Computational Offloading in Tactical Environments

David Doria, (410) 278-2310
david.l.doria.civ@mail.mil

S&T Campaign: Computational Sciences
Advanced Computing Architectures

Research Objective
- Develop new algorithms for Tactical Cloudlet Seeding (TCS) – intelligent placement of deployable High Performance Computers (HPC)
- Introduce the concept of simultaneous Mobile-HPC Path/Computation Scheduling
- Design an R&D software framework (Computation Offloading Emulation Environment) – to validate models and results

Challenges
- Existing HPC placement algorithm runtime is exponential
- Current mobile HPC path scheduling model is oversimplified
- Large physical tactical networks are challenging to field for testing

ARL Facilities and Capabilities Available to Support Collaborative Research
- Ability to run complex large scale network simulations
- Network emulation software and dedicated hardware

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration
- Experience with ad-hoc routing algorithms
- Large network simulation

ideal 3-way tactical network partition

A tactical network composed of mobile devices and HPCs

Comparison of TCS Algorithm Scalability

Predicted scalability of approximation algorithm

Our Computation Offloading Emulation Environment (COFFEE) system

Latency vs Distance