

Best of Breed HPC Tools on Torque & Slurm

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5/11/13

Moab Intelligence Engine + Torque

Moab HPC Suite

- 15+ years battle tested
- Patented (70+ Patents)
- Mimics real-world decision-making

Multi-dimensional Policies Optimize Across:

- Workload/application requirements
- Priorities and SLAs
- Time (real-time and future, predictive)
- Heterogeneous resources

▪ Torque – Open Source Resource Manager

- Executes decisions made by Moab



Product Offerings

Flexible Choice

Value Added
Features / Applications



Moab/Torque Unification

- **Moab directly communicates with Torque node daemons (pbs_mom)**
- **A faster communication framework**
 - Faster:
 - Submission
 - Job start and teardown
 - MOM communication
 - Performance at scale
- **Eliminates race conditions**
- **Simplifies Everything!**
 - Synched JobIDs
 - Configuration
 - Debugging
 - Etc.



Enhanced Power Management

- **Workload-aware Power Management**

- Reduce power state of idle nodes
- Maintain high response times with green pool buffer policy
 - Set quantity of available nodes in power-ready state "buffer pool"
 - Dynamically increase power state of power reduced nodes to maintain "buffer pool" target

- **Per Application CPU Speed Throttling**

(New Initiative with Department of Energy)

- **System Power Cap, Floor and Power Ramp Management**

- Dynamic control over system energy consumption
 - Conform energy use to electrical power contracts
- Job-level energy use data



Other Notable Features

- **Datawarp Integration**
- **KNL**
- **Docker Integration**
- **Singularity Integration**
 - Coming the summer

Open Platform

Get the **best-of-breed HPC tools** on **your choice of scheduler**. “Open Platform” enables organizations to **unify** the user, admin, and manager experience across multi-scheduler environments on a per-service basis.

- **Best-of-Breed HPC Tools:**
 - **Viewpoint Submission Portal**
 - **Remote Visualization**
 - **Reporting & Analytics**
 - **Nitro High Throughput**
 - Moab Accounting Manager
 - Grid Management
- **Cross Scheduler/RM Support:**
 - **Torque**
 - **Slurm**
 - SGE/UGE
 - PBS Pro
 - LSF



Viewpoint Ease-of-use Driven Productivity

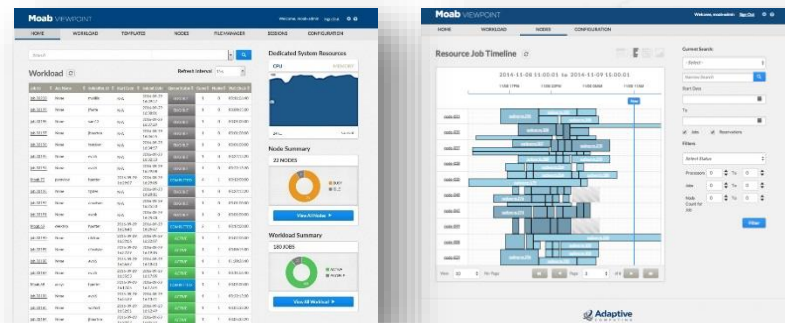
Add On

User

- Increase productivity of end users with **easier** and **faster portal-based submission** of tasks/jobs
- Expand HPC user base to **include non-IT skilled personnel**
- **Automate best practices** information into submission process in order to speed submission, reduce error and optimize processing speed

Admin

- Enable admins to **manage user requests with less time** due to best practices based templates, and user feedback which **helps users help themselves**
- Admins gain quick **visibility** into system and workload status and workload **troubleshooting**



Viewpoint Ease-of-use Driven Productivity

End User Submission Portal

Application Template Form Builder

Self-help Oriented Job Details

Simple Integrated File Manager

Administrative Reporting and Workload Status Tracking

Resource Job Timeline

Remote Visualization

Avoid purchasing expensive licenses and GPU's for all worker, by rendering applications remotely and visualizing locally through an integrated portal.

