Research Report
55th Meeting of the IFIP 10.4 Working Group on Dependable Computing and Fault Tolerance
Cortina, Italy, January 31, 2006

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Fault and Intrusion Tolerant NEtworked SystemS

Roadmap

- People
- Short overview of some of our current research projects
- My research report at the 50th meeting: how it went
- Lessons Learned
- Hope it will happen again ;-)
- Contact Info

People

FITNESS staff

- Faculty:
  - Luigi Romano, Associate Professor
  - Salvatore D'Antonio, Assistant Professor
  - Luigi Coppolino, Assistant Professor
  - Opening for a Full Professor position and for an Associate Professor position (blocked by Ministry of Research recent actions on recruitment)
- PhD Students:
  - Mario Ciampi
  - Massimo Esposito
  - Massimo Ficco
  - Luigi Gallo
  - Salvatore Giordano
  - Valerio Vianello (currently at Nokia Research Center)
  - Ivano Elia
  - Aniello Minutolo
- Research Assistants (10+ people)

Our Multiple Hats – 1/3

- The University of Naples "Parthenope" is one of the three Universities in Naples with a Faculty of Engineering

- The Faculty of Engineering (http://www.ingegneria.uniparthenope.it/) was founded in 1999

- Current offer includes:
  - 3 first-level degree programs (3 years):
    - Telecommunication Engineering
    - Civil Engineering
    - Business Engineering
  - 2 Master degree programs (1 year)
  - 2 second-level degree programs (2 years)
  - A joint degree program with the Polytechnic of New York

Our Multiple Hats – 2/3

- CINI (*Consorzio Interuniversitario Nazionale per l'Informatica*) is a consortium of Italian Universities operating in the fields of Computer Science and Computer Engineering

- It was founded in 1990 as a non-profit organization to foster the co-operation of Italian computer scientists and engineers in nation-wide and international projects

- It currently comprises the major Italian Universities , including the University of Naples Parthenope

- It is partially funded by the Ministry for University and Research (MIUR), and by the Ministry for Industry

Our Multiple Hats – 3/3

- Established in 2005 as an outcome of the Regional Competence Centre on ICT (which had been funded by Regione Campania with an initial installment of 25M€)

- Its objective is to build a Competence Network in the Information and Communication Technology (ICT) field

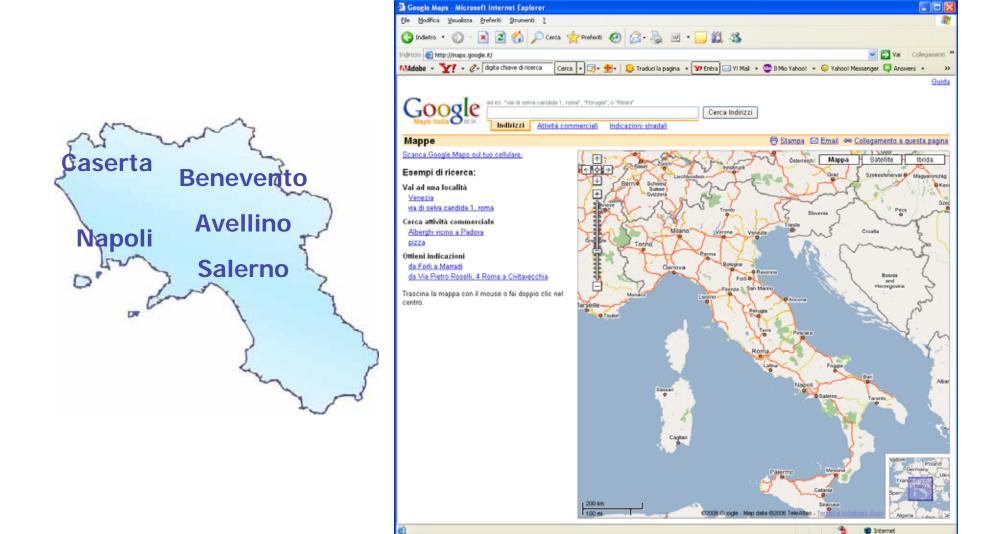- Virtual enterprise organization, connecting three geographically distributed units (Napoli, Benevento, Salerno)

Regione Campania

Current Research Projects

Fault and Intrusion Tolerant NEtworked SystemS

INTERSECTION – FP7

- **IN**frastructure for he**TE**rogeneous, **R**esilient, **SE**cure, **C**omplex, **T**ightly **I**nter-**O**perating **N**etworks
  - **Work programme topic addressed**
    - Challenge 1: Pervasive and Trusted Network and Service Infrastructures
    - Objective ICT-2007.1.4: Secure, dependable and trusted infrastructures
  - Start date: January 1st, 2008
  - Duration: 24 months
  - http://www.intersection-project.eu

