

Project Title: Net100 -- Developing Network-Aware Operating Systems

PI: G. Huntoon, T. Dunigan, B. Tierney

Institutions: PSC, ORNL, LBL

## Project Goals

Develop model for network-aware OS

- optimize end-to-end net performance
- push network expertise into the OS
- eliminate the "wizard gap"
- use sensors and probes to tune net applications

## Scheduled Accomplishments

- Extend/deploy Web100 kernels
- create NTAF and prototype NAIB
- deploy sensors and probes
- demonstrate auto-tuned bulk transfer

## Project Elements

- Web100 network-aware OS
- Network Tool Analysis Framework
- Network Analysis Information Base
- DOE distributed applications

## Future Plans

- Integrate NAOS into grid applications
- Integrate Net100 tools into HPSS
- Analyze tuned vs non-tuned apps
- Analyze TCP extensions/alternatives

# Project Goals



## Objective:

### Develop network-aware operating systems

- Optimize end-to-end network and application performance
- Push the network expertise into the OS
- Eliminate the “wizard gap”
- Migrate away from network-aware applications

# Project Elements



- **Web100 network-aware OS (NAOS)**
  - instrumented and tunable TCP stack
- **Network Tool Analysis Framework (NTAF)**
  - launch network tools to measure network
  - extend/develop tools for network analysis
- **Network Analysis Information Base (NAIB)**
  - smart repository for network performance data
- **Distributed applications**
  - DOE bulk transfer applications (point to point)
  - grid-based applications
- **PI's: Huttoon/PSC, Dunigan/ORNL, Tierney/LBL**

# Scheduled Accomplishments



- Year 1

- extend and deploy auto-tuning Web100 kernels
- create the NTAF
  - instrument tools (*iperf*, *pipechar*, *GridFTP*) with Web100
  - interface NTAF with NWS
  - deploy net sensors and probes
- design and prototype NAIB
- investigate optimizations for single TCP flows
- demonstrate auto-tunable bulk transfer (ORNL/NERSC)

# Future Research Plans



- Year 2
  - integrate NAOS into multi-site distributed applications
  - integrate Net100 tools into HPSS transfer protocols
  - analyze alternatives/extensions to TCP
    - SCTP, rate-based, multipath
  - analyze impact of tuned applications on non-tuned apps
- Year 3
  - integrate NAOS into DOE distributed applications
    - auto-tuning grid applications
  - document and standardize NAOS
  - integrate Net100 into other vendors OS