



High Performance Computing Portal Lowering Barriers / Modern HPC Ecosystems

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- **Secure, Web-based Access to DoD HPC Assets**
 - End-to-End, Full-Featured, Web-Based Workflow
 - Highly Productive User Experience
- **Enabling Non-Traditional Users & Users with Constrained Desktops**

- **Transformative, Successful, Growing, Agile**

- **Enables 3rd Party Developers & Innovative Applications**
 - **A Simple Services API Abstracts the HPC Workflow**

Easy, Secure, & Powerful: Demolishes entry and access barriers to DOD HPC Services

Access: Game Changer for DOD HPC

Secure Sign On

DoD-Hosted OpenID 2-Factor Logon

No User Signups



“Zero Footprint” Browser Access

No Client Installs / Configurations

No Kerberos Kit Required



Software as a Service (SaaS)

Instant Updates to Users

Manage Access through Accounts

Enforces Access Controls

Access from Any Network



Each DoD Supercomputing Resource Center has a Portal

Portal Home

Portal Overview

FAQs

Portal Applications

Technical Papers

Posters

Video Demonstration

Apply for an Account

Gallery/CREATE

Contact Us

HPC Portal



HPC Portal at

AFRL



HPC Portal at

ARL



HPC Portal at

ERDC



HPC Portal at

NAVY

If you have an account on any system at a DSRC, you also have a Portal account at that DSRC. Click on the appropriate DSRC link above to access its HPC Portal.

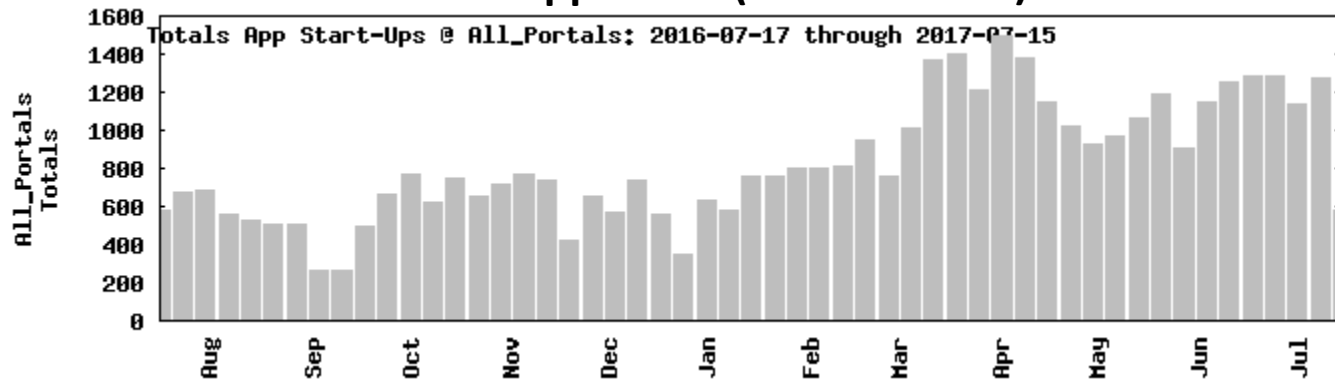
The HPC Portal provides you with native web tools that allow command line access and ability to manage files and jobs from a web browser. The HPC Portal also provides custom web applications that allow you to submit jobs from a web interface. The HPC Portal supports pre/post-processing and data visualization by making DSRC hosted desktop applications that are not web-based accessible from a web browser.