Motivation and Main objectives

Identify and classify the vulnerabilities of heterogeneous and interconnected network infrastructures (wired, wireless, satellite, mobile networks)

Design and implement an integrated network security framework including different components and tools:

- detect anomalous events
- deploy distributed countermeasures against ongoing attacks
- provide systems with mechanisms for intrusion tolerance, i.e, preventing intrusions from generating a system failure
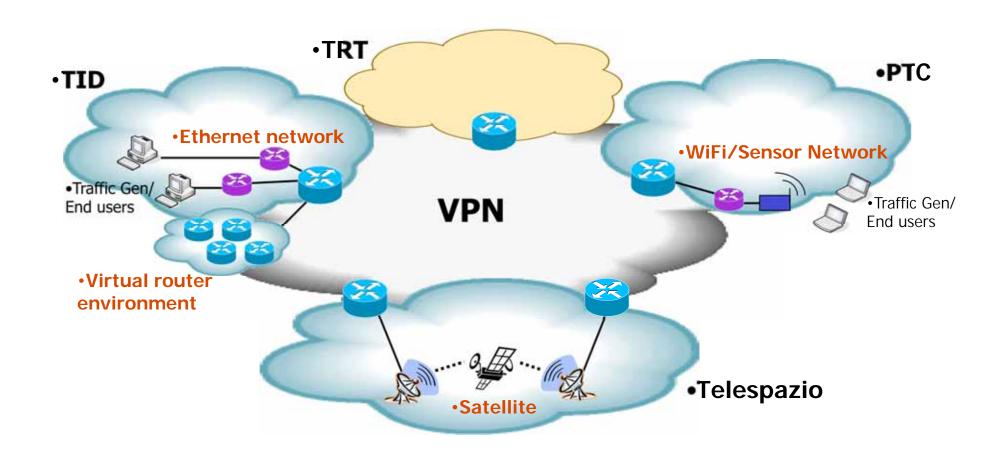
The INTERSECTION demonstrator

INSPIRE – FP7

- **IN**creasing **S**ecurity and **P**rotection through **I**nfrastructure **Re**silience
  - Work programme topic addressed
    - **Objective ICT-SEC-2007.1.7: Critical Infrastructure Protection**
  - Start date: November 1st, 2008
  - Duration: 24 months
  - http://www.inspire-strep.eu/

Motivation and Main objectives

- INSPIRE aims at increasing the security and protection of networked systems controlling Critical Infrastructures through the following key actions:

  – analysis and modelling of relationships between critical infrastructures and communication network

  – design and development of innovative mechanisms and architectures capable to differentiate and prioritize Supervisory Control And Data Acquisition (SCADA) traffic flows

  – development of diagnosis and recovery techniques for networked process control systems

Contacts with US initiatives

- **Mohsen Jafari - Rutgers, The State University of NJ**
  - **Participates to the INSPIRE Group to Experts**
  - **Plans for joint proposals**

- **Dave Bakken – Washington State University**
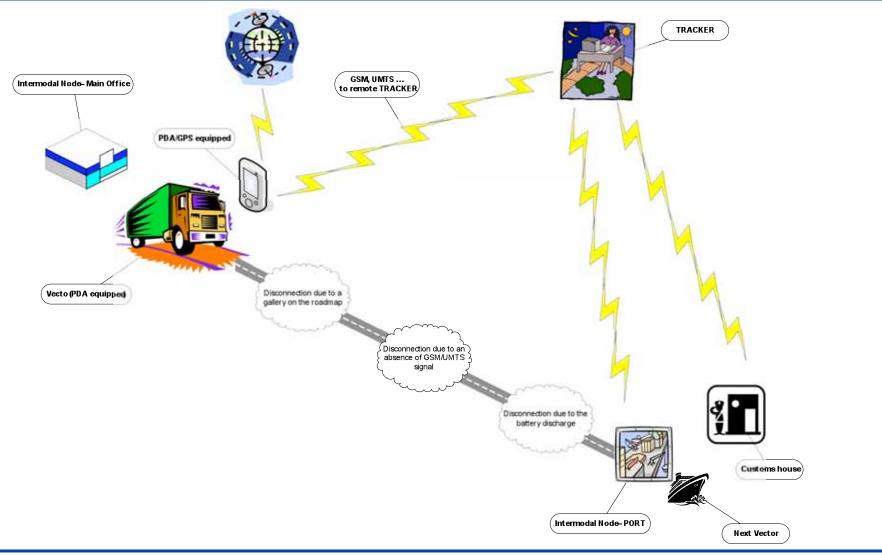 - **Investigating the possibility of interactions with the GridStat project**

SISTEMA – Ministry of Industry

TRACKER

Intermodal Node–Main Office

GSM, UMTS …
to remote TRACKER

PDA/GPS equipped

Vecto (PDA equipped)

Disconnection due to a
gallery on the roadmap

Disconnection due to an
absence of GSM/UMTS
signal

Disconnection due to the
battery discharge

Customs house

Intermodal Node–PORT

Next Vector

The Fault and Intrusion Tolerant NEtwotked SystemsS (FITNESS) research group

Motivation and Main objectives

- To make multi-modal transport convenient
- Focus on "last mile" (particularly: sea → road/railway)
- Tracking of goods
- IP Videosurveillance of stocking areas
- Monitoring of container internal parameters
- Tamper-resistant RFID tag development
- Development of paper-less custom procedures (Digital Signature, Digital Time Stamping, ...)

