Assessing, Measuring and Monitoring Resiliency

Andrea Bondavalli
Resilient Computing Group
Università degli Studi di Firenze

Distributed systems and ICT infrastructures

The relatively new ongoing integration of Information and Communication Infrastructures

- **between them (E-Commerce, E-Government, E-Health, E-whatever….) and**
- **with more 'basic' commodity infrastructures (power, water, gas….)**

including

- **legacy components,**
- **control and embedded systems,**
- **built mostly with COTS basic components**

poses many formidable challenges for its dependable and secure deployment.

Challenges

Among such many challenges here we highlight

i) the required capability to assess and measure the QoS provided to a variety of actors - users (and groups thereof), providers and other actors such as assessors, owners…. etc

ii) the capability required to each entity acting in such context to dynamically adapt to the unpredictability of the environment and to the evolution of its components,

which requires and assumes in its turn the capability to perceive reality in a correct and timely way and predict future (even short term) behavior.

What is needed

Both Assessment and Prediction of such complex world challenges our consolidated background and new paradigms and practices need to be investigated.

We need

- to combine different analysis approaches….

- experimental activities such as measuring prototypes or running systems or testing with fault injection

- Modeling for end to end evaluation and generalization of results

- when monitoring we need also to perform evaluation in real time so we need to be fast!

-We need to combine rigor (Metrology, Statistics….) and relaxed precision due to approximations to aim for quick dynamic decisions.

- This kind of usage opens also a new perspective for modeling approaches and related tools!!!

Awareness of the reality

Whatever we do we always need the capability to perceive reality in a correct (and timely) way

This is true both for the

- **time dimension (synchronization and consistency) and for the**
- **space dimension for the mobile agents.**

A step in this direction is represented by RS&A Clock thought a basic building blocks for architecting dynamic and adaptive systems.

The RS&A Clock provides a time value and the associated Uncertainty, (with an associated coverage)

It allows its users to get aware of their synchronization with respect to a global time reference. So of their current ability to perceive the world around them.