- **Improve Productivity**

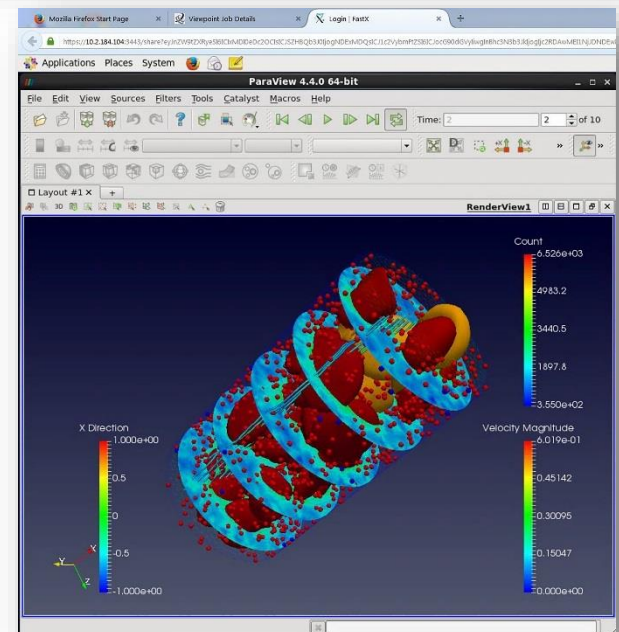
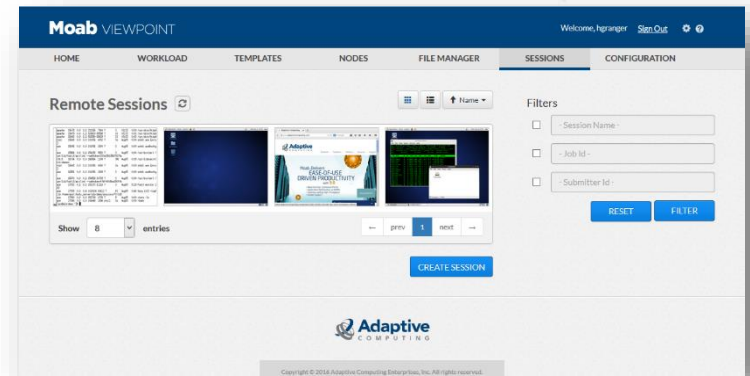
- Avoid waiting for file transfers
- Collaborate on shared projects
- Improve access to high value resources

- **Save Resources Integration**

- Avoid purchasing individual high-end desktops
- Share memory resources, accelerators, etc.
- Share expensive application licenses

- **Improves Manageability**

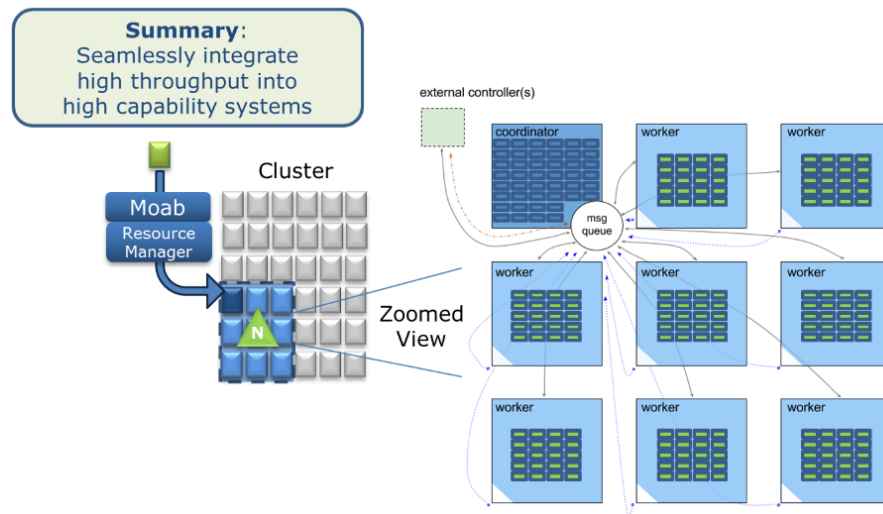
- Easier to launch, find, and manage sessions from submission portal
- Schedule, prioritize, and guarantee SLAs between users and groups
- Integrate into full HPC workflows, including notifications
- Administrative controls over usage, security, sharing, etc.



