

NSF Campus Cyberinfrastructure PI and

Cybersecurity Innovation for Cyberinfrastructure PI Workshop

September 24-26, 2017 University of Maryland, College Park, Maryland

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Project Titles: Regional Embedded Cloud for As-a-Service Transformation (RECAST), Network Embedded Storage and Compute (NESCO)



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# Regional Embedded Cloud for As-a-Service Transformation (RECAST)

### Challenge:

 Researchers are increasingly interested in an emerging class of hybrid services focused on turnkey, on-demand, integration of private/public clouds, cyberinfrastructure, scientific resources, and high performance networks.

#### Solutions:

- New paradigm for flexible edge infrastructure in the form of "Software Defined ScienceDMZ (SD-SDMZ)".
- By sharing SD-SDMZ as regional services, campus IT groups can offload the complex work of developing specialized services and trust it to a regional team that has pooled and dedicated expertise in providing high-performance, integrated services.



#### **Broader Impacts:**

• New paradigm applies to many other regions that have a high speed regional network. Especially useful for underserved campuses who cannot afford offering their own SDMZ or SD-SDMZ.



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Network Embedded Storage and Compute (NESCO)

#### Challenge:

- Networks embedded compute and storage are not generally available for domain science workflow tailored services
- Need fine grained flow management functions to leverage these types of infrastructures

#### Solutions:

 Exchange point embedded private cloud (compute and storage) with high performance hardware flow processing based on P4 (Programming Protocol-Independent Packet Processors) programmable network elements.



#### **Broader Impacts:**

- Establishment of a new paradigm for R&E network designs which includes network embedded compute and storage resources and fine grain flow management will allow new types of cyberinfrastructure services
- Democratization of the Middle Box Functions, serving smaller research groups will allow more innovation