Cruise Barcelona

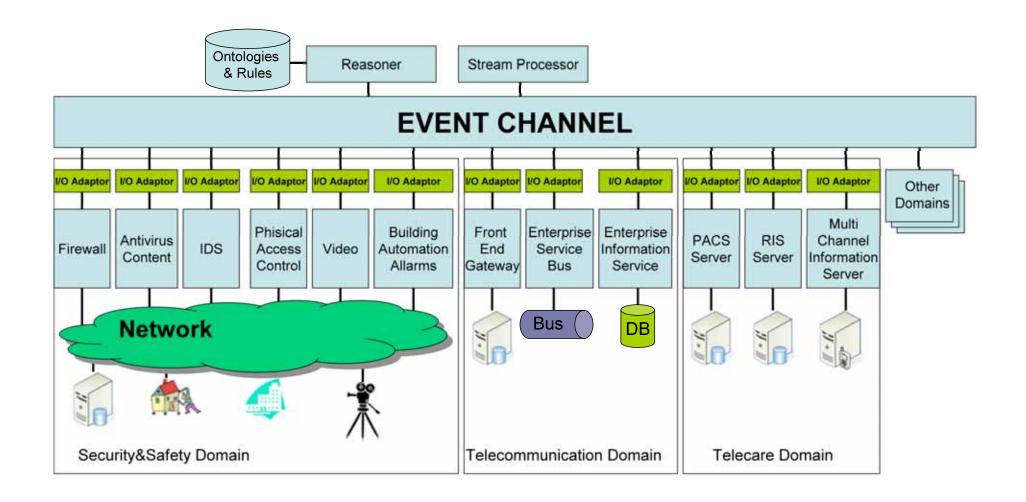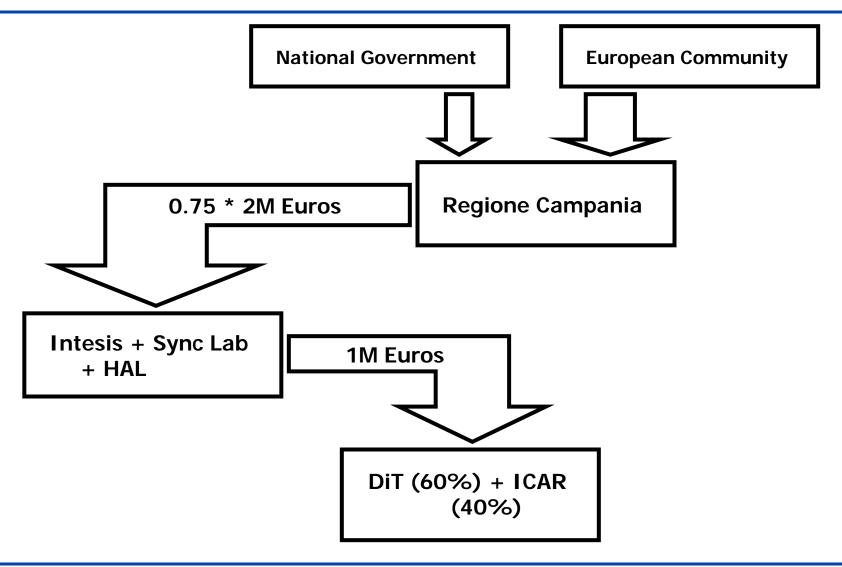# My research report at the 50th meeting: how it went

Fault and Intrusion Tolerant NEtworked SystemS

The PHDS project

Funding Request & Mechanism

National Government

European Community

0.75 * 2M Euros

Regione Campania

Intesis + Sync Lab + HAL

1M Euros

DiT (60%) + ICAR (40%)

Final Grant

National Government

European Community

(0.75 * 2M Euros) * 0.5

Regione Campania

Intesis + Sync Lab + HAL

1M Euros * 0.4

DiT (60%) + ICAR (40%)

Lessons Learned

R&D funding: Europe vs Italy

Excercise:

- – **Come up with a good idea**
- – **Find partners that can help you improve your idea**
- – **Write a proposal for a research project**
- – **Get money to develop the project**

Solution – Europe (EC)

