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# Interdependencies and security metrics

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# Questions for Discussion

- Are there emerging problems in the present and future of Critical Information Infrastructure Protection (CIIP), with special emphasis to **mutual dependency** and cascading effects?
- Are there **metrics** that can be used to measure with repeatable results mutual dependency and cyber security status of an ICT system or network? Can measurement theory or practice be expanded to improve our ability to quantify the level of CIIP and mutual dependency?
- How can **modeling** and **simulation** methods contribute to a science of CIIP and Dependency Analysis?
- Is there reason to believe the above goals are, in principle, not **achievable** and if so, why not?

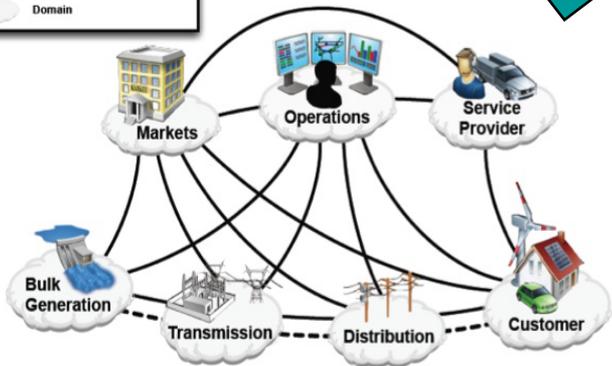
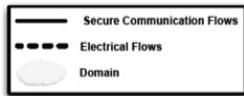


# The Model Driven Security (MDS)

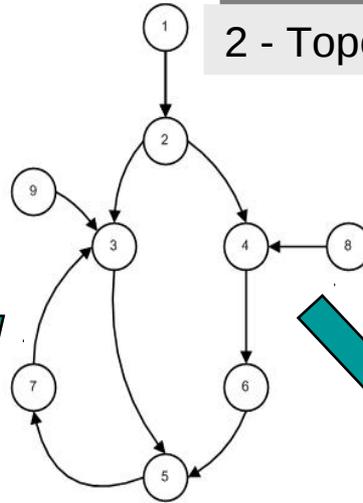
- full integration of security into the Model Driven Development (MDD) of the system
- development of complex software systems. It is based on the concepts of modelling the system in generic modelling languages
- From these models, large parts of software can automatically be generated
- In addition to the functional model, MDS now integrates security relevant information into MDD
- MDS provides for: Model Driven Protection (MDP), Model Driven Security Accreditation (MDSA), Model Driven Risk Assessment (MDRA) and Model Driven Security Monitoring (MDSM)

# Modeling and analysis of System of systems

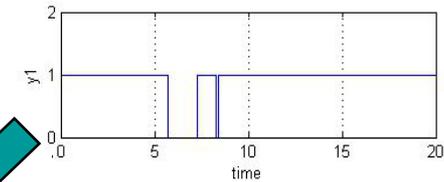
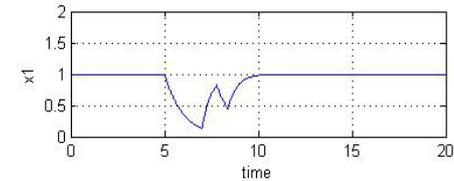
## 1- System of systems



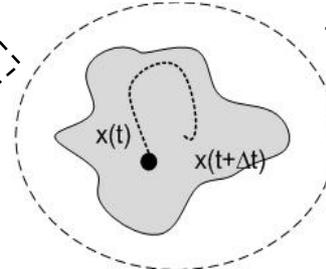
## 2 - Topology



## 3 - Failure dynamics



## 5 - Resilience informed design



## 4 - Resilience control

# Conclusions

- CIIP is an issue (SWIM security problem): complex systems of systems need modeling and simulation tools and solutions to identify vulnerabilities and cascade down strict security policies and requirements
- Metrics; KPIs for security in ATM; qualifiable/non quantifiable. But interfaces/trade offs with other ATM KPA exist: safety, capacity, cost, efficiency, where some metrics can be identify
- Goals (must be) achievable (indeed needed); but not easy