Hyak: Supercomputing @UW

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Hyak: Who’s it For?

- Speed of Science
- Prep for Petascale
- Keep the Pipeline Flowing
Hyak: What is it?

- Personal Supercomputers
- In a UW-IT managed cloud

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Hyak: A Supercomputer

- Supercomputer = Big and Fast
  - > 600 nodes, up to 1,500
  - > 6,000 cores, up to 24,000
  - Fast (10Gbs), low latency (< 3.5µs) network
  - Fast (> 5GBs) scratch storage
  - Fast (> 4GBs) aggregate uplinks

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Hyak: *PERSONAL* Supercomputers

- Participating groups purchase nodes
- Between one node and 170 (or more)
- Choose from a list with the specs you want
- Guaranteed access to your nodes on demand
- Guaranteed access to your storage

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Hyak: a CLOUD resource

• Hyak is a SYSTEM, not infrastructure
  • Instant-on
  • Integrated with data center, storage, and nets
  • We manage everything below your apps
  • We even manage some of the apps

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Hyak: a CLOUD resource

• Hyak is ELASTIC
  • Use idle cycles system wide AT NO COST
  • Use split 60:40 dedicated/backfill over time
  • Backfill access managed fairly - everyone gets in
• Buy for your baseline, not your peak

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Hyak Use by Domain

Hyak Allocation by Domain

- Nuclear Physics
- Biochemistry
- Chemical Engineering
- Climate Science
- Astro & Aero Engineering
- Evaluation
- Astronomy
- Electrical Engineering
- Biology
- Bioengineering
- Applied Math
- Civil & Environmental Engineering
- Data Science

Hyak Utilization by Domain

- Nuclear Physics
- Biochemistry
- Chemical Engineering
- Climate Science
- Astro & Aero Engineering
- Evaluation
- Astronomy
- Electrical Engineering
- Biology
- Bioengineering
- Applied Math
- Civil & Environmental Engineering
- Data Science
Hyak Business Model

• Moore’s Law applies to nodes, not the rest
• Cost to users < acting alone
• Cost to UW < users acting alone

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Hyak Business Model

- Sponsors provide infrastructure
- 6 year lifetime
- Users pay for nodes
- 3 year lifetime

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Hyak 4-Year Growth
lolo: Superstorage@UW

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lolo: What is it?

• Open to ALL UW RESEARCHERS
• Archive Filesystem
  • for safe, long term storage
  • data changes infrequently, if ever
• Collaboration Filesystem
  • general purpose file storage service

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lolo: Archives ≠ Backups

• Backups protect *HOT* data
• Archives protect *COLD* data
• Most data is cold
• SAVE: archives cost less than backups
• SAVE: operate less first tier storage

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The Science DMZ has two components: Local “in datacenter” connectivity to the two router/switches (HSRN) and a “Science DMZ” VRF that allows campus researchers access to the 100G path direct from their labs.
HSRN: What is it?

- 100Gbs backbone between data centers
- 10/40/100Gbs links to co-located gear
- 100Gbs link to research Internet
- 40Gbs link to campus
- Option for layer-2 links

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Science DMZ: What is it?

• Virtual network overlay on HSRN
• Optimized path for select hosts
• Paths outside campus security perimeter
• Data Transfer Node (Iolo Collaboration)
• Option to extend to campus endpoints

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