<https://portal.hpc.mil>*

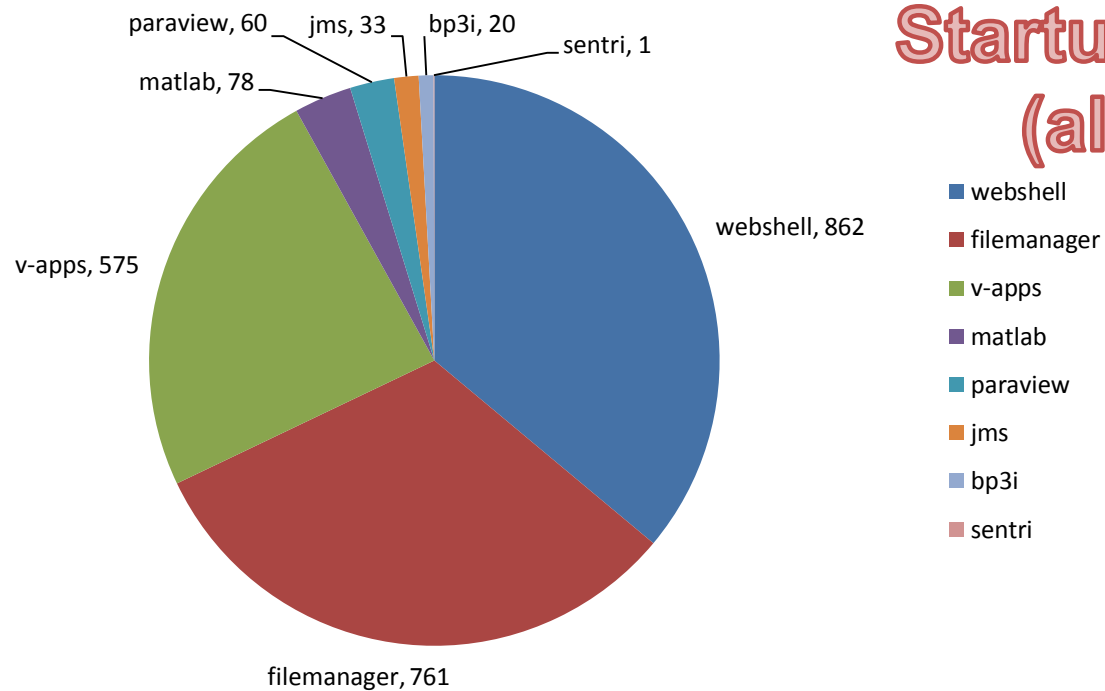
* Note: DoD issues their own certificates, you may get an “unsafe error”

HPC Portal Adoption: APPLICATIONS

Total Webapp Starts (last 52 weeks)



Webapp Starts (7/2 – 7/16)

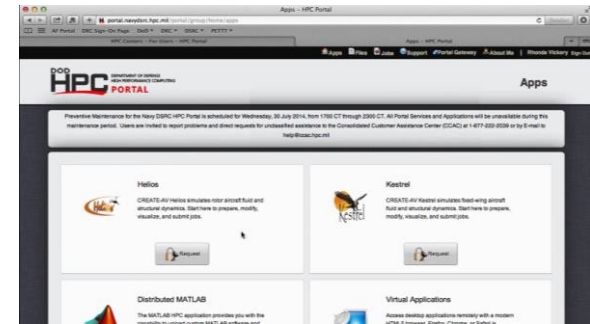


HPC Portal Application Startups ~ 1200/week (also doubled)

- **Job Creation, Submission, Monitoring, Termination, Visualization**
 - ***Virtual Applications***
 - Pre/Post-Processing & Visualization
 - Access any X-Based Application
 - Quickly automate repetitive workflows
 - ***Native Web Applications***
 - Customized User Interfaces for data entry, control and analysis
- **Utilities**
 - **Command Line Interface**
 - **File Management**
 - **User Account Information**
 - **Help & Forums**

HPC Portal-Hosted Web Applications

- **CREATE-AV Web Kestrel**
- **CREATE-RF WebSENTRi**
- **CREATE-MG WebCapstone**
- **CREATE-GV Mercury/MAT**
- **JMS/ARCADE (Space Situational Awareness)**
- **BP3I (Blast Protection Institute)**
- **ParaView Web (3D Visualizations on Utility Servers)**
- **Jupyter Notebooks (on HPC Resources)**
- **Distributed Matlab**
- **Collaboration / Repository Management—in work**



50,000+ application starts and growing!