Nitro High Throughput

Accelerate launch times for short computing jobs by scheduling only once for large sets of jobs. At **500 tasks/second/core**, Nitro eliminates bottlenecks and puts high throughput performance into your computing system.

- **Supports** thousands to millions of tasks
- **Provides** simple user job submission
- Sessions can **grow** and **shrink**
- **Integrates** with all common scheduler
- **Applicable Workloads:**
 - Job arrays
 - Regression tests
 - Embarrassingly parallel workloads like Blast, Monte Carlo, and mass simulations
 - Anytime there are thousands and thousand of short run jobs

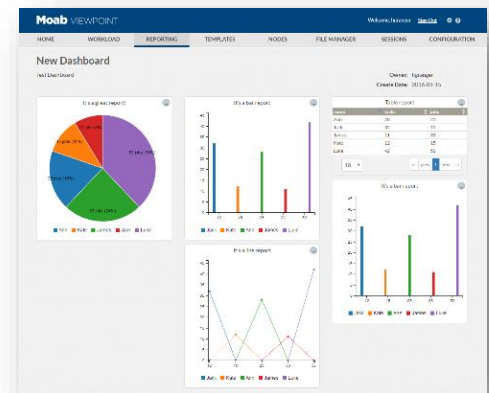


Reporting & Analytics

Gain insights by streaming resource usage and workload data into **custom reports** and **personalized dashboards**. This drives improved resource utilization and efficiency, **better capacity planning**, and greater **alignment of resources to mission objectives**.

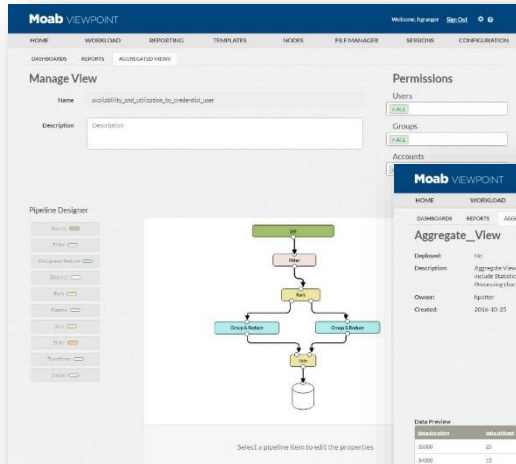


- **Stream** data with lightning-fast Apache Spark processing engine and flexible Mongo database.
- **Process** data to ensure relevance with traditional analytical functions (group, reduce, join, filter, etc.)
- **Visualize** aggregated information in chart-based reports or structured tables.
- **Monitor** key indicators in customizable dashboards
- **Drive** better decision-making & policy enforcement.



