High Performance Computing Security

**Jesse Pollard,
Senior UNIX Analyst
NAVOCEANO MSRC
pollard@navo.hpc.mil**

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High Performance Computing Security

- Needs low overhead
- Protect facility and data
- Easy to use
- Usable audit trails
- Everywhere …

Security Context

- Host/port addressing
- User identity
- Classification of the user and data
- Privileges of the user

"Network Security" Limitations

- Firewalls can only make decisions based on host/port/protocol

- Have no user or data security context

- Reduces throughput significantly

- Routers have limited audit capability

Host support for IPSec

- User identification/authentication

- User and data security classifications

- Defines port access rules

- Encryption

Host Support for MLS

- User identification and Authentication
- User and data classifications
- Protect internal system configuration
- Provide capability controls

Internal Host Needs

- Capabilities to control network access
  - approved applications
  - approved users

- MLS security classifications
  - protect system data structures
  - protect system applications
  - facility control of users and user data

Host Network (IPSec)

- Pass user identity and authentication

- User and data classification

- Authenticate host to host communications

- Apply packet level encryption based on

  - user and data classifications

  - remote host identity

- Translate remote user and classifications to the local user and classifications

Benefits to the User

- Simplified Applications

  - can use socket level programming safely

  - user, data, and security classifications handled by IPSec and host

- Reduced overhead where possible

  - optional packet level encryption

Benefits to the Facility

- Enforceable security controls
  - defined by the list of trusted hosts and users
  - defined by the location of the hosts
  - cannot be bypassed

- Reliable audit trails
  - controlled by the system
  - cannot be bypassed