature
  - Provide a reference paradigm for cumulative research and education
  - Drive higher assurance for open source and commercial software
- Leverage: Raise work factors required to compromise commodity hosts
  - Eliminate remote access penetration vectors
  - Prevent privilege escalation
  - Manage information leakage
  - Verify tool chain and resulting software
  - Rapidly detect and remediate flaws or breaches
- Approach: Pool research efforts across OECD countries to create and evolve a shared host platform reflecting best IA engineering practices
- Research: Motivate technical research via needs of an existing and readily-accessible free implementation.

International Cooperation in Cryptology

With respect to cryptology research on an international level, there is a need for integrated research and policy levels between the EU and counterparts around the world, and collaborative research is required across academia, industry and government

agencies. To build an international strategy for INCO in cryptology, there is a need for collaboration on cryptographic algorithms with the establishment of open competitions with shared governance; effective standardization and continual updates of a key lengths and parameters document register (management of standards). Collaboration also should take place on cryptographic protocols motivated by distribution of trust and privacy (key component in privacy by design) and joint research also need to occur in these areas. We can be more effective by avoiding duplication and increasing impact on both the technology and policy levels. During the discussions, it was also pointed out that for the International open source trustworthy host platform presented, a common cryptographic software stack is a requirement agreed by everyone.

Mobile Security of Software Services

In future, significant confidential operations such as banking transactions and mail exchanging will take place largely from mobile devices. In these cases, it is vital to protect the customer data and applications from attack. Since the Smartphone/Mobile penetration is increasing globally, it makes a lot of sense that large regions, particularly regions like Europe and India/ Asia collaborate closely for the Research & Industrial Developments. Many companies are already putting effort in developing their goals and strategies for securing mobile data and applications.

Furthermore, it is critical to understand what there is to lose – the global vulnerability – before a major mobile security breach occurs. The ultimate goal is not about completely eliminating mobile security risks but rather having the proper systems in place to minimize the impact when breaches occur. Well thought out international controls involving the proper security technologies combined with the proper documentation and business processes are essential.

Mobile Security coverage of international technological research areas should include access, transmission, switching/ distribution, and storage. The international research communities should also focus on other related areas including policy, standards, tools, regulatory controls & test beds. There is already an Indo-Australia project covering international cooperation on mobile / wireless threats. It was suggested that this project should be examined and whether it could also include an EU element to it.

It was also suggested that the level of Industry participation may be increased from where it is and a higher mix of SMEs and large corporate with research bodies would be ideal. Towards this, BIC can be a key player in ensuring this critical coordination.

Joint exercises for Cybersecurity planning and improvement across borders

A presentation was made about the joint EU-US Joint CIIP exercise, called Cyber Atlantic 2011, co-organised by the European Union's cyber security agency, ENISA[14] and the Department of Homeland Security (DHS) in the USA. The first joint exercise was held on 3rd November 2011 and was set up as a centralised table-top exercise in which over 20 countries were involved (17 countries played).

Cyber Atlantic 2011 was an exploratory exercise with the following objectives:

- Explore and identify issues in order to improve the way in which EU Member States would engage with the US during cyber crisis management activities;

[14] http://www.enisa.europa.eu/

- Explore and identify issues in order to improve the way in which the US would engage with the EU Member States during their cyber crisis management activities, using the appropriate US procedures;
- Exchange good practices on the respective approaches to international cooperation in the event of cyber crises, as a first step towards effective collaboration.

There was a two part scenario used for the scenario:

1. Advanced Persistent Threat (APT) scenario with a hacker group, “Infamous”, *exfiltrated* sensitive documents from EU and US – ‘Euroleaks’ web site and
2. Supervisory Control and Data Acquisition (SCADA) scenario highlighting vulnerabilities leading to backdoors (and failures) on Programmable Logic Controllers of power generation equipment.

The initial lessons learned (results ongoing) from Cyber Atlantic 2011 were:

- Mechanisms/structures for cross-border cooperation do exist; however, each country needs awareness of all communications options ;
- There is a further need to exchange Standard Operating Procedures (SOPs), training, exercises;
- Exercises need increased participation from all three areas: Technological, Law Enforcement, Policy/Political;
- Single Point of Contact in EU for US would help but is not compulsory;
- More exercises/workshops are needed!

CONCLUSIONS AND NEXT STEPS

A final dedicated session on the future planning and operations was designed to set out where the BIC project and the community will go in the next period, and to discuss what the trust and security research community would need in terms of support for these activities.

The chairs from the technical sessions started the session with a short summary of the recommendations made within their panel sessions.

Session 1: Opening session and panel of INCO projects.

James Clarke presented the recommendations from session 1:

- **Implement technical platforms or longer term initiatives apart from projects alone** (something lasting and that can help cooperation between multi-countries
- **BIC should talk to SECAS** partners about their **experiences** (see if their methodologies and approaches would be of use to BIC)
- **BIC** may help to develop **content** for upcoming **BILAT** workshops.
- **Efforts should be made to dramatically increase** visibility of RTD programmes.
- In addition to Working groups, look at possibility of setting up permanent **Action Groups** to improve collaborations (currently recommendations are highlighted but nothing is implemented, which leads to frustration amongst the key stakeholders)
- It is good to **take stock** of current INCO projects, to provide greater clarity on what important topics we want to focus on.
- **Bi-lateral** approach and initiatives are still very important and necessary, even when trying to establish a parallel **truly global community**.
- **Collaborations** between various countries will be at **different levels**, and over time could improve taking **ideas or building on experiences** from other countries established collaborations. **Patience is required**.
- **There is a need to co-ordinate** activities of INCO across **all areas (as an umbrella)**, to get a bigger picture of what's going on.

Session 2: Human Oriented Approaches to Security.

Priscila Solis Barretto presented the recommendations from session 2:

- It is important to consider that we are in a globally connected world with **different generations** of users.
- We need **the adaptation of experts** to what users need, not the contrary (**user centricity**).
- **Multidisciplinary workshops and building international working groups** is necessary, e.g. multi-disciplinary experts on human oriented security.
- Build **local expertise** and then establish key **international linkages**: local expertise based on local demands and then participate together in coordinated calls for formal cooperation.

- Development of solutions that take into account the **different social structures** (BRICs, developing countries, etc.).
- **Availability of Funding mechanisms:** good will is important but there must be a political work between agencies in the different countries to be successful.
- **Cooperation activities** to compare tools and techniques, avoid duplication, validation of case studies and shared testbeds **in different environments** and **cultures**.

Session 3: Digital ecosystem and network information security.

John C. Mallery presented the recommendations from session 3:

- As a community, we should pick the highest priority topics in network security and develop an **overall international R&D plan for policy makers.**
- Focus on **mutually beneficial topics** for **international cooperation:**
  - International data exchange architecture for cybersecurity;
  - Open source trustworthy host platform for collaborative research and education;
  - Cryptology;
  - Mobile Security of Software Services;
  - Joint exercises related to cybersecurity
- **Identify** R&D expertise in the relevant fields.
- Form a **planning group to get maximum impact.**
- Cryptography - Like to have **world scale competition**
- **Ecrypt II roadmap for next 10 years –** crypto for cloud computing/Internet of Things
- In the US, NIST drives crypto policies, in Asia, crypto policy is by country, **Europe joint research policy by country.**
- **We Need to bridge gap between research interaction with policy/**
- Algorithms – **More open competitions** with shared governance
- In order to foster Joint research – we need to **go beyond meetings.**
- Mobile applications – e.g. mobile health care, data storage – **threats lead to wider implications.**
- **Focus on** policy framework, build prototypes for DDOS, secure new services, mobile security.
- **Lessons** taken from the **EU – US Cyber exercise** should be taken on board and more of these kinds of exercises should be organised.
- In Japan, there is a large scale **International Project on Cybersecurity**. It should be checked as to the feasibility of forming co-operations around this.

BIC Working / Action Groups

Michel Riguidel presented a summary of the work items in which working groups would be established and supported by BIC. It would be the intention of the project to additionally form longer term action groups based on the successful outcomes of these working groups.

WG1. Human oriented /citizen security focus, which as a starting point would focus on the following topics:

- End to end trust assurance for users;
- Usability / user interface designs;
- Addressing prediction, validation and enforcement mechanisms needs and requirements;
- Putting users in control of their data and information;
- Taking into account cultural aspects.

WG2. Network Information security / Cybersecurity, which would focus on:

- International data exchange architecture for cybersecurity;
- Open source trustworthy host platform for collaborative research and education;
- Cryptology;
- Mobile Security of Software Services;
- Joint exercises related to cybersecurity.

WG3. Programme /funding focus/ identify community, which would focus on:

  - Identifying stakeholders (contacts in programme management and research communities);
  - R&D Planning/R&D experts of excellence;
  - Raising programme visibility.

If interested to participate to these working groups, please contact **michel.riguidel@telecom-paristech.fr** and **jclarke@tssg.org**

Finally, in order to increase the networking potential of the international trust and security community, an international research network portal is being set up by the BIC project to enable a one stop shop for trust and security researchers from all countries. The information will be accessible and searchable by country, research topics, projects, and other criteria. The portal will also provide access to researchers other well established sites – LinkedIn, personal web sites, blogs, ..A number of people from the International research community have already volunteered to participate in the BIC portal in the first draft. Additional volunteers are welcomed to **jclarke@tssg.org.** An example screen shot is shown in Figure 1:

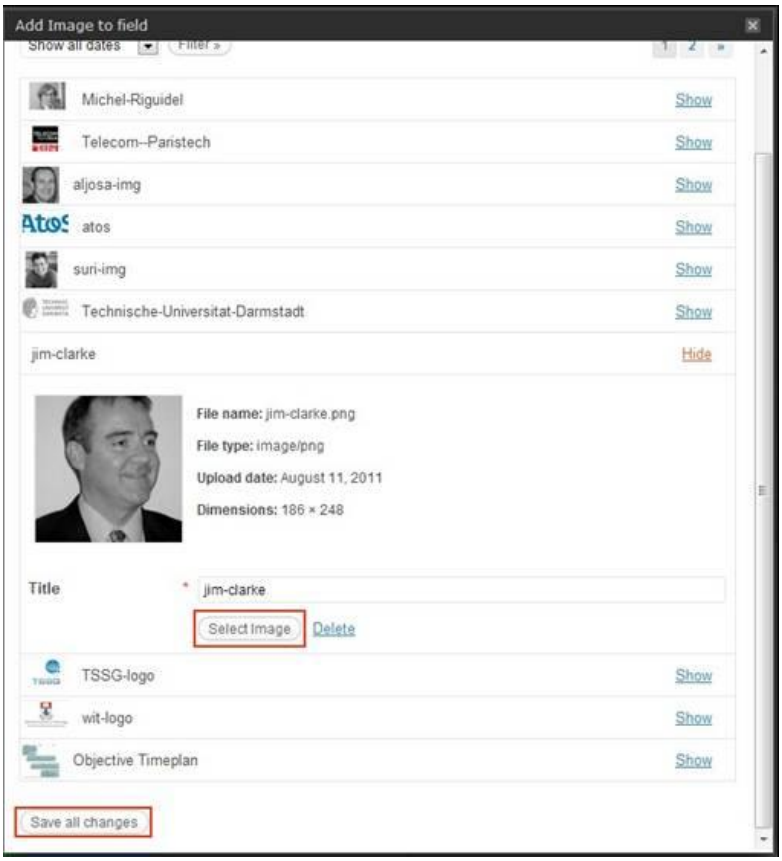

Figure 1. BIC Research network portal – data entry page

Acknowledgments

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[15] http://cordis.europa.eu/fp7/ict/security/