Native Web Applications: Matlab

Secure <https://portal.arl.hpc.mil/portal-framework-widgets-vaadin>

[Applications](#) [File Manager](#) [Job Manager](#) [Support](#) [Gateway](#) [About Me](#) [Log Out](#)

[File Menu](#) [Create Copy](#) [Save](#) [Submit Job](#) [Reload Project](#) [Help](#) [Feedback](#)

JOB NAME
job35

NAVIGATION

- Setup Matlab
- Input Files
- Status**
- Track Files

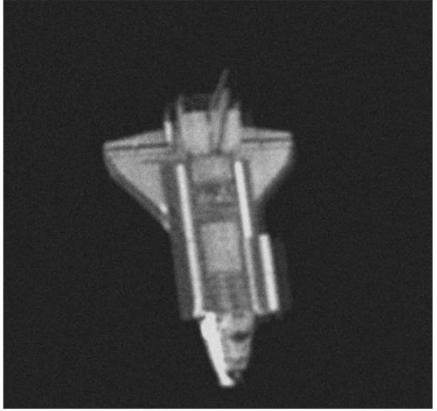
[Terminate](#) [Job Files](#) [Debug Info](#)

Project Status: FINISHED

NAME	S
Matlab Compile Phase	F
Parametric Iteration 1	F
Parametric Iteration 2	F
Parametric Iteration 3	F
Parametric Iteration 4	F
Parametric Iteration 5	F
Parametric Iteration 6	F
Parametric Iteration 7	F
Parametric Iteration 8	F
Parametric Iteration 9	F
Parametric Iteration 10	F
Parametric Iteration 11	F
Parametric Iteration 12	F
Parametric Iteration 13	F
Parametric Iteration 14	F
Parametric Iteration 15	F
Parametric Iteration 16	F

