Towards a Discipline of
Mission-Aware Cloud Computing
(A Position Paper)

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Cloud Computing

- ➢ The NIST terminology
  - ❖ IaaS, PaaS, SaaS
  - ❖ Public, Private, Hybrid, Community
  - ❖ Elasticity, on demand, etc
- ➢ Basic premise
  - ❖ The cloud is here to stay
  - ❖ We are only in the initial stages
- ➢ Layman's terms
  - ❖ Cloud computing moves computing, data, information resources into the network (the "cloud") and
  - ❖ Make these instantly and seamlessly accessible from multiple devices (PCs, smart phones and tablets)

Cloud Computing

- ➢ Attractions:
  - ❖ Economics
  - ❖ Productivity
- ➢ Concerns:
  - ❖ Dependability
  - ❖ Security
- ➢ Guess who wins?!

Cyber Security

Cyber security has evolved

❖ Computer security

❖ Computer security + Communications security

- Consider ACM Computer and Communications Security (CCS) Conference founded 1993

❖ Information security

❖ Information assurance

❖ Mission assurance

- The cloud, or any other cyber infrastructure, by itself cannot guarantee mission assurance.
- Cyber security then becomes a piece of the larger goal of mission assurance.

Mission Aware Cloud

Research challenges include
- ❖ Realistic-scale experimental instrumented research cloud infrastructure
- ❖ Enhancing strength of VM separation
- ❖ Predictability of computation/communication performance
- ❖ Identification and mitigation of new attack paths and threats
- ❖ Models and languages for specifying cyber requirements of a mission
- ❖ Automated adjustment of mission cyber support based on cyber/external situational awareness
- ❖ Rapid reconfiguration in response to major mode changes
- ❖ Protecting/controlling information on the client