Annex I. List of registered attendees

		BIC Annual Forum Registrants as of 28th November 2011	
Last Name	**First Name**	**Organisation**	**Country**
Aguilar	Virginia	Nato	Belgium
Ancans	Alvis	European Commission	Belgium
Arsene	Vlad	Vector Business Consulting (RO)	Romania
Barreto	Priscila Solis	University of Brasilia	Brazil
Boudaoud	Karima	University of Nice	France
Bus	Jacques	DigiTrust.EU	Netherlands
Clarke	James	Waterford Institute of Technology	Ireland
Cleary	Frances	Waterford Institute of Technology	Ireland
D'Antonio	Salvatore	University of Naples Parthenope	Italy
Eloff	Jan	SAP Meraka UTD & University of Pretoria	South Africa
Faletic	Rado	Forum for European-Australian Science and Technology cooperation	Australia
Gavrila	Razvan	European Network and information Security Agency (ENISA)	Greece
Hishinuma	Hiroyuki	National Institute of Information and Communications Technology (NICT)	France
Hoepman	Jaap-Henk	TNO, Groningen & Radboud University Nijmegen	Netherlands
Howker	Keith	Waterford Institute of Technology	Ireland
Ishigami	Megumi	Fraunhofer IFF	Japan
Kalbe	Gustav	European Commission	Belgium
Kar	Ashok	Infra Technologies	France
Kechadi	Tahar	University College Dublin, Ireland	Ireland
Krontiris	Ioannis	Goethe University Frankfurt	Germany
Legiša	Katja	TESEO Sprl	Belgium
Levitt	Karl	University of California, Davis	United States
Mallery	John C.	Massachusetts Institute of Technology	United States
Malone	Paul	Waterford Institute of Technology	Ireland
Martinelli	Fabio	National Research Council - C.N.R.	Italy
Massonet	Philippe	CETIC	Belgium
McManus	Gary	Waterford Institute of Technology	Ireland
Menevidis	Aki Zaharya	Fraunhofer IPK	Japan
Morales	Stephanie	Sigma Orionis	France
Morgan	Gary	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
NIVOLIANITOU	Zoe	NCSR 'DEMOKRITOS'	Greece
OLIMID	Cristian	European Commission	Belgium
Pasic	Aljosa	AToS	Spain
Pasin	Marcelo	University of Lisbon - FCUL	Portugal
Preneel	Bart	Katholieke Universiteit Leuven - COSIC	Belgium
Riguidel	Michel	Telecom-ParisTech, ENST	France
Sanchez	Fernando Kraus Sanchez	AToS	Spain
Sekiguchi	Satoshi	AIST	Japan
Sharma	Abhishek	NetEdge TeleSolutions Pvt. Ltd.	India
Skellern	David	Macquarie University	Australia
Sora	Adrian	Vector Business Consulting (RO)	Romania
Torrenti	Camille	Sigma Orionis	France
Tsagalidis	Ross W.	FMKE	Sweden
Williamson	Tom	ERCIM EEIG	France
Yuncken	Elizabeth	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia
Zic	John	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia

Annex II. Summary of presentations made at the Forum

The Annual Forum Welcome and Opening – James Clarke

Speaker: James Clarke, Waterford Institute of Technology, TSSG, Ireland

Since January 2011, James Clarke is Project Coordinator of a European Framework Programme 7 Co-ordination action entitled BIC, which stands for Building International Cooperation for Trustworthy ICT: Security, Privacy and Trust in Global Networks & Services. BIC will engage the European Union trust and programme management (funding organizations) and research communities with their peers in Brazil, India and South Africa and enable the collaboration with research communities in trust and security already established in the US, Australia, Japan, Korea and Canada established in the recently concluded INCO-Trust project that Mr. Clarke also coordinated from 2008 - 2010. In addition, Mr. Clarke is actively involved in the research community, having served in various international conference committees as organizing, technical and programme committee member.

Mr. Clarke opened the annual forum by describing the overall mission and objectives of the BIC annual forum, which was not to present current projects but instead, to bring together the wider and global trust and security communities to explore how best to organise future International cooperation (INCO) research activities and its supporting programmes, together with the identification of the key challenges, issues and priorities to tackle together. Mr. Clarke explained how the agenda was formed in order to cover the core objectives of the Annual Forum.

Objective 1. *Identification of the technological challenges that really need and could be tackled in common between the countries so they can be elaborated clearly with the policy makers in the respective countries as a way forward;*

This objective was being covered by a presentation on Identification of advantages for international cooperation and the trust and security technological challenges – BIC review of research topics already identified; and panel session 2. Human oriented approaches to security, privacy and trust and how international cooperation can benefit; and panel session 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits.

Objective 2. *Highlighting the current bi-lateral (and potentially overlapping) country to country cooperation(s) into a more comprehensive unified global cooperation;*

This objective was being covered by the opening session on Setting the scene with DG INFSO views on International Cooperation and Panel session 1. Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects.

Objective 3. *From the insights of the researchers and programme managers, to explore how best to organise future International cooperation (INCO) research activities and its supporting programmes, together with the key challenges, issues and priorities.*

This objective was being covered by Panel session 1. Other INCO-related projects with direct or indirect linkages to ICT trust and security aspects; and panel session 2. Human oriented approaches to security, privacy and trust and how international cooperation can benefit; and panel session and 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits; and the closing session on planning and operations.

Setting the scene with European Commission DG-INFSO views on INCO

International cooperation in the ICT theme of the FP7 programme – Alvis Ancans

Speaker: Alvis Ancans is in the Information Society and Media Directorate General (DG INFSO) of the European Commission. He is an International relations officer within the Unit A2, International Relations.

Alvis Ancans outlined his talk, which would focus on international cooperation in the ICT theme in the FP7 programme in which there is currently a strong emphasis on international cooperation.

In the FP7 research programme, it operates on a basis of calls for proposals in which proposals are submitted to address these and the next call (number 8) has a deadline of 17th January 2012. The following table highlights the objectives currently open.

Challenge	Objectives for Call 8 (deadline 17 January 2012)
Challenge 1: Pervasive and Trusted Network and Service Infrastructures	ICT 2011.1.1 Future Networks ICT 2011.1.2 Cloud Computing, Internet of Services and Advanced Software Engineering ICT 2011.1.4 Trustworthy ICT ICT 20011.1.6 Future Internet Research and Experimentation (FIRE)
Challenge 3: Alternative Paths to Components and Systems	ICT 2011.3.1 Very Advanced NanoelectronicComponents: Design, Engineering, Technology and Manufacturability ICT 2011.3.2 Smart Components and Smart Systems Integration ICT 2011.3.5 Core and Disruptive Photonic Technologies
Challenge 4: Technologies for Digital Content and Languages	ICT 2011.4.4 Intelligent Information Management
Challenge 6: ICT for a Low Carbon Economy	ICT 2011.6.1 Smart Energy Grids ICT 2011.6.3 ICT for Efficient water Resources Management ICT 2011.6.7 Cooperative Systems for Energy Efficient and Sustainable Mobility
Challenge 8: ICT for Learning and Access to Cultural Resources	ICT 2011.8.1 Technology-Enhanced Learning
Future and Emerging Technologies	ICT 2011.9.6 FET Proactive: Unconventional Computation (UCOMP) ICT 2011.9.7 FET Proactive: Dynamics of Multi-Level Complex Systems ICT 2011.9.8 FET Proactive: Minimising Energy Consumption of Computing to the Limit (MINECC) ICT 2011.9.12 Coordinating Communities, Identifying New Research Topics for FET Proactive Initiatives… ICT 2011.9.14 Science of Global Systems
Horizontal Actions	ICT 2011.11.1 Pre-Commercial Procurement Actions

The next Call 9 will open in January 2012 and close in April 2012. There will be a specific objective on international cooperation ICT 2011.10.3 called International Partnership Building and Support to Dialogues (Enable Partnership Building in Low and Middle Income Countries, incl. Africa)

The Commission recognises the need to cooperate internationally, with the following objectives:

- To jointly develop ICT solutions to major global societal challenges;
- To jointly respond to major global technological challenges by developing interoperable solutions and standards;
- To improve scientific and technological cooperation for mutual benefit.

A number of general points were raised about the supports related to international cooperation, including international partners welcome in all Challenges and Objectives and there is an eligibility criteria that needs to be satisfied including a minimum of 3 different EU Member States or Associated Countries and beyond this minimum, all non-EU/non-AC countries can participate. For targeted openings in which countries are specifically mentioned within the objectives, the participation of third countries is particularly encouraged. There have been some horizontal actions on international cooperation including coordinated calls with Brazil and with Russia and related to international partnership building and support to dialogues. A number of past, current and future targeted open calls were highlighted on a country by country basis.

Japan

Calls 7, call 8 and call 9 had targeted calls with Japan in the following objectives:

Call 7: deadline passed

- Objective ICT-2011.1.3 Internet-connected Objects,
- Objective ICT-2011.3.6 Flexible, Organic and Large Electronics and Photonics.
- Objective ICT-2011.5.2 Virtual Physiological Human

Call 8: deadline 17 January 2012

- Objective ICT-2011.1.1 Future Networks,
- Objective ICT-2011.1.2 Cloud Computing, Internet of Services and Advanced Software Engineering,
- Objective ICT-2011.3.1 Very Advanced Nanoelectronic Components,
- Objective ICT-2011 9.6 FET Proactive: Unconventional Computation (UCOMP).

Call 9: deadline April 2012

- Objective ICT-2011.5.2 Virtual Physiological Human

Brazil

There already was a first EU-Brazil coordinated call announced in September 2010 at the ICT 2010 event, Digitally Driven with a joint funding of €10 million (€5 million each side). After evaluation and negotiation, five projects started in May-Sept 2011 with average project durations of 24-30 months. The projects being funded are in the areas of Future Internet Experimental Facilities and Security, Microelectronics and Micro-Systems, Networked Monitoring and Control, and e-Infrastructures. In November 2011, an agreement was reached between the European Commission and the Brazilian government to launch a new EU-Brazil coordinated call with a joint funding of €10 million. The Call for Proposals will focus on such areas as cloud computing for science, sustainable technologies for smart cities, smart platforms for a smarter society, and hybrid broadcast-broadband TV applications and services. Following evaluation and negotiation, projects are expected to kick-off in 2013.

Russia

The first coordinated call under the FP7 ICT 2011-2012 Work Programme was agreed with the Russian Ministry of Education and Science. The focus was on the following areas: Programming Models and Runtime Support, Performance Analysis Tools for High-Performance Computing Optimisation, Scalability and Porting of Codes. As a result, two EU-Russian coordinated projects started in Feb 2011. Both are separate EU and Russian projects linked through a coordination agreement: 1. HOPSA (HOlistic Performance System Analysis); duration 24 months; funding: €1.4 million from the EU side and 20 million roubles from the Russian side; 2. APOS (Application Performance Optimisation and Scalability); duration 24 months; funding: €1.2 million from the EU side and 19 million roubles from the Russian side.

What does the future hold for International Cooperation?

The work programme for 2013 is currently under preparation and is expected to be published in the first half of 2012. It is expected that there will be coordinated Calls with Brazil and Russia (currently under discussion; topics: high-performance computing and semantic web) and the possibility of coordinated Calls with Australia, South Africa, Mexico and Japan are in the pipeline – more likely in 2013 or later. On the international cooperation theme (CSA), there is an expected budget increase (up to €7 million) and a comprehensive geographic coverage.

On the question of who can participate:

- Three independent legal entities from three different EU Member States or Associated countries (presently: Albania (AL), Bosnia-Herzegovina (BA), Croatia (HR), the Faroes (FO), Iceland (IS), Israel (IL), Liechtenstein (LI), FYR of Macedonia (MK), Montenegro (ME), Norway (NO), Serbia (SR), Switzerland (CH), Turkey (TR));
- EEIGs composed of members that meet the criteria above can participate;
- International (intergovernmental) organisations;
- participants from third countries **if in addition to minima;**
- Collaborative projects for specific cooperation actions (SICA) dedicated to international cooperation partner countries (ICPC): minimum 4 participants of which 2 in different MS or AC and 2 in different ICPC countries unless otherwise specified ;
- Support actions; no restrictions.