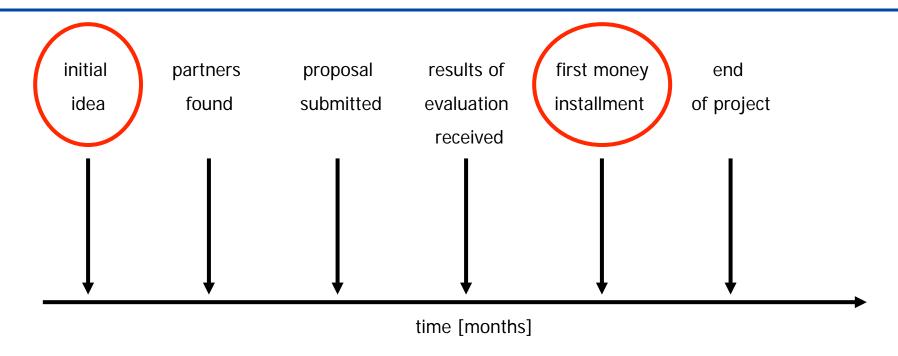initial idea | partners found | proposal submitted | results of evaluation received | first money installment | end of project

time [months]

- Time elapsed bw "initial idea" and "first money installment" < 10 months
- Entire timing known in advance
- Rules/constraints known in advance
- Selection process (relatively) fair
- (Size of granted funding) / (Size of requested funding) typically close to 1 (in the range [0.9 -1])
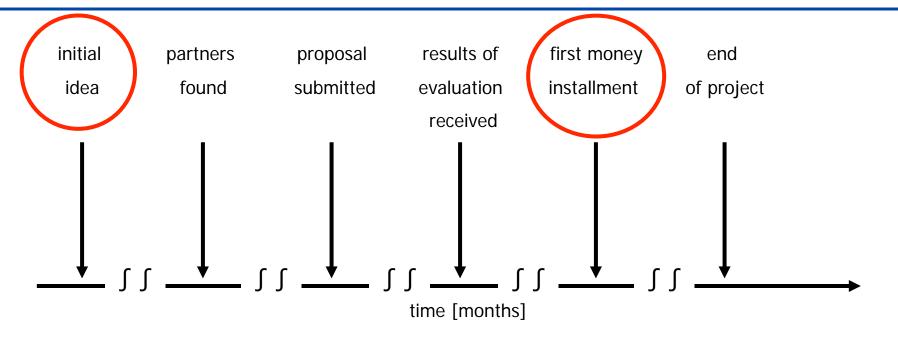
Solution – Campania

initial idea   partners found   proposal submitted   results of evaluation received   first money installment   end of project

time [months]

- Time elapsed bw "initial idea" and "first money installment" unpredictable
- Timing entirely random (and heavily influenced by external factors)
- Rules/constraints partially known (and – worse! – change over time)
- Selection process obscure
- (Size of granted funding) / (Size of requested funding) often << 1

@ Exercise done wrt Campania, which is probably a best case scenario, as compared to the rest of Italy
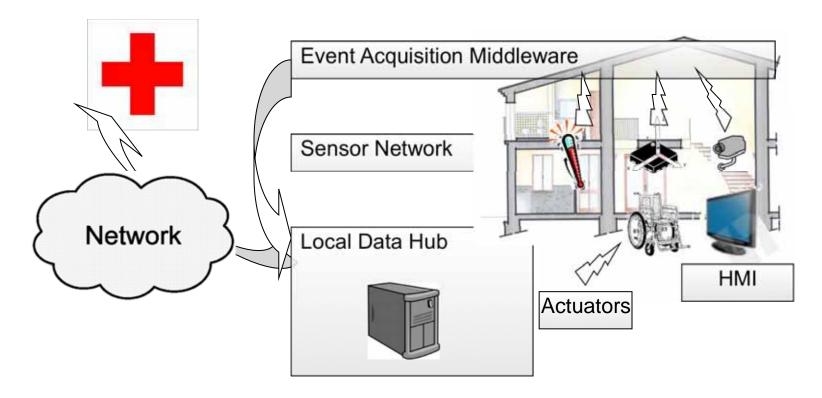
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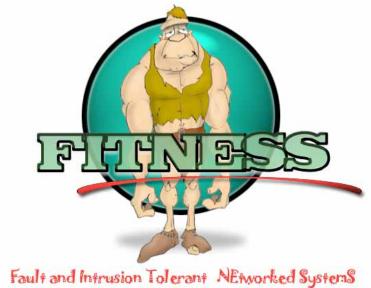
Living House System (LHS) – Industria 2015

Contacts

Contact Info

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The **F**ault and **I**ntrusion **T**olerant **NE**tworked **S**ystem**S**
(FITNESS) Research Group
http://www.dit.uniparthenope.it/FITNESS/