Preview

restored.jpg

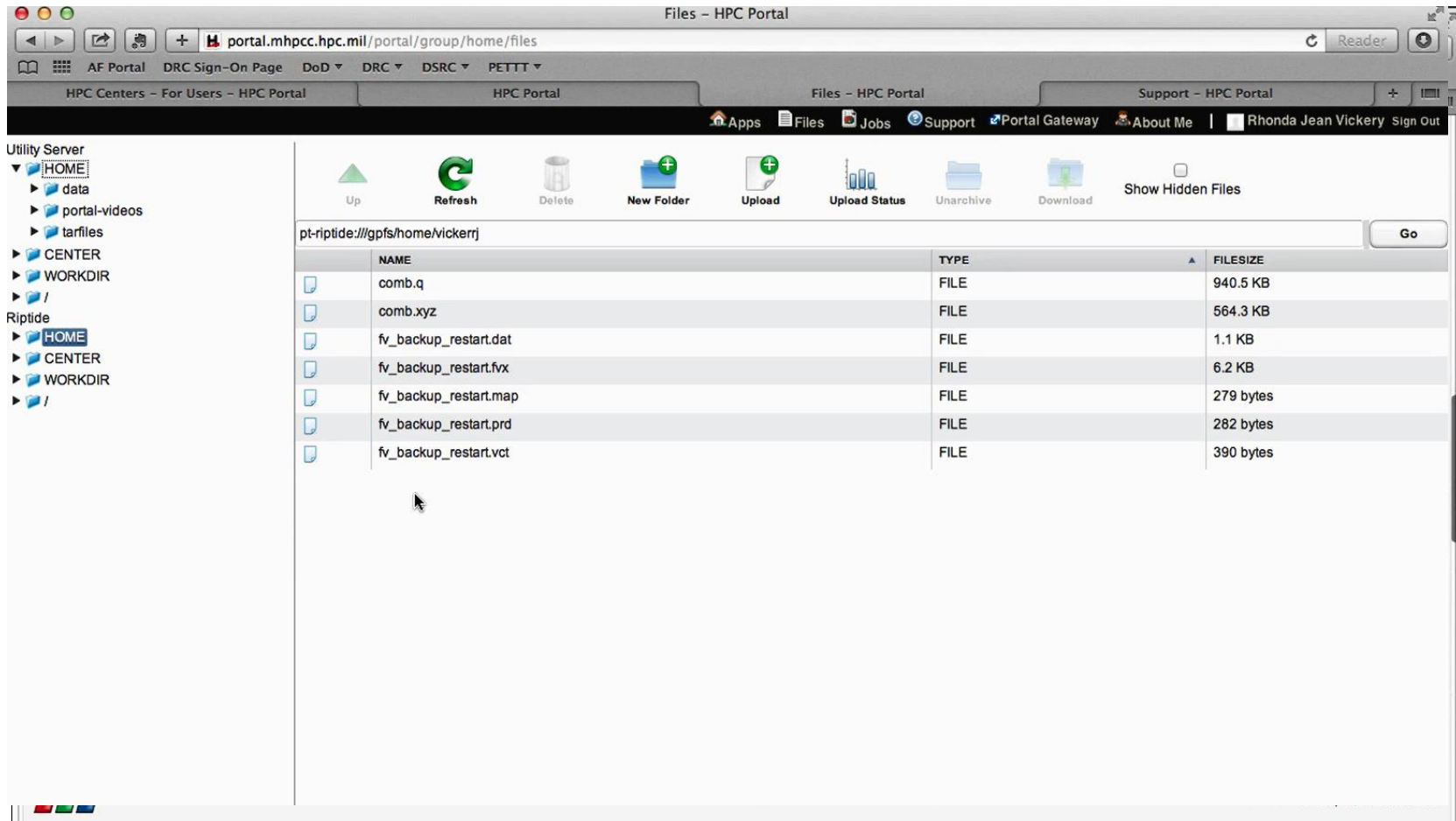


<< >> Slide Show

Name: restored.jpg
Size: 1.410 MB
Date: 2017-07-18 09:31:08 EDT
Path: /p/cwfs/andyg/.portal_work_space/mil

[Download](#)

Native Web Apps: File Manager



	NAME	TYPE	FILESIZE
	comb.q	FILE	940.5 KB
	comb.xyz	FILE	564.3 KB
	fv_backup_restart.dat	FILE	1.1 KB
	fv_backup_restart.fvx	FILE	6.2 KB
	fv_backup_restart.map	FILE	279 bytes
	fv_backup_restart.prd	FILE	282 bytes
	fv_backup_restart.vct	FILE	390 bytes

Virtual Applications

Remote Display of X-Based Applications

https://dportal.mhpc.hpc.mil/vapps1.1/apps/novnc/vnc.jsp?host=192.168.2.100&port=5900

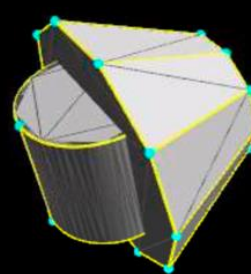
Connected (encrypted) to: Capstone503

capstoneGui

File Edit Points Curves Surfaces Solids Breps Advanced Mesh Attribution CREATE User-Plugins Views Config/Help

Geometry Model

Vector xyz N/A



Base Radius = 2.000000
Top Radius = 1.000000
Length = 2.000000
Direction = 0.000000 0.000000 1.000000
Number of Sides = 10

N/A
N/A
Process [tessellation] started
Process [tessellation]
Process [CreateFrustum]

randyg@pv01:~

File Edit View Search Terminal Help

















Tasks: 355 total, 1 running, 353 sleeping, 0 stopped, 1 zombie
Cpu(s): 0.2%us, 0.2%sy, 0.0%ni, 99.6%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 24596832k total, 24210272k used, 386560k free, 124512k buffers
Swap: 26836988k total, 13056k used, 26823932k free, 22279540k cached

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
37490	randyg	20	0	90828	14m	5220	S	3.0	0.1	0:16.89	xllvnc
37458	randyg	20	0	142m	38m	19m	S	2.3	0.2	0:14.45	Xvfb
1	root	20	0	19364	960	740	S	0.0	0.0	0:02.51	init
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01	kthreadd
3	root	RT	0	0	0	0	S	0.0	0.0	0:02.70	migration/0
4	root	20	0	0	0	0	S	0.0	0.0	0:01.40	ksoftirqd/0
5	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	stopper/0
6	root	RT	0	0	0	0	S	0.0	0.0	0:00.50	watchdog/0
7	root	RT	0	0	0	0	S	0.0	0.0	0:03.16	migration/1
8	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	stopper/1
9	root	20	0	0	0	0	S	0.0	0.0	0:01.90	ksoftirqd/1
10	root	RT	0	0	0	0	S	0.0	0.0	0:00.46	watchdog/1
11	root	RT	0	0	0	0	S	0.0	0.0	0:00.84	migration/2
12	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	stopper/2
13	root	20	0	0	0	0	S	0.0	0.0	0:00.25	ksoftirqd/2
14	root	RT	0	0	0	0	S	0.0	0.0	0:00.42	watchdog/2
15	root	RT	0	0	0	0	S	0.0	0.0	0:00.17	migration/3