The talk concluded with a summary of the eligibility for community funding:

- Legal entities from MS and AC or created under Community law (and the JRC);
- International European interest organisations;
- Legal entities established in international cooperation partner countries (ICPC-INCO);
- Legal entities established in 3rd countries other than ICPC-INCO, if provided for in SP or WP; or if essential for carrying out action; or if funding is provided for in a bilateral agreement between Community and that country.

Panel Session 1. Other INCO-Related projects with direct or indirect linkages to ICT trust and security

EU-India Spirit project[16] – Tom Williamson

Speaker: Tom Williamson (TW), European Research Consortium for Informatics and Mathematics, European Economic Interest Grouping) ERCIM EEIG. He is the project co-Ordinator of Euro-India SPIRIT project.

1. *How does your project contribute to International cooperation and trust and security?*

The EU – India Spirit project seeks to build consensus between the EU and India on areas of collaborative research across the ICT spectrum and the area of trust and security is a central part of its work. We're in the process of producing a final set of recommendations with some targeted areas of suggested international cooperation in this area; including but not limited to: usable security in the mobile world, large scale data security and ID management.

2. What are the benefits and expected impact of your project brought on by international cooperation?

From the EU – India Spirit project perspective, obviously it's our hope that the recommendations produced will be further taken up and implemented by the respective governments, difficulties in finalising arrangements for a Joint Working Group (JWG) notwithstanding. In terms of the benefits accruing to the partners as a result of participation in an international cooperation action, the Indian partners have increased visibility and familiarity with Commission-funded projects, in particular, and EC processes in general as well as strong relationships with consortium members and related entities. Both sets of partners obviously benefited enormously from cross-cultural experiences in terms of travel, working norms and approaches to networking over the course of the project.

3. International cooperation is not an easy task and required a lot of patience and time. What are the issues encountered and how did you address them?

Issues can be wide-ranging. Difficulties in scheduling face-to-face meetings are obviously magnified in international cooperation projects with such significant scale to contend with and as a coordinator, it's very important that you find ways to work around this through regular teleconferences etc. Time and distance are factors in terms of travel and events require careful scheduling further in advance. Especially in the model of project that I'm involved in, where you need the time not only of your consortium members but also external experts, significant advance notice is required.

[16] http://www.euroindia-ict.org/

4. In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy.

The EU – India Spirit project is finishing at the end of December 2012 so it is difficult to plan a longer term strategy beyond this and it hasn't been built into the legacy planning. In terms of BIC, it is highly recommended to continue the collaboration in the countries and it has been a highly mutual benefit to have a number of the BIC members involved in the working groups of EU – India Spirit from the very start.

5. What are your recommendations for improving effectiveness?

The day to day working of the SPIRIT project has not been as radically different from exclusively EU-based projects as might have been initially expected. I would say that in terms of improving effectiveness, greater emphasis should be placed on widening the net of participating international partners, so as to ensure that consortia are to the greatest extent possible comprised of partners with the most appropriate competencies and not the limited pool of potential partners who are already familiar with the FP7 structure and have previously participated in projects. In this regard, projects promoting international cooperation such as BIC, India-Gate and its equivalents for the other BRIC countries are crucially important.

Synchroniser project[17] – Katja Legiša

Speaker: Katja Legiša is an Italian consultant with seven years of experience in international and EU project management, promotion and support of research and development activities. Her professional and educational background is in Project Management, Public Relations and Communication. Since 2006 she is coordinating EU-India projects. She is now the Project Coordinator of the SYNCRONISER project.

1. *How does your project contribute to International cooperation and trust and security?*

Synchroniser boosts the impact of the policy dialogue by identifying EU-India research priority areas and recommendations on how to improve the cooperation. The identified areas, the recommendations together with the action plan is then delivered to the DIT (India's Department of Information Technology) and EC. The method used by the project is to organize policy dialogue meetings with high level EU – India experts and a foresight exercise on medium and long term research trends and perspectives: Delphi study on technology priorities in ICT R&D identified by thirty visionaries of India. The study aim at understanding what India might prefer to invest in, in ICT R&D in the next 2, 5, 10 years. One of the identified research priorities is also *Security, Privacy & Monitoring* (data management system, secure storage system, person identification and tracking systems; for healthcare, governance and education).

2. What are the benefits and expected impact of your project brought on by international cooperation?

The Joint Working Group (JWG) on ICT was established in 2004 between European Union and the Government of India's Department of Information Technology (DIT). The JWG is mainly comprised of policy-makers and concerned ministers from both regions including very few researchers and stakeholders. The JWG meetings are inter-governmental, closed-door meetings which follow a top-down approach. In this scenario, actors from the two regions never meet in a common platform to discuss JOINT research Priorities. SYNCHRONISER aims to fill this gap by bringing together the 'gurus' of the research and stakeholder communities of both regions on a common platform as "analyzers of these Joint research priority areas", thus providing a more **practical, consultation approach** to boost the impact of policy dialogues on Joint research priority areas, Synchroniser uses a **bottom up approach** in which the project provides the EC with the evidence, on which they can make policy decisions.

3. International cooperation is not an easy task and required a lot of patience and time. What are the issues encountered and how did you address them?

The difference of viewing time and deadlines is different between the two countries, which brings to difficulties in carrying out joint activities. Time can be viewed in the form of a line or in the form of a circle: For Indians: a beginning is

[17] http://euroindiaresearch.org/synchroniser/

not the beginning and the end the end, but a continual cycle of beginnings and endings. The past, present and future, are circular, interconnected, that is why time is less important. The arrow of the timeline gives irreversible processes; it has a start and an end. The past present and future are not necessary connected. The difference between Formal and Informal communications plays an important role in getting things done and especially when passing a message across.

4. In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy.

Both the EU – India Spirit and Synchroniser projects have had long term planning problems due to the periodic postponements over the last 2 years of the main DIT/EU meeting. However, this same situation resulted in this very topic of long term planning to be included as a key recommendation being made by the project. For liaising with other projects like BIC, this is also included in a recommendation that the follow up work can be directly or indirectly supported by other projects and/or other initiatives or channels. As part of the recommendations, an action group is being proposed to continue after the project. In addition, it should be noted that the Synchroniser project are not just trying to find the research topics for collaboration but it is also concentrating on recommendations on how to improve the longer term cooperation between the countries e.g. via other means apart from the projects something that could stay in place for a longer period of time. Some examples in discussions include: Executive bodies, collaboration with EU based eTPs, forming India based eTPs, which would be discussed in more detail later. This approach came up as the project recognises that research priorities have a strong tendency to change from year to year and we need something more everlasting. This is what is missing now and needs to be addressed as a matter of urgency.

5. What are your recommendations for improving effectiveness?

Recommendations include setting up **collaboration with ETPs and xETP Initiatives** in order to launch the Indian Technology Platform Channel. This tool would be horizontal to All ICT related ETPs in order to bring the Indian flavor to the debates within the ETPs and the xETP Innovation initiative. It is also recommended to **involve Indian experts in the ISTAG** related activities: Search on the mechanism which would allow Indian experts to get involved in the relevant bodies shaping priorities and strategic directions of the FP7/Horizon 2020. Another recommendation is to establish a JWG Action Group for executing JWG outcome: Proposal to establish a JWG **Action Group** that could execute the JWG outcome. The form could be flexible (nomination of officers by EU and India, Support Project, Tenders, ...). The Action Group would be a sort of executive office to undertake the decisions adopted by the JWG. Another recommendation is a proposition of **a Co-funding Model** for DIT: *Analyse Energy and Biotechnology co-funding programmes (between EC & DST).*

EURASIAPAC project[18] – Fernando Kraus Sanchez

Speaker: Fernando Kraus Sanchez, Director of the Foreign Affairs Sector within the Research and Innovation division of AToS in Spain. Fernando has over fifteen years of experience in participating in the implementation of ICT projects including the EURASIAPAC project. He has wide experience in the field of exploitation and marketing activities as a senior consultant both in the private and public sectors of different countries (Argentina, Azerbaijan, Brazil, Cameroun, Dominican Republic, Egypt, ..). Additionally, he has been highly involved in the management of European and National R&D projects (Cockpit, ImmigrationPolicy2.0...) as well as in managing multi-people teams.

1. *How does your project contribute to International cooperation and trust and security?*

Eurasiapac focuses on ICT research cooperation between the EC and the Asia-Pacific region, mainly Korea, Japan, Australia and New Zealand.. Eurasiapac has provided a global picture of themes of interest in ICT, priorities, tendencies, difficulties in cooperation, reasons why to search cooperation, sources of information used in each country.

a. European and Asian-Pacific institutions declared strong interest in pursuing cooperation/collaborative research with each other and share the main motive to seek cooperation and research: "*knowledge (technology) exchange*". A high number of EU respondent organizations recognize searching cooperation as a mean to market penetration and development in the AP region, reason which is not so relevant for AP respondents.

b. No clear thematic focus for cooperation was cited by EU respondents while Future and Emerging Technologies is a dominant focus for AP countries. EU respondents expressed interest in Future and Emerging Technologies at similar level to "ICT for Mobility, Environmental Substantiality and Energy Efficiency", "ICT for health and wellbeing" and "ICT for learning and access to cultural resources". Other thematic priorities for AP respondents are 'ICT for mobility, environmental substantiality and energy efficiency', "Cognitive Systems, Interaction, Robotics" and 'ICT for health and wellbeing'.

c. By countries, EU respondents has cooperated mainly with Japan and Korea and, to a slightly lesser extent, with Singapore, Taiwan, Australia and New Zealand, by this ranking. The EU countries to cooperate with for AP respondents are the UK, Germany, France, Netherland and Sweden. Over half of respondents are interested in cooperating with Spain.

Eurasiapac has enabled the creation of links between ICT researchers between the mentioned countries through workshops carried out in each countries and constant cooperation during the last 2 years.

Trust and Security has been identified as one of the priorities among the topic of interest in ICT research in the countries participating in the project.

[18] http://eurasiapac-fp7.eu/

2. What are the benefits and expected impact of your project brought on by international cooperation?

Through the surveys carried out among the researchers community, we have identified joint common topics of interest in ICT research between EC and Korea, Japan, Australia and New Zealand.

The contacts and the fact that some main stakeholders in ICT research have been directly involved in the project – consortium partners are CSIRO in Australia, KIAT in Korea, Fraunhofer Japan, University of Canterbury in New Zealand , and Fraunhofer, Atos and Sigma in the EC - has raised interest in launching joint call with some of the countries. Joint calls with Japan and Australia are under preparation and are expected to be launched in 2012 or 2013.

3. International cooperation is not an easy task and required a lot of patience and time. What are the issues encountered and how did you address them?

Although the Eurasiapac project focuses on ICT cooperation between EC and the Asia-Pacific region, it's difficult to deal it as a homogeneous region because each participating AP country (Japan, Korea, Australia, New Zealand) has different characteristics, institutions and approach to ICT research, i.e. they are not homogeneous. In Europe, the EC FP7 creates a common approach to research, but it doesn't exist a similar common institutions in the Eurasiapac targeted countries. Each country needs to be dealt in a different way

On a day-to-day cooperation, the fact that there are 10-12 hours of time differences between the countries difficult the usual working cooperation process. A call conference among all partners always causes a "sacrifice" for one or another partner, as it can't be held at a standard working daily time for all partners.

IPR is always an issue in international ICT research cooperation and needs to be dealt at a very early stage of the research process.

4. In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy.

This is an issue that was highlighted and attempted by EURASIAPAC also but it was found to be incredibly difficult as even though the project's overall goal was to consider the cooperation between the EU and the entire ASIAPAC region as a whole, in actual fact, there are considerable differences between the countries involved and these always need to be factored into the discussions and cooperation models. Therefore, a bi-lateral approach is absolutely necessary even if there are some common cooperation issues across the regions.

