



Greenfield →



Transitioning from *Blacklight* to *Bridges* via *Greenfield*

Nick Nystrom, PSC · nystrom@psc.edu · July 24, 2015
XSEDE Campus Champions Gateway Community Presentation

PSC's *Blacklight* (SGI Altix® UV 1000×2)

- **2×16 TB of cache-coherent shared memory**
 - hardware coherency unit: 1 cache line (64B)
 - 16 TB exploits the processor's full 44-bit physical address space
 - *ideal for fine-grained shared memory applications, e.g. graph algorithms, sparse matrices*
- **NUMAlink® 5 interconnect**
 - fat tree topology spanning full UV system; low latency, high bisection bandwidth
 - *hardware acceleration for PGAS, MPI, gather/scatter, remote atomic memory operations, etc.*
- **Intel Nehalem-EX processors: 4096 cores (2048 cores per SSI)**
 - 8-cores per socket, 2 hardware threads per core, 4 flops/clock, 24MB L3, Turbo Boost, QPI
 - 4 memory channels per socket → *strong memory bandwidth*
 - x86 instruction set with SSE 4.2 → *excellent portability and ease of use*
- **A widely-used Linux operating system**
 - supports OpenMP, p-threads, MPI, PGAS models → *high programmer productivity*
 - supports a huge number of ISV applications → *high end user productivity*
- **To be decommissioned August 15, 2015**
 - Migration path: *Greenfield (Blacklight replacement), then Bridges*

Greenfield

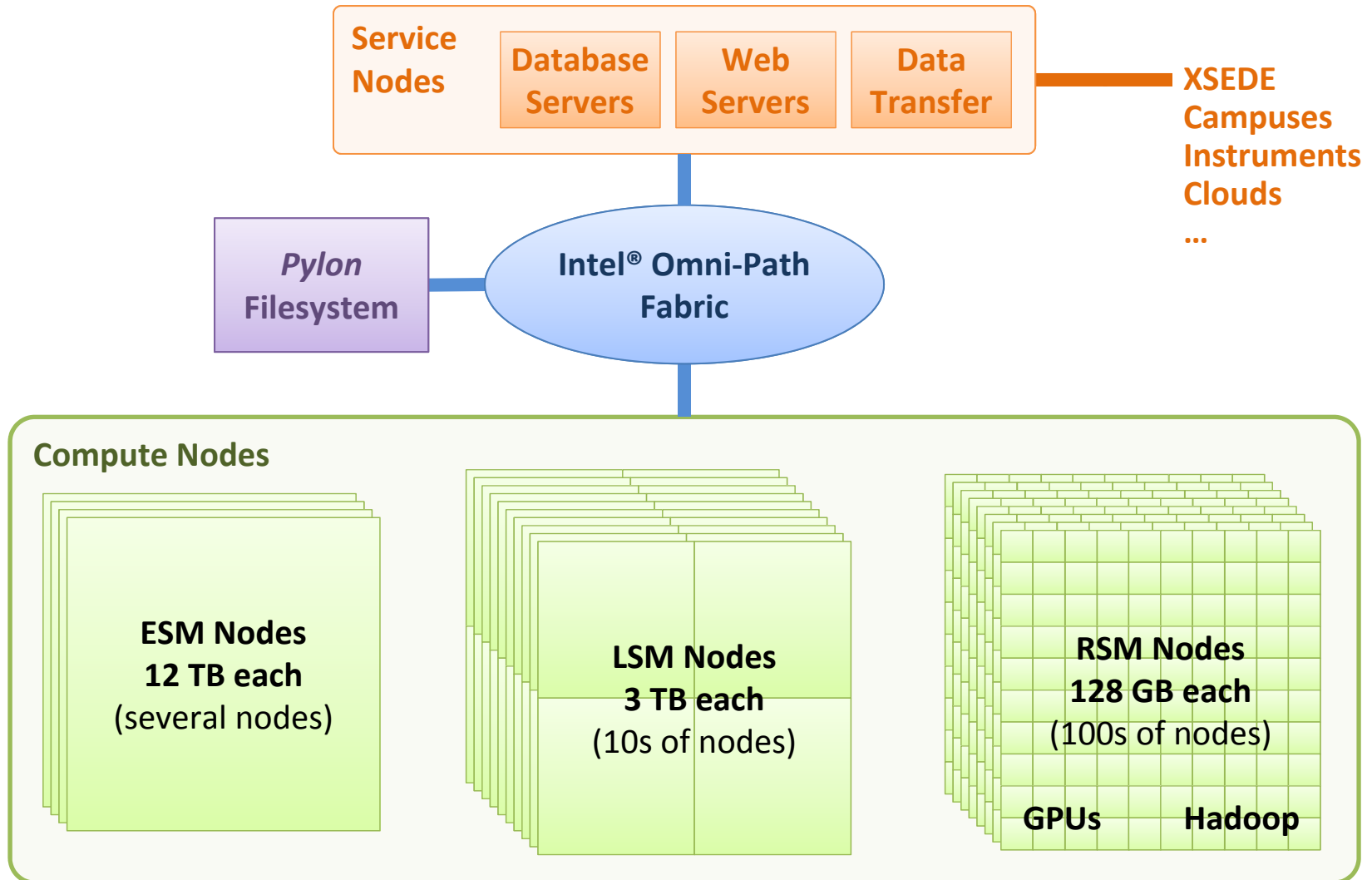
- Building on communities' uses of *Blacklight* and its architectural strengths, *Greenfield* comprises three memory-intensive systems:
 - HP Integrity Superdome X: 12TB RAM, 240 cores (E7-2880v2)
 - Two HP DL580 systems: each 3TB RAM and 60 cores (E7-4880v2)
 - Representative of 12TB and 3TB nodes to appear in *Bridges*
 - Access to large, central filesystems: *Data Supercell* and *Crucible*
- Level 1 XSEDE Resource
- *Blacklight* projects requiring large shared memory and other data analytic capabilities likely to continue on *Greenfield*
 - Starter grants will also be available for *Greenfield*, especially to help with developing proposals for *Bridges*

Bridges: User-Friendly HPC & Data Analytics

Integrates HPC, Big Data, and Cloud

- **Interactivity** is the feature most frequently requested by nontraditional HPC communities and for doing data analytics and testing hypotheses.
- **Gateways and tools for gateway building** will provide easy-to-use access to Bridges' HPC and data resources.
- **Database and web server nodes** will provide persistent databases to enable data management, workflows, and distributed applications.
- **High-productivity programming languages & environments** will let users scale familiar applications and workflows.
- **Virtualization** will allow users to bring their particular environments and provide interoperability with clouds.
- **Campus bridging** will explore new ways to transition data and computing seamlessly between campus and XSEDE resources.

Bridges: High-Level Architecture



Target Schedule

Early August, 2015	<i>Greenfield</i> access available
August 15, 2015	last day for access to <i>Blacklight</i>
Late 2015	early-user period on <i>Bridges</i>
January, 2016	<i>Bridges</i> to begin production