HPCMP SaaS Portal Overview
NDIA Physics-Based Modeling In Design & Development for U.S. Defense

February 21, 2013
Overview

• What is the HPC Portal?

• Kestrel

• MATLAB / TASAT

• HPC Portal legacy/COTS application delivery

• HPC Portal development tools

• Future
Motivation for HPCMP Portal

- **Increasingly Difficult to Install ANY Software on DoD Desktop**
  - True Barrier for Many HPC Applications and Associated Workflow Tools
    - Client Software Installation Barriers
    - Firewall and Networking Barriers
    - Networking Bandwidth Barriers

- **Traditional HPC Access Limits Individual User Productivity**
  - Steep Learning Curve for HPC Novice Scientist and Engineers Skill Sets
  - For Experienced HPC Users Traditional Access Limits Collaboration

- **HPC Portal Lower Barriers and Increase Adoption of HPC Tools by Individual Projects (Project Productivity)**
  - No Local Software Installation Required
  - HPC Training and Skill Set Barriers Eliminated

- **Software as a Service (SaaS) Delivery Model Benefits**
  - CREATE: Ease of Product Release, ITAR Restrictions Complications, Bug Fixes
  - USERS: “Self Published” Applications
  - Highly Enhanced Workgroup Collaboration
Portal Objectives

Zero Footprint
Only a web browser is required
Simplified Security Model

HPC Access DoD Wide
Easy and Accessible
Field Device Compatible
Collaboration

Safe and Secure

Single Sign On
Initial Roll Out: Completed

- Selection of applications based on DoD needs
  - Value to warfighter
  - Overall sustainability and utility to DoD
  - CREATE-AV Kestrel and MATLAB for initial deployment

- 2-April-2012, IATT Pioneer Mode for limited users
- 3-July-2012, Authority to Operate (ATO) received
Operational Standup
14-November-2012

- Kestrel V2
- Distributed MATLAB
- Distributed TASAT
- Virtual Apps
  - Fieldview, Pointwise, Capstone, MATLAB IDE
- Enhancements
  - Web-Shell
  - Job Management
  - Yubikey
Kestrel Delivery Using HPC-Portal

Fieldview Fully Integrated into workflow

Smart Parameter Entry

Convergence Plot (User Selected Parameters)
Matlab for Naturally Parallel Jobs

drag and drop upload
(m files and resources)

automated node distribution
Matlab Example (Naturally Parallel)

- Example 1: DoD Time-domain Analysis Simulation for Advanced Tracking (TASAT) used to determine accurately simulate reflectance and scattering of satellite materials
  - Each iteration generates new light curve with different geometry
  - >500 Matlab source files
  - Also Includes compiled Fortran modules

Example 2: Blur Deconvolution Study
HPC Portal

VIRTUAL APPS FOR LEGACY / COTS APP DELIVERY
Legacy Application Delivery (Level 0) (Virtual Apps)

- Quickest standup for legacy apps or COTS
- No SW changes
- All SW installed at DSRC
- Virtualized machine (Windows or Linux) running on a Linux server
- App delivered via “zero footprint” browser
  - HTML5 + JavaScript (AJAX) only
  - No plug-ins or client-side SW required
  - Eliminates user config and maintenance
Example Virtual Applications (vApps)

MATLAB IDE

vApps Menu

Capstone
HPC Portal SDK

DEVELOPER TOOLS
Portal Developer Tools

**HPC Portal Framework**
API to simplify development of HPC applications

**HPC AppUI**
Jump start and ease user interface development for interactive HPC web applications

**HPC AppTop & VNC**
Legacy application delivery and enhanced desktop experience via the web browser
Portal Developer Tools

- **Portal SDK is being developed for the DoD community using proven concepts**
  - Community share a common repository
  - Community contributes to bug fixes and new features
  - MHPCC moderates changes

- **Portal Framework SDK for HPC resource access**
  - Backend: File and Job Management
  - **HTTP ReSTful service API**

- **Portal AppUI SDK for web interface components**
  - Frontend: Quickly deploy custom HPC web apps

- **Leverage existing technologies**
  - OpenID / Oauth
  - ERDC UIT
  - FY13 demonstration of seamless resource management between MHPCC and ERDC
Status

• **Release Cycle “N”, 14-November-2012**
  – CREATE-AV Kestrel, Includes ASC Recommended Enhancements (e.g. searchable project mgt) for Pilot
  – Distributed MATLAB
  – Level 1 TASAT capability for AFRL/RV
  – YubiKey support
  – Web-based shell access (simplified security model)
  – 6-stage agile dev environment for CM, CI, Security, Alpha, Beta, Ops

• **Release Cycle for “N+1” Q2, 2013**
  – CREATE-AV DaVinci
  – CREATE-AV Kestrel
  – CREATE-AV Helios
  – JSpOC Mission System (JMS) Development Environment
  – One Semi-Automated Forces (OneSAF)
  – TASAT (Level 2)
Questions?

- MATLAB deliver to traditional and non-traditional devices
- Drag-and-drop matlab code
- Browser displays HTML results