5. What are your recommendations for improving effectiveness?

Joint calls are already being prepared with Australia and Japan. A Japan – EU S&T Cooperation agreement has entered into force on 29 March 2011, aiming at promoting a structured S&T policy dialogue between Japan and the EU. We need to crreate more agile processes to define, launch and approve ICT cooperation initiatives. Many of the Asia-Pacific institutions involved in the projects, mentioned that the period of time to create, prepare and launch a cooperation initiative should be shorter as the view is that EC processes take too long. Understanding legal and administrative EC funding processes are not always easy for non EC institutions; simplified methods may enhance international participation.

SECFUNET project – Marcelo Pasin

> **Speaker: Marcelo Pasin**, Assistant professor at the University of Lisbon. Previously, he was a researcher at INRIA (France, 2007-2008) and tenured associate professor at the Federal University of Santa Maria (Brazil, 1991-2007). He has worked for CoreGRID, EGEE and EC-GIN in FP6, and is now working for TClouds and SECFUNET in FP7. SECFUNET is a project from within the recent EU-Brazil joint call held during Call 7 of FP7.

1. How does your project contribute to International cooperation and trust and security?

SECFUNET is a STREP in FP7, with EU and Brazilian partners. It proposes to create a new generation in the Internet security that is very simple to use (no need of a specialized skill). It is based on secure microcontrollers, has strong authentication with privacy and secure identity management. It is intended for use with virtual networks and clouds, offering isolation, reliability and encryption.

2. *What are the benefits and expected impact of your project brought on by international cooperation?*

SECFUNET's partners are very heterogeneous: Brazilian and European partners complement each other. We have a large number of partners, with many different skills. It would be hard to gather these skills without cooperation. Specifically from Brazil we get different perspectives, very different regulation frameworks and very different concerns. Brazilians also include a pioneer researcher in intrusion-tolerance and a national networking research laboratory. SECFUNET also allows for leveraging previous cooperation, that would otherwise be impossible.

3. *International cooperation is not an easy task and required a lot of patience and time. What are the issues encountered and how did you address them?*

In time scales, the start times were very different and this caused a lot of problems. EU – started May and Brazil are only now hiring as they received funding in October. So EU partners started long before.

Cooperation projects in Brazil are not structurally the same as in EU. They are not used to the types of joint projects, which include meetings, discussions, workshops, etc. They are just used to meeting at the beginning and then work on the project in an independent fashion. It will take a while for them to get used to it. The evaluation process is also very different between EU and Brazil. In Brazil, reporting is carried out mainly in the very end of the project, therefore, making it difficult to get things going in terms of a common progress reporting mechanism between the countries. Another example is Brazilians are not responsible for delivering to the EC. These efforts need to be harmonised between the participants in the different countries.

4. *In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy.*

As a perspective for longer term exploitation, we have several industrial partners. We feel it is the combination of the companies that are going to do their development of their products within the projects in order for the project to have a longer term impact for both the partners and the project in general. Twinteq wants to develop its products in near-field communication, EtherTrust and Implementa work with secure elements like SIM cards, and Infineon wants to boost its trusted components for the future networks. More generally, SECFUNET wants to establish a sound security infrastructure that could be used by anyone.

5. *What are your recommendations for improving effectiveness?*

As recommendations for improving effectiveness, I suggest better agreements with non-European authorities, with, for instance, better definitions in the commitments, and better synchronisation. It could include previous negotiation for project management standards, as, for example, how to deal with deliverables, project review and evaluation. The European Commission should help the targeted applicants to have knowledge of its rules and evaluation standards, using, for example, concertation meetings in the targeted countries.

FEAST/FEED/AUS-ACCESS4EU/SECAS/ projects – Rado Faletic

Rado Faletič (RF), Executive Director of FEAST. Rado's involvement with the *Forum for European-Australian Science and Technology cooperation* (FEAST)[19] stems from his interest in promoting, encouraging and highlighting science and new ideas, along with the personal satisfaction he receives from facilitating individual collaborations. He has previously held a number of research, teaching and IT positions at The Australian National University, including appointments at the Research School of Chemistry, the Research School of Earth Sciences, the Research School of Humanities, the Research School of Social Sciences and the Australian National Institute for Public Policy. At ANU, Rado has also completed a PhD in shock tunnel tomography (rocket science!). His other research projects have included the spatial modelling of water flow in de-forested landscapes, and seismic tomography.

1. *How does your project contribute to International cooperation and trust and security?*

Within the panel, Rado Faletič represented a number of projects.

FEED (www.feast.org) The *FEAST Extension, Enhancement and Demonstration project* (FEED) project is the third iteration of the BILAT with Australia (2008-2012). The explicit objective of the BILAT projects is to highlight and facilitate R&D collaboration between Europe and the target third countries (in this case… Australia). We operate a support helpdesk for all research fields, act as NCP's for Australia, and provide information and support to the government-government JSTCC meeting between the EU and Australia. The ICT meeting as a part of the most recent JSTCC (in 2010) identified trust and security as a priority area of collaboration between Europe and Australia. We have conducted bibliometric studies on EU-Australian collaborations, though there is a poor coverage of ICT publications. We also conducted an extensive stocktake of Australian involvement in FP7.

AUS-ACCESS4EU (www.aus-access4.eu) *Supporting EU Access to Australian Research Programmes* (AUS-ACCESS4EU) catalogues and promotes Australian funding opportunities available to European researchers, and conducts studies on Australian research strengths and the openness of Australia's funding programmes.

SECAS (www.secas.eu) *Strategies for European ICT RTD Collaboration for Australia and Singapore* (SECAS) is a sister project to EURASIAPAC. It identified ICT thematic capabilities and areas of potential synergy, performed policy analysis and has made strategic recommendations for improved cooperation policies. This project performed the first lab-level systematic analysis of ICT research groups in Australia, thematic strengths etc, which has delivered results that are now ready to be used. Trust and security topics are clearly identified in the final report, which is now available online.

2. *What are the benefits and expected impact of your project brought on by international cooperation?*

Both FEED and AUS-ACCESS4EU have greatly contributed to the flow of information between Europe and Australia regarding overall funding modalities available for international collaboration, but more importantly have identified and developed strategies on how to most successfully use these mechanisms (including

[19] http://www.feast.org/

FP7, COST[20], ARC[21] and NHMRC[22]). SECAS has produced a concrete set of strategic recommendations, which are available in the final public report online.

3. *International cooperation is not an easy task and required a lot of patience and time. What are the issues encountered and how did you address them?*

One of the issues of most importance has been the persistent lack of understanding, particularly in Europe, regarding how to include third country partners on FP7 proposals. FEED and AUS-ACCESS4EU have been working actively (through email alerts, but more affectively through targeted seminars and direct communication) to education both Australian and European researchers on *the facts* as well as *the realities* of including Australian partners on FP7 projects. This includes issues of funding support. SECAS has identified issues ranging from abstract political ones (e.g. that policies need to be concrete, should also include technical content, and need follow-up actions) to practical ones at the researcher level (e.g. how to best work over long distances, the benefits of setting up joint labs, the challenges of researcher exchange, etc.).

4. *In the opening session, it was mentioned by the Commission that INCO projects should go further than just identifying stakeholders and who the counterparts are in the countries and topics of cooperation. What are your projects plans to take this approach for a longer term strategy and is there anything that BIC can do to help you with this strategy.*

The issue of sustainability has been a very important one especially within the FEED/BILAT projects where they have started working already with what they call 'multipliers' to impart their knowledge and key ideas around Australia. For other projects, it is an issue. What can projects do during their lifetime so the work can continue? BIC can talk to the SECAS project to see if there is anything BIC can do to help create this value.

The BILAT project, one of which just finished are putting together significant workshops on specific topics. BIC can help develop the content and identify the individuals who can contribute to this workshop. This can lead to more lasting co-operations.

5. *What are your recommendations for improving effectiveness?*

We have noticed a lack of coordination and information-sharing between the variety of INCO activities across FP7. We propose that consideration be given to this issue in future INCO calls, and recommend that activities be developed to facilitate the integration of activities amongst all INCO projects, particularly so that findings can be directly implemented into ongoing projects (rather than waiting for final reports, which in any case are rarely read by other INCO actors).

[20] http://www.cost.eu/
[21] http://www.arc.gov.au/
[22] http://www.nhmrc.gov.au/

Keynote: Identification of advantages for international cooperation and the trust and security technological challenges – BIC review of research topics already identified – Michel Riguidel

Speaker: Michel Riguidel is Professor Emeritus, previously the Head of the Department of Computer Science and Networks, at Telecom ParisTech (École Nationale Supérieure des Télécommunications, www.telecom-paristech.fr) in Paris, where he lectures in security and advanced networks. His research is oriented towards security of large Information Systems and Networks and architecture of communication systems (Security of the Future Internet, Trust, Privacy and Advanced Networks). In the European Projects, he is contributing to the Coordinated Action in international security research of the FP7 BIC (2011-2013) and caretaker for security and trust of the FIA (Future Internet Assembly). He has several patents in security (firewall, watermarking and protecting CD ROM, illicit content downloading).

In starting out his talk, Michel Riguidel explained in some detail the shifts in paradigms that we are encountering where it is increasingly difficult to attain a trusted and secure global digital communication and information handling system via a dependable international ICT infrastructure. This will continue to be based on an evolving Internet, together with the many services that rely on it to deliver their benefits. Many of these services are now integral parts of our daily lives and the fabric of our societies, and are increasingly part of our cultures. However, the whole edifice – Internet and Services – is currently quite frail and vulnerable to both attack and failure. The remedies include repair, shoring up and reinforcement, and eventual replacement over time by more modern robust or resilient designs and components.

A general recommendation made by Professor Riguidel is that it is essential to continue current initiatives and the ongoing consensus towards our goal of increasing the trustworthiness, dependability, and security of interoperable global ICT. Through the BiC project – Building International Cooperation for Trustworthy ICT: Security, Privacy and Trust in Global Networks & Services and previously INCO-Trust as explained in the opening talks, work is already in progress that will maintain, and indeed extend, the dialogue between Europe and international partners in pursuance of our goal. Through these projects, we are engaged in identifying topics and themes recommended for further elaboration leading to international collaboration and cooperation leading towards a stronger, more trustworthy global communications – where this inevitably involves the Future Internet.

Within the INCO-Trust project, a number of recommendations were made within their final deliverable D3.1 INCO-Trust Final recommendations **report**[23]. Two groups of recommendations are Strategic and Tactical and these were presented in brief by Prof. Riguidel. It was pointed out that the ordering of the recommendations is not meant to imply any over-riding chronological order, but that the Strategic group are meant to be the pre-requisite enablers for international cooperation, setting out the frameworks, common understandings and motivations, and overall landscape to ensure the possibility and effectiveness of the more concrete Tactical group recommendations.

[23] http://www.inco-trust.eu/media/D3_1_report.pdf

The recommendations made here are split into two groups:

- Strategic: setting out the frameworks, common understandings, and overall procedural and governance landscape that takes into account the diversity of social, economic, and cultural norms and requirements worldwide;
- Tactical: research towards the technical building blocks and their relationships that will enable a trustworthy, secure ICT ecosystem.

(a) Strategic Recommendations

SR1 **International alignment**: preparation of policy frameworks to enable global collaboration and interoperability

SR2 **Variety**: cooperation on topics related to security and diversity.

SR3 **Scalability**: cooperation on topics related to security and complexity

SR4 **Reciprocity**: cooperation on topics related to security and interoperability

SR5 **Secrecy**: cooperation on the issues of digital sovereignty and dignity

SR6 **Negotiation**: cooperation on the theme of security and trust

SR7 **Security expertise**: cooperation on topics related to security and technological challenges of security

SR8 **Protection:** cooperation on topics related to security and cyber-defence

(b) Tactical Recommendations

The international ICT trust and security community should collaborate on research to:

TR1 Support strengthening infrastructure resilience and control crisis management.

TR2 Support securing the current and future Internet related to diversity, complexity and interoperability.