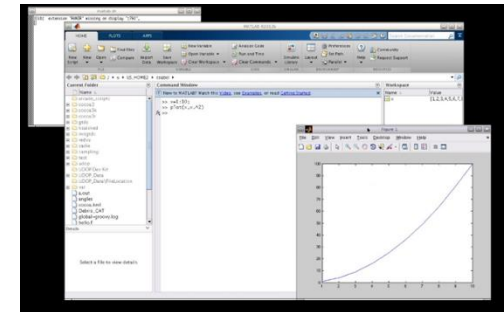
[randyg@pv01 ~]\$

N/A Geometry Database : SMLIB | Mesh Database : Create | Attribution Database : Create

“Capstone” Hosted as Virtual Application

	High Definition XTerm
	XTerm
	MATLAB
	Firefox
	Google Earth
	NASA World Wind
	Eclipse IDE
	Mule Studio
	SoapUI
	JMS UDOP Demo Server
	JMS UDOP
	gedit
	GNU Emacs
	Git GUI
	IDL Dev Environment
	TotalView

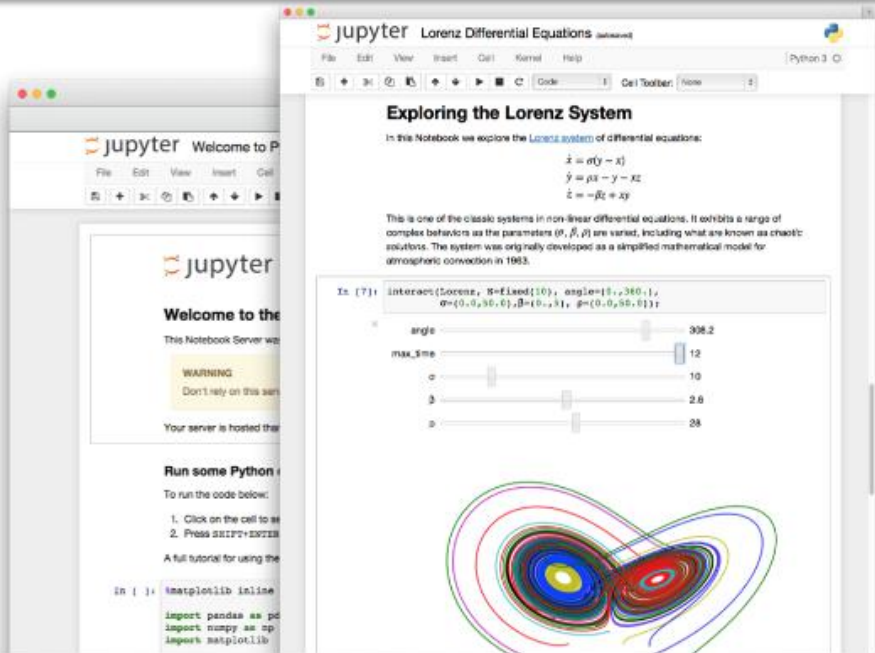
- **Integrated Development Environments**
- **Editors**
- **Debuggers**
- **Configuration management**
- **File manager**
 - Transfers to/from client machine
 - Permission editing
- **Command line**
- **Specialized HPC Workflows**
- **Visualization**



Matlab running through browser

Jupyter Notebooks on HPC Portal

Open source, interactive data science and scientific computing platform (web-based) supporting over 40 programming languages



The Jupyter Notebook

The Jupyter Notebook is a web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, machine learning and much more.



Language of choice



Share notebooks



Interactive widgets



Big data integration

Focus is On Data Analytics & Reproducible Workflows for R&D

Portal Platform Enables Integrated M&S

JMS
Joint Mission System

Advanced Research • Collaboration • Application
Development Environment

Web access to development tools and resources

News

Monday 2013-09-02:

Good news: ARCADE is touted in the first [JMS Newsletter!](#)

Tuesday 2013-07-02:

The JMS ARCADE has been installed on the new Portal Production server. Application available include:

- Workflow Builder
- Virtual Application development tools
- File Manager

Friday 2013-08-28:

The JMS ARCADE team has successfully met a major milestone. This milestone encompasses a freeze of all current capabilities that will be release at the end of July timeframe. During the next month, the development and quality assurance teams will perform a bug burndown.