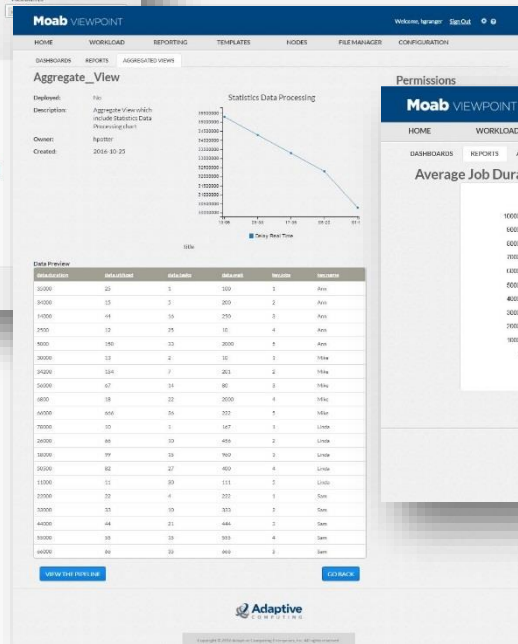
Reporting & Analytics

1. Data Stream Pipelines



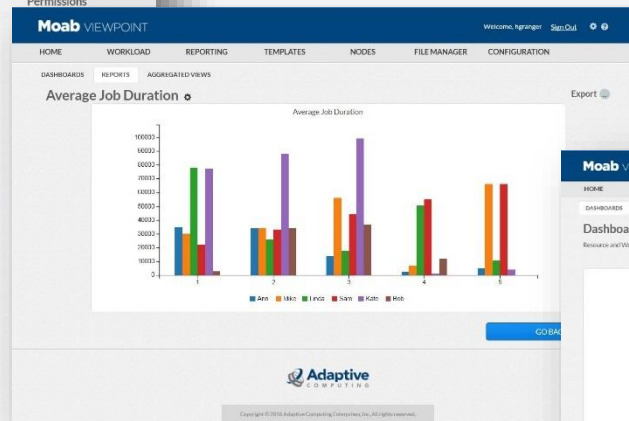
The 'Manage View' interface in Moab Viewpoint shows a form for creating or editing an aggregated view. The 'Name' field is populated with 'availability_and_utilization_by_credentials_user'. There are fields for 'Description' and 'Permissions' (Users, Groups, Accounts). Below the form is a 'Pipeline Designer' section with a flowchart showing a 'Data In' node connected to a 'Data Out' node, which is then connected to a 'Data Store' node. A text prompt says 'Select a pipeline item to edit the properties'.

2. Aggregated Views



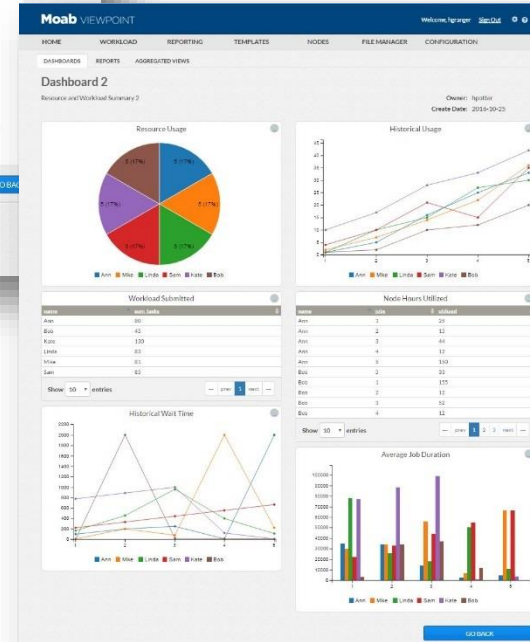
The 'Aggregate View' interface displays a line chart titled 'Statistics Data Processing' showing 'Daily Run Time' over a period from 09-01 to 09-15. The y-axis ranges from 0 to 1000000. Below the chart is a table with columns for 'Date Profile', 'Description', 'CPU Hours', 'Memory', 'Network', and 'Storage'. The table contains multiple rows of data for different dates and profiles. The Moab Viewpoint logo and 'Adaptive Computing' branding are visible at the bottom.

3. Chart or Table Reports



The 'Average Job Duration' report shows a bar chart with the y-axis representing duration from 0 to 100000. The x-axis shows categories 1 through 6. The bars are color-coded by resource type: ARM (blue), M100 (orange), KVM (green), N100 (purple), K81 (red), and R10 (brown). The report includes a 'GO BACK' button and the Adaptive Computing logo.

4. Custom Dashboards



The 'Dashboard 2' interface provides a comprehensive overview of resource usage and workload. It features several widgets: a 'Resource Usage' pie chart showing percentages for ARM (17%), M100 (17%), KVM (17%), N100 (17%), K81 (17%), and R10 (17%); a 'Historical Usage' line chart showing trends over time; a 'Workload Submitted' table with columns for 'Date' and 'Jobs'; a 'Nodes Hours Utilized' table with columns for 'Date', 'Jobs', and 'Utilized'; a 'Historical Wait Time' line chart; and an 'Average Job Duration' bar chart. The dashboard includes navigation buttons like 'GO BACK' and 'Adaptive Computing' branding.

Public Grant Program

Buy Support – Get Licenses Free

Eligibility: Government and Education Organizations

- Education organizations must be diploma issuing entities
- Systems must not be used by commercial organizations (e.g. hosting)

Included Products: Moab HPC Suite, Viewpoint Submission Portal on Torque or Slurm

Engage Us

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