TR3 Support securing cloud computing for enterprises.

TR4 Support designing identity and accountability management frameworks.

TR5 Support new privacy infrastructure, reconsidering privacy spaces, storage function areas.

TR6 Support repositioning trust infrastructure at the same level as security infrastructure.

TR7 Support metrics and standardization issues.

TR8 Initiate green security.

TR9 Support cooperation in cyber-defence against the asymmetric challenge

TR10 Enable the engineering of secure and trustworthy software and systems.

Professor Riguidel summarised the four main themes that have been highlighted in the project's bi-lateral cooperation events to date. These include:

Theme 1: Digital ecosystem security (Network & Information security) oriented to the System. This theme involves protection and trustworthiness with the strengthening of infrastructure resilience and control crisis management, crisis management (CIP), Security and cyber-defence (incl. against the asymmetric challenge). It also includes securing the current and Future Internet, network/system security, securing cloud computing for enterprises, Mobile security, security for mobile connectivity. In addition, it deals with policy properties such as variety, scalability, reciprocity, diversity, complexity and interoperability.

Theme 2: Trust & Privacy (including personal data protection) oriented to the Humans, Users. It incorporates topics related to responsibility (Identity versus Anonymity), designing identity and accountability management frameworks, international Privacy friendly authentication and reputation assurance. It includes measurement and negotiation, repositioning trust infrastructure at the same level as security infrastructure and trust management. Other areas under this theme include secrecy, dignity, sovereignty designing digital sovereignty and dignity, and new privacy infrastructures, reconsidering privacy spaces, storage function areas; and, last but not least, usability creating a Human oriented and usable security for citizens.

Theme 3: Global Framework & International alignment oriented to principles & governance. This includes properties such as interoperability, openness, transparency and secrecy; the preparation of policy frameworks to enable global collaboration and interoperability; Knowledge and International Data exchange architectures for cybersecurity; and socio-economic aspects including data policy, governance and secure, trustworthy and viable ecosystems.

Theme 4: Methodology, tools and technical challenges oriented to the tools. Under this theme is expertise sharing in science, technology & engineering; methods to support metrics and standardization issues; software security to enable the engineering of secure and trustworthy software and systems; protection of data and information with cryptology (digital signature, etc.) and other upstream topics including the initiation of green security.

In conclusion, Professor Riguidel presented a table showing a summary of all of the countries interactions to date, showing the programme /funding agency contacts, research level contacts and a sampling of the priority research themes for international cooperation in trust and security. The full table can be found on the next page.

Table 1. Summary of all of the countries interactions to date

Country	Program Level	Research level	Priority research themes for INCO
USA	National Science Foundation Department of Homeland Security	Massachusetts Institute of Technology, Rutgers University, University of California, San Diego, University of California, Davis, University of Illinois , Others	CyberSecurity/Privacy: Technology and Usage Issues Trustworthy International information exchange including data transfer and sharing, Security models for the Future Internet.
Canada	National Science & Eng. Res. Council	Univ. of New Brunswick, Ecole Polytechnique Montreal	Industry driven projects on trust, security and privacy.
Korea	Ministry of Knowledge Economy, KEIT	SoonChunHyang University, Seoul National Univ. Others	Internationalisation of data (identity management, privacy, end to end trust metrics, ...); Countermeasures against Massive DDoS; Security of Cloud computing e.g. Security of Smart Grid; Security compliance management and information security assurance; Security for VoIP and Mobile communications; Future Internet.
Japan	Japan Science and Technology Agency, CREST programme, MIC	NICT, University of Tokyo, Tokyo Inst. of Tech, JAIST, Others	Dependability, Security, Privacy and Trust of embedded systems
Australia	Australian Research Council (ARC)	CSIRO, NICTA, Macquarie University, Univ. of Sydney, IIS Partners, many others	Communications Security, Trust and Privacy in the Future Internet; Formal approaches for trust and security.; Sensor networks.
Brazil	CNPq (National Research council), FUNTEL, State Research foundations ITI (Instituto Nacional de Tecnologia da Informação)	Universidad de Brasilia, Univ. of Sao Paulo, CPqD Serasa Experian, Others TBD	Future Internet, Wireless Technologies: Security, Privacy, Trust over ad-hoc networks, Quantum crypto, ID management.
South Africa	SA Dept. of Science and Technology SA Technological Innovation Agency	Council for Scientific and Industrial Research (CSIR) – The Meraka Institute, SAP, University of Pretoria, University of Johannesburg, University of South Africa, others	Wireless Technologies: Security E-infrastructures security and trust
India	Dept. of Information Technology (DIT), ERNET, EuroSpirit India Support action (FP7)	India Institutes of Technology (IITs), India Institute of Science (IISc), Universities - Hyderabad, Pune, Anna amongst others).	Data Center Security, Data Privacy, ID card, ID management.

Panel Session 2. Human-oriented approaches to security, privacy and trust and Chair: Priscila Solis Barretto

Human-oriented and Usable Security – Karima Boudaoud

Speaker: Karima Boudaoud is Assistant Professor at the University of Nice Sophia Antipolis. She had obtained her PhD. degree in Computer Sciences from Ecole Polytechnique Fédérale de Lausanne (EPFL) and had received her M.Sc in Computer Sciences from the University of Versailles Saint Quentin-en Yvelines (UVSQ). She has participated in several research projects in the area of Networks and Services Security funded by the European Commission (IST-FP6 research programme), CNRS-INRIA-DGA and Fond National Suisse. She has serverd in several TPC and OC of several national and international (IEEE/IFIP or others) conferences and workshops (IM, WWW, ICC, NOMS, etc.). Her main research interest is Security management but a security management oriented towards the User and her previous research field was intrusion detection using multi-agent system

With the growth of Internet, one of the most sensitive issues of our "always connected" society is the security of electronic data. The issue concerns everyone: individuals, corporations and public institutions. At the Network and Information Security Management: research ideas workshop [24] held on 22nd September 2011, one of the main recommendations was there is a need to examine human oriented security solutions as the generation of users is changing as they are born and raised with ICT and studies show they would be more open to use security solutions and the security designers need to listen and adapt their solutions according. At the workshop, there were discussions about the level of evidence about young people caring more about security and privacy. There is mainly anecdotal evidence on this that while some users will ignore these issues, there are considerable levels of users that care about their security and privacy. It was agreed that researchers should not take as a starting point that young people don't care about security and privacy. Instead, all of the points of view should be studied from the sociological perspectives and involve the right stakeholders in our research projects.

Security management should be more accessible to all kind of users and especially non-security experts evolving towards a more human oriented security management vision. To address today's security issues, we need to: 1) move from the traditional technology-only oriented design of security solutions towards user-centric security management and 2) bring together experts from psychology, social science, economics, legal, technologists and security experts to address security and privacy from a user point of view and put her/him at the heart of problem.

From an international point of view, we need:

- Collaboration between security experts and experts from other disciplines (psychology, social science, etc.) and from different countries, in addition to collaboration with international government institutions.
- Organisation of **multidisciplinary** and **international workshops** targeting wide public.
- Set up of **multidisciplinary** and **international working groups** in targeted countries.
- Collaboration with standardization organisations.

[24] http://cordis.europa.eu/fp7/ict/security/events_en.html

Privacy-respecting Authentication – Ioannis Krontiris

Speaker: Ioannis Krontiris, is a senior researcher in the group of Mobile Business and Multilateral Security at **Goethe University Frankfurt**. Ioannis holds a PhD from Mannheim University, Germany and a MSc degree from Carnegie Mellon University, USA. He is currently involved in the coordination of the EU-Project ABC4Trust (Attribute-based Credentials for Trust) where he is also leading the architecture work package. His main research interests include Identity Management, Online Privacy, Security and Privacy in Pervasive Environments.

Europe aims for an electronic identity management infrastructure as a basis for trustworthy services in e-government and e-commerce to overcome fragmentation, closed solutions and lack of user control and transparency. The outcome of the EU-project ABC4Trust will result in important input for the design of the upcoming electronic identity management infrastructure, by closing the gap between the architectural framework level and the crypto level that slows down the adoption of privacy respecting attribute-based credentials systems (Privacy-ABCs), as well as making the infrastructure independent of specific implementations.

Towards this goal, ABC4Trust is implementing and deploying privacy-ABCs in two actual production pilots. These two user-trials will give the opportunity for the first time to test credentials use and performance on a large scale and provide experiences on their operation, interoperability and user acceptance. The first pilot scenario will be deployed at a school in Soederhamn, **Sweden**, where young students (youngsters and teenagers of both sexes) will be able to communicate in an anonymous and privacy preserving way with other pupils and with school health personnel (doctors, nurses, psychologists and other coaches). The second pilot scenario will be deployed at the University of Patras, **Greece**, where students will be able to anonymously evaluate courses they attended.

Thus, ABC4Trust is building its architecture based on privacy requirements collected within the European setting (e.g. Greece and Sweden). However, privacy concerns differ in the international setting. These differences can be attributed to differences in cultural values and perception of privacy, differences in the familiarity with Web privacy practices, or even differences in regulations. In that respect, international cooperation could greatly help exchanging views with other cultures, collect different application scenarios and requirements from other cultures and effectively broadening the perspective of privacy-ABC architecture.

It is, therefore, an open research question to be discussed how privacy relevant processing with and in countries like Brazil, India or South Africa can be handled within ABC-scenarios. How are concepts like proportionality, unlinkability, minimal disclosure etc. being perceived in such countries? How other legal systems outside Europe can be affected by and have effects on Privacy-ABCs?

Technological research can also be greatly benefited from international cooperation when it comes to taking under consideration the human factor in designing technologies. How people perceive technological solutions and how that affects the adoptability of the corresponding technologies? How to best explain to people the potentials and features of the existing solutions? How to best design user-interfaces to encourage usability and adoptability? The answers to these questions will vary for different cultures and by opening up beyond the European borders will give us a great insight in these aspects and eventually help us design better technology.

To address the above challenges, collaboration opportunities should allow EU-project consortia to open up and include various kinds of actors in the international setting: user communities, governmental organizations, regulatory authorities, and research institutes. A framework for enabling such collaboration should encourage joint working groups, organization of public events with experts from both sides and collaboration in standardization activities.

Human-oriented approaches to trust, security and privacy and the role of international cooperation – John Zic

John Zic is a research team leader in the Commonwealth Scientific and Industrial Research Organisation (CSIRO) ICT Centre, specialising in the area of privacy, security and trust. He is a co-inventor of the patented Trust Extension Device, which was the world's first portable USB trusted computing platform to incorporate a TPM cryptographic microcontroller. He holds Honorary Senior Research Fellow positions at the Department of Computing, Macquarie University and with the School of Computer Science and Engineering, UNSW. John has recently given invited presentations and keynotes at the EU FP7 INCO-TRUST workshop in New York in 2010, MIT Kerberos Consortium Conference in 2010 and 2011, and the Vanguard/TTI CyberINsecurity Conference in 2010 and participated in the 11th Joint EU and Australian Science and Technology Cooperation Committee in 2010. John was a member of the Australian Academy of Technological Sciences and Engineering Working Group on Cloud Computing from 2009-2010 advising on privacy, security and trust.

Fundamentally, the basis for human oriented approaches to trust, security and privacy relies on having a real (recognized) need for people to work together on a work package that cannot be addressed by a single entity. By grounding and focusing the work within a collaborative setting, a solid, practical understanding of the requirements for trust, security and privacy may be developed.

Further, partner organisations (commercial, government, and academic) will understand how best to contribute their own respective capabilities within the collaboration. To emphasise that there is a continuum of requirements for trust, security and privacy, two case studies were presented: one dealing with a specialist committee to respond to Australian biosecurity issues, and the other dealing with smart infrastructure and the relationships between residential customers and service providers. These two cases were used to demonstrate the diversity of collaboration types.

It is important to note that underpinning any successful collaboration requires not only that the partners understand their respective roles and contributions, but can also properly commit their respective resources and fund the work.