Development Tools

Software Development Toolkit

Virtual Development Environment

Xterm

File Manager

Testing Tools

Workflow Tool

UDOP

Service Directory

Statistics

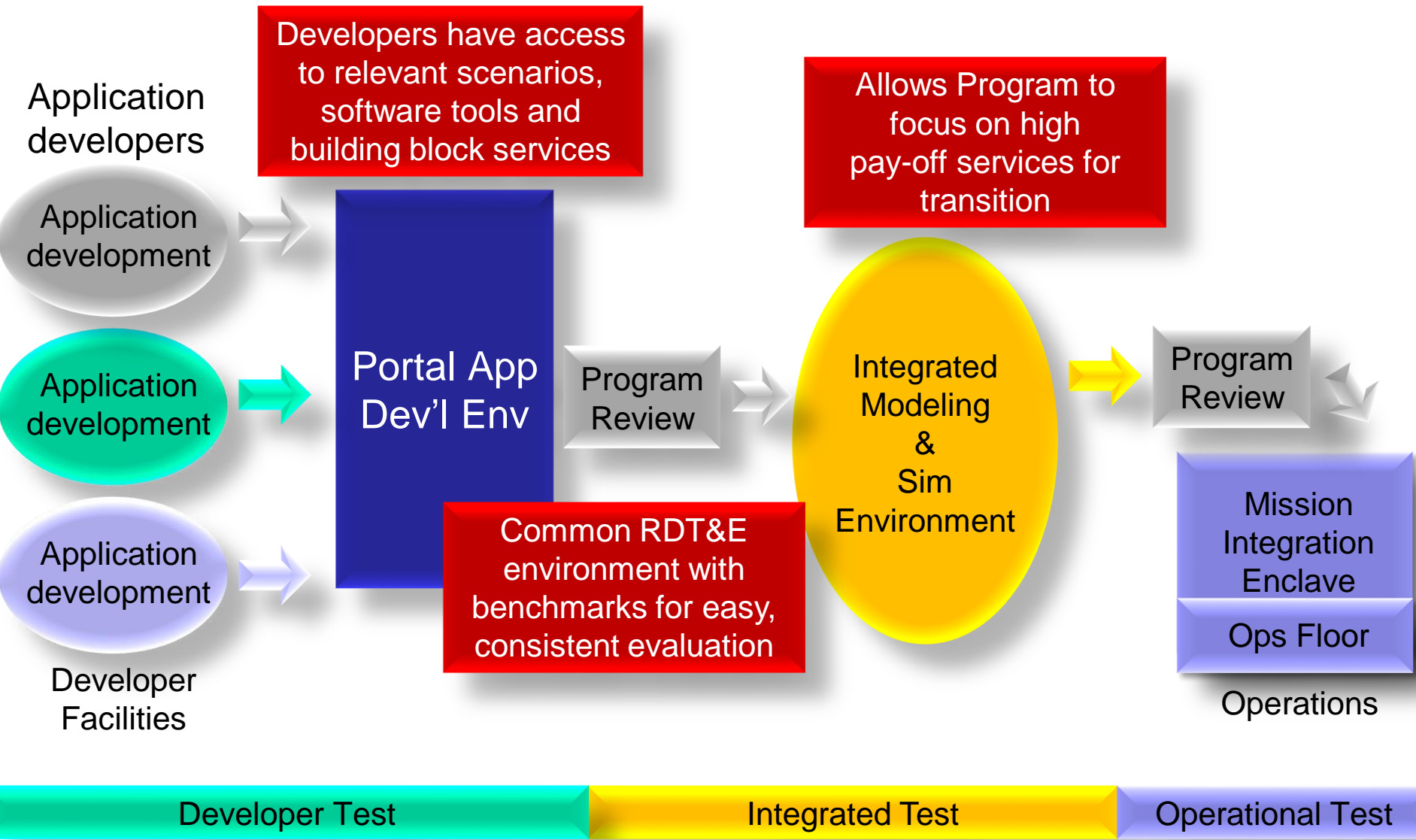
MATLAB

Collaboration Center

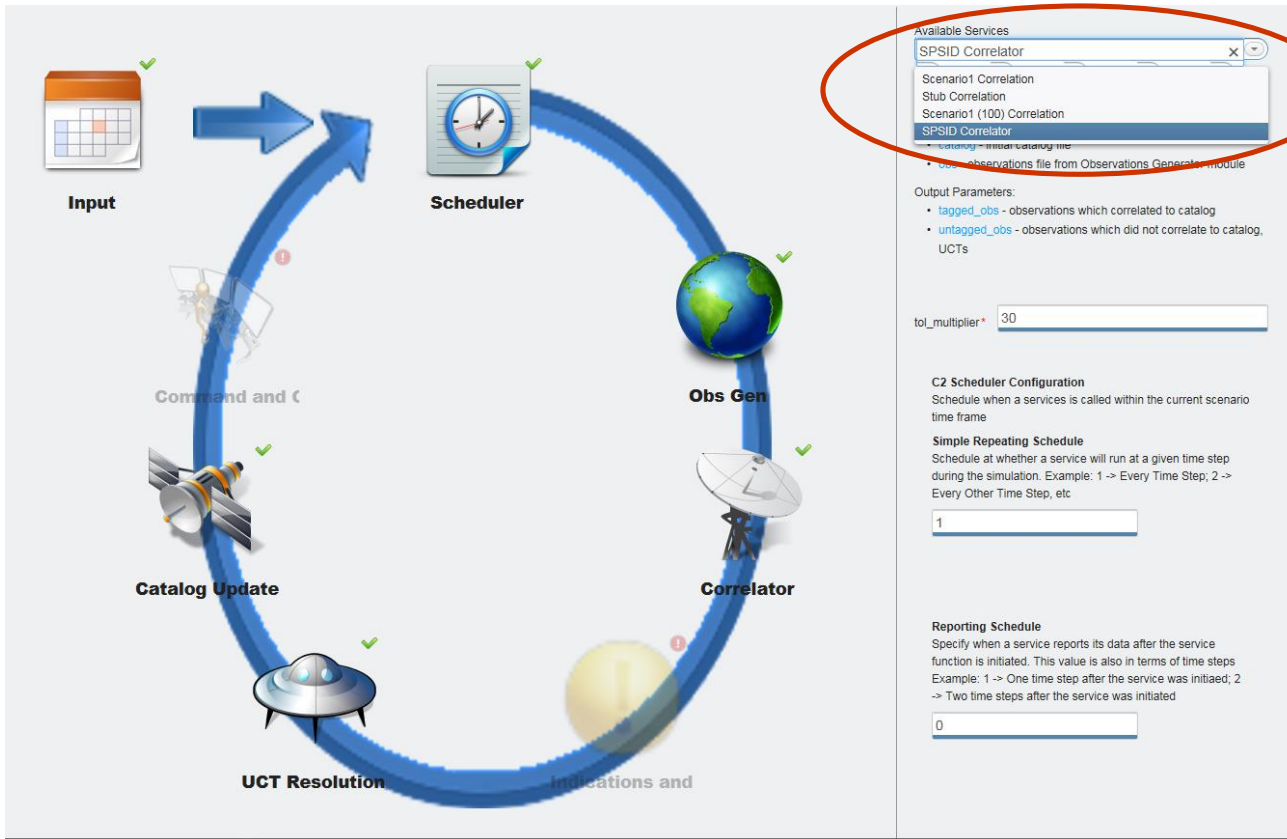
Automated web-service generation from executables
 End-to-end performance testing in user sandbox

Collaboration and market survey tools and resources

Portal Supports Technology Integration into Acquisition: e.g., ARCADE



Example: Custom Workflow Tool for Trade-Space Exploration and Analysis



- **User can select services based upon group permissions**
 - Group permissions also used to protect intellectual property
- **Different combinations of capabilities can be tested to determine best approach**

Key “Take Aways” ... HPC Portal:

- Provides Modern/Productive Web-Based Workflow
- Demolishes Entry Barriers to DOD Supercomputing
- Enables 3rd Party Developers & Innovative Applications
- Supports a Modern HPC Ecosystem: *Portal as Platform for Innovative Solutions*
- Enables Collaboration, Advanced Work Flows & Acquisition Engineering

Questions?