Establishing international co-operation is important in two respects. First, it offers collaborating partners increased access to potential receptors for ideas and cross-fertilisation of markets. Second, by definition, it builds a larger research community, and this in turn can enable future, potentially larger/more complex collaborative projects in trust, security and privacy. However, alignment and commitment is required at multiple levels, from the individual researchers to their respective organisations and to the participating governments. This complexity should be in the first instance address in a methodical manner.

First, identifying partners who are like minded and interested in addressing similar, relatively small scale but concrete problems with real needs (such as addressing the information management and process requirements of the biosecurity community). These can be regarded as pathfinder projects, which stand a good chance of being identified, proposed and finally supported by the broader community. Of course, any such project requires funding and commitment from each partner, and in the case of international co-operation, agreements need to be in place between the respective governments to allow the collaboration to proceed. This is particularly significant, as success requires the respective governments' policies and budgets to agree to articipate in the international collaboration.

Actions that can be taken to build international co-operation include the development and building of local expertise and a community of users through such path-finder

projects. The success of these is then used to promote further development of international collaborations to the broader community. Path-finder projects may also be used to build up international linkages on an incremental level, with the community of users developing internal and external trust in each other to be able to successfully work together. As part of the community building, the development and engagement of partners in formal forums (such as the Internet of Things Forum, for example) is very important, with regular face-to-face meetings (both formal and informal) occurring duringthese fora. Once again, as a part of the community building exercise, it is important that each potential partner is able to support the work through assuring some funding and resourcing is set aside specifically for this activity. Good will is necessary, but not sufficient, for ensuring a successful collaboration or community building exercise.

Collaboration with Africa / BRICS for human oriented approaches to security, privacy and trust – Jan Eloff

> **Speaker: Jan Eloff** is currently appointed as Research Director at **SAP Meraka UTD / SAP Research Pretoria** and as an Extraordinary Professor in Computer Science at the University of Pretoria. At the University of Pretoria, he is a co-founder of the Information and Computer Security Architectures (ICSA) research laboratory. He represented South Africa as an expert member on IFIP Technical Committee 11 (Information Security).

Although traditional / developed world ICT markets will experience growth in the future, the growth will be relatively slow since these markets are widely saturated. The next big growth market will likely come from areas that are seen as under-developed, such as the Africa / BRICS region, where ICT use is currently at comparatively low levels.

To ensure that the potential of the Africa / BRICS market can be addressed, it is necessary to understand the needs and challenges of this market. International cooperation between European and Africa / BRICS partners is therefore necessary to establish this understanding and to create solutions appropriate for the target market.

To begin this cooperation, we provide the following recommendations with regards to the research and technology outputs as well as with regards to the collaboration methodology.

Recommendations for cooperation - research and technology outputs

Collaboration should be based on context awareness. Traditional user-centered approaches for technology development do not consider cultural and contextual needs. This results in deriving user requirements that do not give the right view of the real needs, leading to technology failure. Example of contextual factors that should be considered include:

- Cultural norms and tradition
- Appropriate tactics for community entry and engagement
- Appropriate research techniques that involve the users and communities
- Appropriate needs assessment practices
- Infrastructure capacity of the targeted community
- Solution maintenance costs

The technology developed should be advantageous from the viewpoint of the local users. Therefore, technology development should be based on an understanding of the real requirements as well as an understanding how existing technology can be adapted to meet contextual requirements. Lastly, solutions developed should be relevant to local users, their needs and the available infrastructure.

Recommendations for cooperation - collaboration methodology

European funding opportunities (e.g. Framework Programmes) should encourage
collaboration with partners in Africa / BRICS. European Project consortia should be more open to accept African / BRICS partners, which should not just provide use cases, but should also develop and adapt technology for their local needs.

We also recommend the following three areas of research topics for international cooperation with regards to security, privacy and trust.

1. Research topics for international cooperation - Security

In Africa / BRICS, mobile phones are the most common ICT device used. Typical users of such devices may not fully understand the security vulnerabilities the use of these devices pose. Security configuration of such devices for most users will therefore be a challenge. Therefore, the research challenge to address with regards to facilitating usable security is: How to quantitatively analyze and design appropriate user interfaces for mobile devices to enable a typical user to make informed decisions about different security settings?

2. Research topics for international cooperation - Privacy

Privacy and information utility are conflicting requirements. As the level of privacy increases, the level of information utility decreases. This is because as we hide more information to preserve privacy, the usefulness of the released information decreases. Local context and culture also influence what information should be regarded as private, and what information is considered as useful. Therefore, the research challenge to address with regards to privacy is: How to ensure an optimum balance between privacy and utility, taking into account local contextual needs and preferences?

3. Research topics for international cooperation - Trust

In African communities, trust is influenced by social network position. Social position governs activities within rural communities. For example, the chief of a village can influence business collaborations. Rural communities therefore require a different approach to business due to unique social structures, social norms, and traditions. Therefore, the research challenge to address with regards to trust is: How to ensure that trust management takes into account concepts relevant to the target context?

Conclusion

In conclusion, by facilitating international cooperation to provide human oriented approaches to security, privacy and trust, we believe that both European and African / BRICS partners will benefit. The great potential of the Africa / BRICS market can be exploited, while at the same time, these markets will be provided with solutions that are appropriate, affordable and contextually-relevant.

Network of Excellence on Engineering Secure Future Internet Software Services and Systems – Fabio Martinelli

Speaker: Fabio Martinelli is a senior researcher in the security group at Security Group at the Istituto di Informatica e Telematica - IIT; National Research Council - C.N.R. He is the Project Coordinator of the EU Project NESSoS Network of Excellence on Engineering Secure Future Internet Software Services and Systems and responsible for the CNR Interdipartimental Security Project.

The Network of Excellence on Engineering Secure Future Internet Software Services and systems (NESSoS, http://www.nessos-project.eu) aims at constituting and integrating a long lasting research community on engineering secure software-based services and systems.

The NESSoS engineering approach of secure software services is based on the principle of addressing security concerns from the very beginning in system analysis and design, thus contributing to reduce the amount of system and service vulnerabilities and enabling the systematic treatment of security needs through the engineering process. In light of the unique security requirements the Future Internet will expose, new results will be achieved by means of an integrated research, as to improve the necessary assurance level and to address risk and cost during the software development cycle in order to prioritize and manage investments. NESSoS will integrate the research labs involved; NESSoS will re-address, integrate, harmonize and foster the research activities in the necessary areas, and will increase and spread the research excellence. NESSoS will also impact training and education activities in Europe to grow a new generation of skilled researchers and practitioners in the area. NESSoS will collaborate with industrial stakeholders to improve the industry best practices and support a rapid growth of software-based service systems in the Future Internet.

NESSoS research topics cover several main areas: A first set of activities represents the traditional early stages of (secure) software-services development: from secure **requirements** over **architecture** and **design** to the **composition** and/or **programming** of working solutions. These three activities interact to ensure the integration between the methods and techniques that are proposed and evaluated. In addition, NESSoS research programme adds two horizontal activities that span the service creation process: Both the security **assurance** programme and the programme on **risk** and **cost** aware SDLC will interact with each of the initial three activities, drive the requirements of these activities and leverage upon, even integrate their outcome; finally, notice that all 5 research activities mentioned above will be inspired and evaluated by their application in specific FI application scenarios.

NESSoS considers necessary a Networking and Liaison Board (NaLAB) for international cooperation mainly aimed at representatives of Technical WGs in the topics of the NoE. The creation of the NaLAB is in progress right now and it is explicitly meant to collect researchers from outside Europe. Several NESSoS components would benefit the international cooperation: The NESSoS Common Body of Knowledge, the engineering tool workbench, open competition, research activities. NESSoS plan to identify the main stakeholders in the NESSoS topics world-wide and create connections among researchers/WGs especially using the NESSoS internal mobility programme. Some possible cooperation topics include comparison of tools and techniques; Usage control of disseminated data; and focus on SLA with protection information, possibly in cooperation with other projects as ASSERT4SOA and ANIKETOS.

NESSoS use cases covers smart-GRIDs and e-heath scenarios. We think that those are currently hot topics and cooperation at international level fruitful.

Panel Session 3. Digital ecosystems network and information security and how international cooperation can provide mutual benefits – Chaired by John C. Mallery on behalf of Karl Levitt

International Data Exchange and A Trustworthy Host: Focal Areas For International Collaboration In Research And Education – John C. Mallery

Speaker: John C. Mallery, Massachusetts Institute of Technology, Computer Science & Artificial Intelligence Laboratory, Cambridge, MA, United States
John C. Mallery is a research scientist at the Massachusetts Institute of Technology, Computer Science & Artificial Intelligence Laboratory. He is concerned with cyber policy and has been developing advanced architectural concepts for cybersecurity and transformational computing for the past decade.

A key message is the acknowledgement that international cooperation is nascent and a more global approach is urgently needed because there is ultimately just one, single global information environment, consisting of the interdependent networks of information technology infrastructures, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers.

Table 1 enumerates asymmetries within cyber attack and defense that today disproportionately favor the attacker. The attacker benefits from the initiative (A) and the large defender value at risk (B), whereas the defender controls more knowledge (L), architects the systems (M) and the criminal justice system (N). In between (C – K), the attacker has many advantages but international data sharing and defensive coordination can deny advantage to the attacker by improving communication (F), enhancing situational awareness (G), providing mechanisms for coordination (I), speeding up decision cycles (J), increasing agility (K), encouraging more defensible architectures (M) and supporting or incentivizing defensive coordination with the legal system.

Table 1. International data exchange can reduce asymmetries between attack and defence.

	Mode	*Attacker*	*Defender*
A	Initiative	Chooses the best place, time and means of attack	Must defend everywhere, all the time, against any attack
B	Value At Risk	Small (terror or criminal actors)	Large
C	Code Size	Small (often 100s of lines)	Large (>20-50 million lines)
D	Software Control	High	Supply chain → Low
E	Software Abstraction	Good, integrated for purpose	Poor, evolutionary tower
F	Communication	Organized around attack → Good	Organized around products → Poor
G	Situational Awareness	High	After-market bolt-on → Low
H	Accountability	Low (terror or criminal actors)	High
I	Coordination	Small group → high	Non-scalable → low
J	Decision cycle	Fast	Slow
K	Agility	High (apparent)	Low
L	Domain Knowledge	Low, narrow & concentrated	High, broad but diffuse
M	Architectural Control	Low	High, but slow
N	Legal/Justice Systems	Low	High, but slow & political

It is essential that we have the ability to conduct comprehensive intelligence collection and evaluation on any developing situation that threatens our cyberspace activity, followed by near-simultaneous processing, exploiting and disseminating of the information. This depends on collaboration, data exchange and sharing (and also knowledge sharing) between countries. We need comprehensive research towards international intelligence, surveillance, and reconnaissance (ISR) in the cyberspace domain.

Mallery characterized these challenges as follows.

- **Problem:** Attackers can replay attacks across different countries without rapid international learning to defend against attacker innovations
- **Benefits:** International collaboration and coordination can rapidly reduce defensive gaps across the OECD and build crisis-response capacities
- **Leverage:** Bias work factors in favour of defense and against cyber attack
- **Approach:** Exchange data related to cyber crime, attack patterns and best defense practices
- **Research:** Motivate technical research via needs of realistic data sharing scenarios

An architecture for international and cross-sector sharing of cyber threat and attack data will ensure a more effective collective cyber defense than countries, sectors or organizations might otherwise achieve individually.

Fig. 1. Straw man architecture for international data sharing and collaboration.

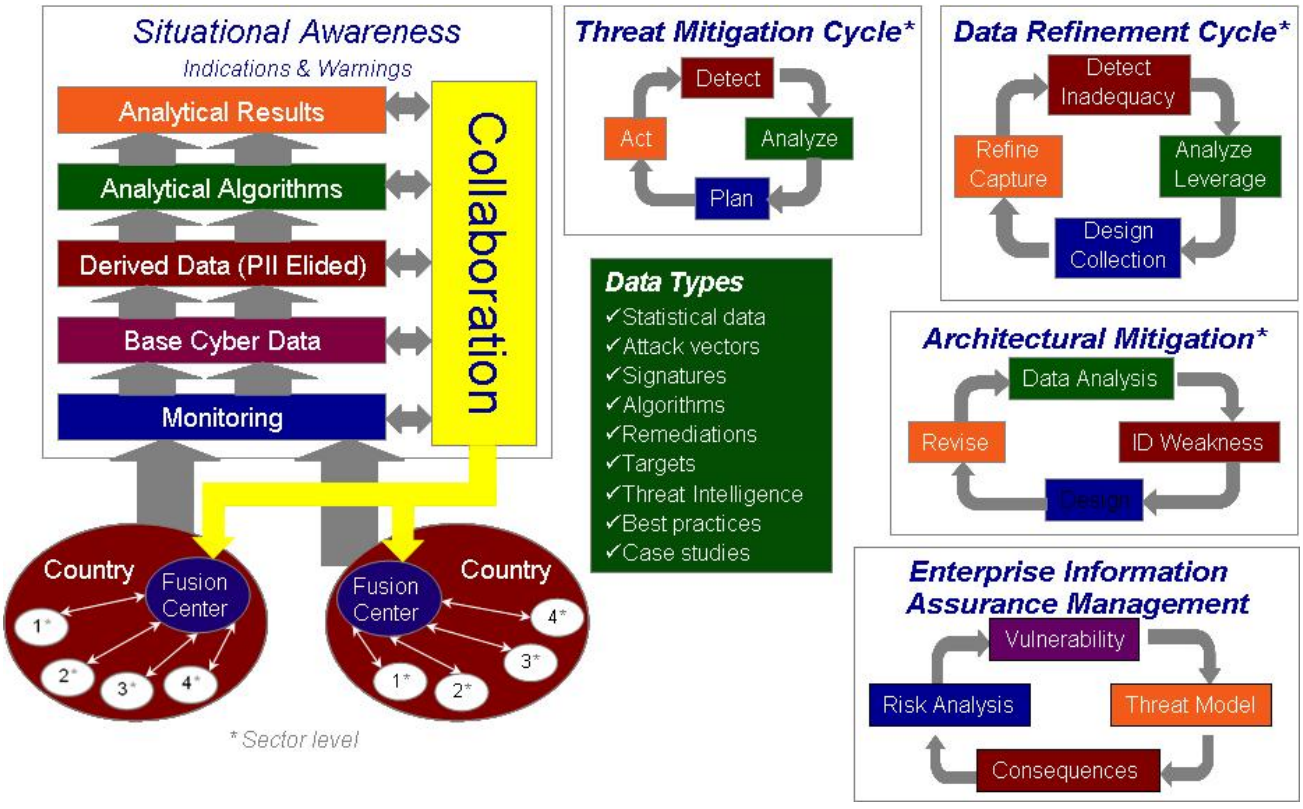

Figure 1 illustrates an international cyber data sharing architecture that integrates data from multiple countries and sectors and returns collaboratively produce analytical products and threat mitigation techniques. Country fusion centers integrate country information and expertise internationally. Within each country and across its sectors, shared monitoring infrastructures capture base cyber data at sources. This data is processed to remove personally identifiable information (PII) before being analyzed using shared algorithms to produce results fed back into shared situational awareness. The architecture supports sector-based threat mitigation cycles as well as enterprise information assurance management of value at risk. The architecture supports learning modalities like data refinement to improve data capture, analysis and utility in threat mitigation. Based on knowledge gained about vulnerabilities and attacker vectors, the architecture helps drive improvement of enterprise and infrastructure architectures to improve defensibility.

This kind of sharing scenario can drive research along many trajectories. The type of data collected needs to be effective and offer leverage for cyber defense. Large-scale analytics over the data need to reveal important patterns in real time and lead to timely threat mitigation. Given an effective sharing architecture, major malicious actors will endeavor to corrupt the data and subvert its operation, and so resilient and trustworthy engineering will be needed for all components from sensors to hosts, monitoring, analysis and mitigation actions. At the same time, PII and enterprise information must be protected to respect important societal values and incentivizing sharing. Difficult technical, legal and administrative challenges in international authentication, authorization, encryption and remote policy enforcement must be overcome to reach higher levels of trust and sharing necessary for weaponizable data like critical infrastructure attacks and mitigations.

Mallery characterized the goals of cyber data sharing and collaborative analysis as follows:

- Build shared awareness and understanding of cyber phenomena across countries
    - Employ shared data collection methodologies
    - Integrate measurements of phenomena across borders
    - Focus early on cyber crime and economic incentives
- Create comparable transnational data sets
    - Capture cyber breaches, attack patterns, best practices, defensive coordination
    - Include aggregate data on crime, black markets, economics, state-state interactions, long-term transformations
- Field a cyber data sharing framework that helps countries to:
    - Collect cyber data for compatible sharing
    - Fuse data to create common situational awareness
    - Manage national legal impediments to sharing via derived or aggregate data or by recommending harmonization steps
    - Exchange derived data in real time
    - Provide mechanisms for controlled drill down needed for law enforcement, advanced persistent threats (APT) or cyber emergencies
- Build shared collection, fusion, analysis, and response capabilities

In addition to cyber data sharing and collaborative analysis, Mallery introduced the idea of raising the work factors for malicious actors worldwide by collaboratively

developing an open-source trustworthy host platform for collaborative research and education. Mallery characterized the challenge as follows:

- Problem: Attackers are subverting legacy architectures which are inadequate for current threats
- Benefits: Development and evolution of a clean-slate trustworthy host will:
  - Create reference host architecture for computing, routers, cloud, embedded, wireless
  - Integrate best information assurance (IA) engineering from the open literature
  - Provide a reference paradigm for cumulative research and education
  - Drive higher assurance for open source and commercial software
- Leverage: Raise work factors required to compromise commodity hosts
  - Eliminate remote access penetration vectors
  - Prevent privilege escalation
  - Manage information leakage
  - Verify tool chain and resulting software
  - Rapidly detect and remediate flaws or breaches
- Approach: Pool research efforts across OECD countries to create and evolve a shared host platform reflecting best IA engineering practices
- Research: Motivate technical research via needs of an existing and readily-accessible free implementation

Finally, Mallery presented 10 technical features for a trustworthy operating system.

1. Safe Language*: No penetration vectors
   - Clean semantics – lambda calculus, extensible
   - Design for verification
   - Composability (practical even if incomplete)
2. Trusted Operating System*: Enforce least privilege
   - Separation kernels or hypervisors
   - Factored into well-defined independent cooperating components
   - Critical components verified
3. Binary Hygiene*: Eliminate return oriented programming
   - Control function entry/exit points (gates)
4. Information Flow Control: Manage side channels
   - Leak resistance
5. Monitoring: Audit & Accountability
   - Multi-scale reference models
   - Privacy awareness
6. Recovery: Efficient diagnosis and rollback to known states
   - Transactional persistent memory
7. Safe Networking Stack: Enforce least privilege
   - Protocol and channel separation by application, process or thread
8. Authorization & Authentication System: Manage least privilege
   - Non-by-passable
9. Separation User Interface:
   - Manage domain crossings explicitly
10. High Productivity Trusted Software Engineering*:
    - Inside industry development Cycles
    - Verified tool chain

During the discussions, Bart Preneel suggested cryptographic software stack as an additional requirement and everyone agreed.

International Cooperation on Cryptology – Bart Preneel

Speaker: Bart Preneel is a full professor in the research group ***COSIC*** of the ***Electrical Engineering Department*** of the ***Katholieke Universiteit Leuven*** in ***Belgium.*** His main research area is information security focussing on cryptographic algorithms and protocols as well as their applications to computer and network security and mobile communications.

Professor Bart Preneel presented the **ECRYPT II** project[25], a Network of Excellence project in Cryptology with 11 partners and 25 associate partners (1 from Taiwan). *ECRYPT II,* which stands for *European Network of Excellence for Cryptology II,* is a 4-year network of excellence funded within the Information & Communication Technologies (ICT) Programme of the European Commission's Seventh Framework Programme (FP7) under contract number ICT-2007-216676. It falls under the action line *Secure, dependable and trusted infrastructures*. ECRYPT II started on 1 August 2008 and runs until the end of 2012. Its objective is to continue intensifying the collaboration of European researchers in information security.

The main objective of ECRYPT II is to ensure a durable integration of European research in both academia and industry and to maintain and strengthen the European excellence in these areas. In order to reach this goal, 11 leading players and 20 adjoint members to the network propose to integrate their research capabilities within three virtual labs focusing on symmetric key algorithms (SymLab), public key algorithms and protocols (MAYA), and hardware and software implementations (VAMPIRE). ECRYPT II has been publishing widely used yearly report on algorithms and key lengths.

Some of the technical objectives of ECRYPT II include improving trade-offs between cost (footprint, power and/or energy consumption), security and performance**;** development and analysis of advanced cryptographic protocols for distributing trust**;** and secure hardware and software implementations**.**

The ECRYPT II research roadmap for the next 10 years is motivated by the changing environment and threat models in which cryptology is deployed and has a focus on Crypto for Internet of Things including the need for low energy crypto; Crypto for cloud computing including distributed cryptography; fully homomorphic encryption; cryptology for use in applications (in part driven by regulation) e.g. privacy for smart grid; privacy for road pricing; e-voting; and advertising.

In terms of the key elements required for the cryptology area on an international level, there is a need for an integrated policy at EU level and international collaboration is required across academia, industry and government agencies and there is a significant need for collaborative research and its interaction with policy. To build an international strategy for INCO, there is a need for collaboration on cryptographic algorithms with the forging of open competitions with shared governance; effective standardization and continual updates of a key lengths and parameters document (management of standards). Collaboration also should take place on cryptographic protocols motivated by distribution of trust and privacy (key component in privacy by design) and joint research also need to occur in these areas. We can be more effective by avoiding duplication and increasing impact on both the technology and policy levels. Professor Preneel concluded by saying it was good to see that Cryptology is included in the research agenda presented earlier within the identified BIC topics.

[25] **http://www.ecrypt.eu.org/**

Trust & Security for Mobile Communication Services – EU- India cooperation – Abhishek Sharma

Speaker: **Abhishek Sharma** is Co-founder, MD & CEO of NetEdge Tele-Solutions (NTS). He is a veteran of the ICT domain with authority on Telecom & Radar. Abhishek has a B.E. Degree in Electronics & Telecom Engineering, from GEC, Jabalpur, M.E. in Computer Sc & Automation from I.I.Sc, Bangalore, Masters in Management Studies from College of Defense Mgmt & M.B.A. in Marketing from IGNOU Delhi. His company develops mobile applications on Utility VAS for GSM/ CDMA mobile users. Abhishek is also international consultant on Mobile VAS, Telecom Network, Radar Data Systems and Avionics. He has rich experience of managing large business, Operations & projects, setting up GSM, CDMA, Satellite & Radar NW and BSS, OSS solutions. Abhishek has participated in many national 7 international seminars and events and has pitched novel product & solution ideas.

INTRODUCTION

In the world of computers and communications, the more widely a technology is used, the more likely it is to become the target of hackers. Such is the case with mobile technology, particularly Smart Phones, which have exploded in popularity in recent years. Smart Phones becoming very popular among people and a considerable part of the population owns at least one of them. The main reason behind this growing popularity is the availability of variety of applications for them, be it for entertainment, utility or just better user experience. This popularity has attracted enough hackers to make the potential for serious security threats a reality. McAfee Labs' threat report for 2010's fourth quarter reported a 46 percent increase in malware targeting mobile phones over the same time period the previous year. More than 55,000 new pieces of malware are seen on a daily basis as per the report. Visiongain research shows that the number of mobile malware more than doubled in 2011 from 2010 with over 200 new variants in the first half of 2011 alone

Mobile devices are the fastest growing consumer technology, with about 600 million smart phones today to crossing 1.74 billion by the year 2012. Mobile applications are likewise booming. In June 2011, for the first time ever people on average spent more time using mobile applications (81 minutes) than browsing the mobile web (74 minutes). With this scenario, Mobile devices increasingly face various types of threats from mere Annoyance to invade privacy, propagation, malicious tools or Steal Money. Threat to mobile money transactions could be one of the most dangerous and painful security threat. The value of mobile payment transactions is projected to reach almost $630 billion by 2014, up from $170 billion in 2010[5]. Vendors, retailers, merchants, content providers, mobile operators, and banks are all actively establishing new payment services. Mobile payments create an attractive target for attackers, as they allow direct monetization of attacks.

MOBILE SECURITY THREATS & MOBILE APP VULNERABILITY:

Security Threats: It important to analyze the sources of such threats besides analyzing the vulnerability. Mentioning a few major ones – **Botnet**, which is a collection of compromised devices connected to the Internet. The malware gives hackers remote control of the compromised devices, which can then be instructed to perform harmful acts. The easiest way for an attacker to benefit from a mobile botnet is to send SMS or multimedia message service (MMS) communications to a premium phone account that charges victims fees per message. **Malicious applications** are usually free and get on a phone because users voluntarily install them. Once on a handset, the programs steal personal information such as account passwords and logins and send it back to the hacker. **Social Networking** has grown enormous as smart phone use has grown, so has mobile Malicious links on social networks can effectively spread malware. Participants

tend to trust such networks and are thus willing to click on links that are on “friends’” social networking sites, even though a hacker may have placed them there. **Spyware** available online are used to hijack a phone by hackers, allowing them to hear calls, see text messages and e-mails, and even track a user’s location through GPS updates. Bluetooth enables direct communication between mobile devices. Wireless devices can broadcast their presence and allow unsolicited connections. Though on rare occasions, mobile malware has used Bluetooth to propagate. In case of Wi-Fi Hackers can intercept communications between smart phones and Wi-Fi hotspots. In this scenario with has no encryption to protect transmitted data., the hacker gets between the user and the hotspot provider and hijacks the session via a man-in-the-middle attack. **Phishing** poses the same risk on smartphones as it does on desktop platforms. Mobile phishing is particularly tempting because wireless communications enable phishing not only via e-mail, as is the case with PCs, but also via SMS and MMS. Social media phishing is becoming a major issue as social networking sites contain an increasing amount of personal information.

App Vulnerability: Like traditional applications for desktop / laptop computers, mobile apps too suffer from myriad security vulnerabilities. Many of these vulnerabilities are unintentional, caused by poor programming practices. Vulnerabilities can also be intentional and malicious, hidden within a seemingly safe and legitimate app. Some security vulnerabilities occur when sensitive data is transmitted to and from remote servers over unencrypted channels. Perhaps the most severe app vulnerabilities are those that exploit lax security of stored data.

SECURITY APPROACHES

Traditional Security Approaches: Mobile communications can use the same types of security-antivirus and firewall products as fixed communications. Vendors include Fortinet, F-Secure, Juniper Networks, Trend Micro etc. Mobile security software can also better use the cloud to offload some of the processing.

Mobile Encryption software is another approach but there are only a few such as Cryptech by Caspertech, Cellcrypt by Cellcrypt Mobile, ComSecure by NetEdgeTeleSolutions, Phonecrypt. They’re scarce primarily because they’re challenging and expensive to develop.

Vetting the Apps by Purchasing organizations or a third-party labs before buying them is another approach. . However, the vetting process poses several challenges, including specifying security and analysis requirements; identifying appropriate tools, mechanism, and approaches for analyzing security vulnerabilities and finding appropriate personnel to manually vet the apps. To foster the availability of only “safe” apps, it’s also necessary to vet the app store. However Before you can analyze an application, you need an infrastructure for testing the application and reporting the results.

STATUS & DEMAND

Currently, app stores don’t incorporate a vetting process that thoroughly examines potential security vulnerabilities in apps made available to consumers. This is likely due in part to the cost and time associated with vetting an app, as well as the potentially complex and contentious interactions needed with developers to resolve identified vulnerabilities. Given the growing potential for dangerous and widespread vulnerabilities, however, it’s becoming increasingly critical to vet apps for such vulnerabilities, but in a cost- and time-efficient manner.

As the mobile ecosystem evolves and hackers probe for vulnerabilities, devices will face a growing number of a variety of attacks viz a viz those traditionally launched against desktop systems. The need is to increase analyzing the attacks. The greater

visibility of these attacks will place an increasing importance on mobile device makers to include security features and configuration options in place. Also to make it necessary that security is to be considered in all phases of application development to ensure that resiliency against attacks is built into mobile devices from the start.

Commercially, the global market for Mobile Security is projected to reach $14.4 billion by 2017, primarily driven by rapid proliferation of feature phones and intelligent mobile computing devices. Increasing use of mobile devices for accessing data services and corporate networks and the emergence of open network concept, which opens up potential risk avenues from security and privacy perspective will boost market prospects over the next few years. Robust demand from Asia-Pacific market also augurs well for the future of this market.

CONCLUSIONS

In future, there will be significantly more confidential operations like banking transaction, mail exchanging will take place from mobile only. In these cases, it is very necessary to protect the customer data and application from various attacks. Since the Smartphone/ Mobile penetration is increasing globally, it makes a lot of sense that large regions, particularly regions like Europe and India/ Asia collaborate closely for the Research & Industrial Developments. Many companies are already putting efforts in making their consternation for securing mobile data and application.

Finally, it's critical to understand what there is to lose before a mobile security breach occurs. The ultimate goal is not about completely eliminating mobile security risks but rather having the proper systems in place to minimize the impact when breaches occur. Well thought out controls involving the proper security technologies combined with the proper documentation and business processes are essential.

BIC CONTRIBUTION

Today, the realisation has come and lots of efforts are in progress at different locations, organisations & institutions and different levels towards addressing the issues related to Trust & Security. There is also lots of focus towards mobile Security. However all these efforts are happening largely in isolation and wherever there is any cooperation and coordination between different organisations, it is very limited. Focussed and targeted international cooperation shall play a major role in this massive & coordinating efforts for research, development and implementation of measures required to be taken to address this menace of the "breach of Trust & Security for Mobile". Towards this, BIC can and have to be a key player in ensuring this critical coordination. Following actions are suggested:

- Increase the degree and level of Industry participation from the level where it is today.
- An appropriate combination of SMEs and large corporate with balanced mix with research bodies would be ideal.
- Suitable selection criteria, based on result orientation & capabilities of the participants may be worked out.
- Special incentive coupled with delivery commitments be accorded to SMEs who are more oriented and geared up for faster deliveries.
- Increasing the frequency of interactions by way of seminars and events.
- Create a Project Management Team or a sub group under the Programme Manager, comprising of representatives from Institutions and industry (SME & Corporate) with defined leadership, targets & timelines.

A mobile has already become a full time companion. Soon it shall be a full time friend, philosopher & guide and all in one service provider. Most of the "Delivery of Services" shall happen through mobile, world over. It would not be any exaggeration to say that these are "desperate" times ensuring "Trust & Security for Mobile" and *desperate times need desperate measures.*

EU-US joint CIIP Exercise, Cyber Atlantic 2011 – Raznan Gavrila

> **Speaker: Raznan Gavrila** is the Network and Information Security Operation Officer, CIIP & Resilience Unit, at European Network and Information Security Agency (ENISA).

The European Union's cyber security agency, ENISA[26], organised an EU – US Joint CIIP exercise, called Cyber Atlantic 2011, which was held on 3rd November 2011. The idea for this exercise was discussed during a number of events and initiatives including: EU-US summit of 20 November 2010 (Lisbon); EU-US Working Group on Cybersecurity and Cyber Crime (EU-US WG). The holding of the event was formally announced on 15th April 2011 during the Hungary Ministerial Conference by Commissioner and DHS Secretary and ultimately held on 3rd November 2011.

Cyber Atlantic 2011 was the first joint EU-US cyber exercise and was comprised as a centralised table-top exercise in which over 20 countries were involved (17 countries played). The overall planning and preparation was carried out by ENISA and DHS incorporating facilitation and overall management of the preparation and evaluation phases. The planners teams were from: AT, BE, EE, ES, FI, FR, HU, IT, NL, RO, SE, UK, ENISA, US/DHS, EC, JRC.

Cyber Atlantic 2011 was an exercise of an exploratory nature with the following objectives:

- Explore and identify issues in order to improve the way in which EU Member states would engage the US during cyber crisis management activities;
- Explore and identify issues in order to improve the way in which the US would engage the EU Member states during their cyber crisis management activities, using the appropriate US procedures;
- Exchange good practices on the respective approaches to international cooperation in the event of cyber crises, as a first step towards effective collaboration.

There was a two part scenario: Advanced Persistent Threat (APT) scenario with a hacker group, "Infamous" exfiltrated sensitive documents from EU and US – 'Euroleaks' web site and Supervisory Control and Data Acquisition (SCADA) scenario highlighting vulnerabilities leading to backdoors (and failures) on Programmable Logic Controllers of power generation equipment.

The lessons learned (tentative) from Cyber Atlantic 2011 were:

- Mechanisms/structures for cross-border cooperation do exist; however, each country needs awareness of all communications options ;
- Exchange Standard Operation Procedures (SOPs), trainings, exercises;
- Exercises need increased participation from all three: Technical, Law Enforcement, Policy/Political;
- Single Point of Contact in EU for US would help but is not compulsory;
- More exercises/workshops are needed!

[26] http://www.enisa.europa.eu/

Information Security by NICT and the Government of Japan - Hiroyuki HISHINUMA

Speaker: Mr. Hiroyuki HISHINUMA is currently Director of Europe Center, **National Institute of Information and Communications Technology (NICT),** which is a research institute of ICT in Japan. Before he came to NICT, Mr. Hishinuma worked in the Ministry of Internal Affairs and Communications (MIC), the Government of Japan, dealing with telecommunications policy.

1. Information Security Policy by the Government of Japan (MIC: Ministry of Internal Affairs and Communications)

MIC has developed an information security policy consisting of four aspects; network, individuals, technology and international partnership & collaboration.

As a solution to fight against cyber attacks, MIC started a new project based on international collaboration in this April. The project aims at gathering research institutes, ISPs and other experts, and the project establishes an information-analysis and -sharing system that utilizes cyber-threat data, gathered through various sources.

MIC wants to implement various effective activities with collaborating partners, including information exchange, joint R&D, etc., on various levels, such as the government, research institute and operational level. MIC hopes other countries to be a collaborating partner.

2. R&D on Cybersecurity by NICT (NICT: National Institute of Information and Communications Technology)

NICT researches and develops “nicter”, that is Network Incident analysis Center for Tactical Emergency Response. “nicter” is the largest network monitoring system in Japan. In the nicter, Macro analysis System is a darknet monitoring and analysis system. Micro analysis System is a fully automated and isolated malware analysis. Network and malware enchaining system binds phenomena (or attacks) and root cause (or malwares). Then candidates of infecting malware can be listed.

Among the Macro analysis System in ”nicter”, Mr. Hishinuma demonstrates geographical traffic visualization, which shows geographical positions of a packet’s source and destination from the IP addresses in real time.

NICT is conducting Research and Development to investigate practical Cybersecurity technologies. NICT still needs new frameworks to monitor, analyze and respond the emerging threats. International collaboration is crucial for Cybersecurity field.

3. Discussion

Mr. Hishinuma was asked whether MIC has already started cooperation with other countries on the new project. Mr. Hishinuma answered that discussions for collaboration with EU, France, U.K., and ASEAN countries are going on. His colleague in NICT has just visited South Korea to collaborate with this in the last week.