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CHAMELEON: BUILDING A RECONFIGURABLE EXPERIMENTAL TESTBED FOR CLOUD RESEARCH

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*NSF Project Panel
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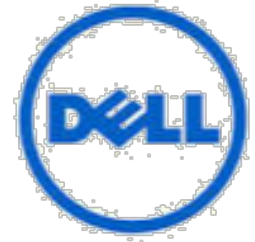
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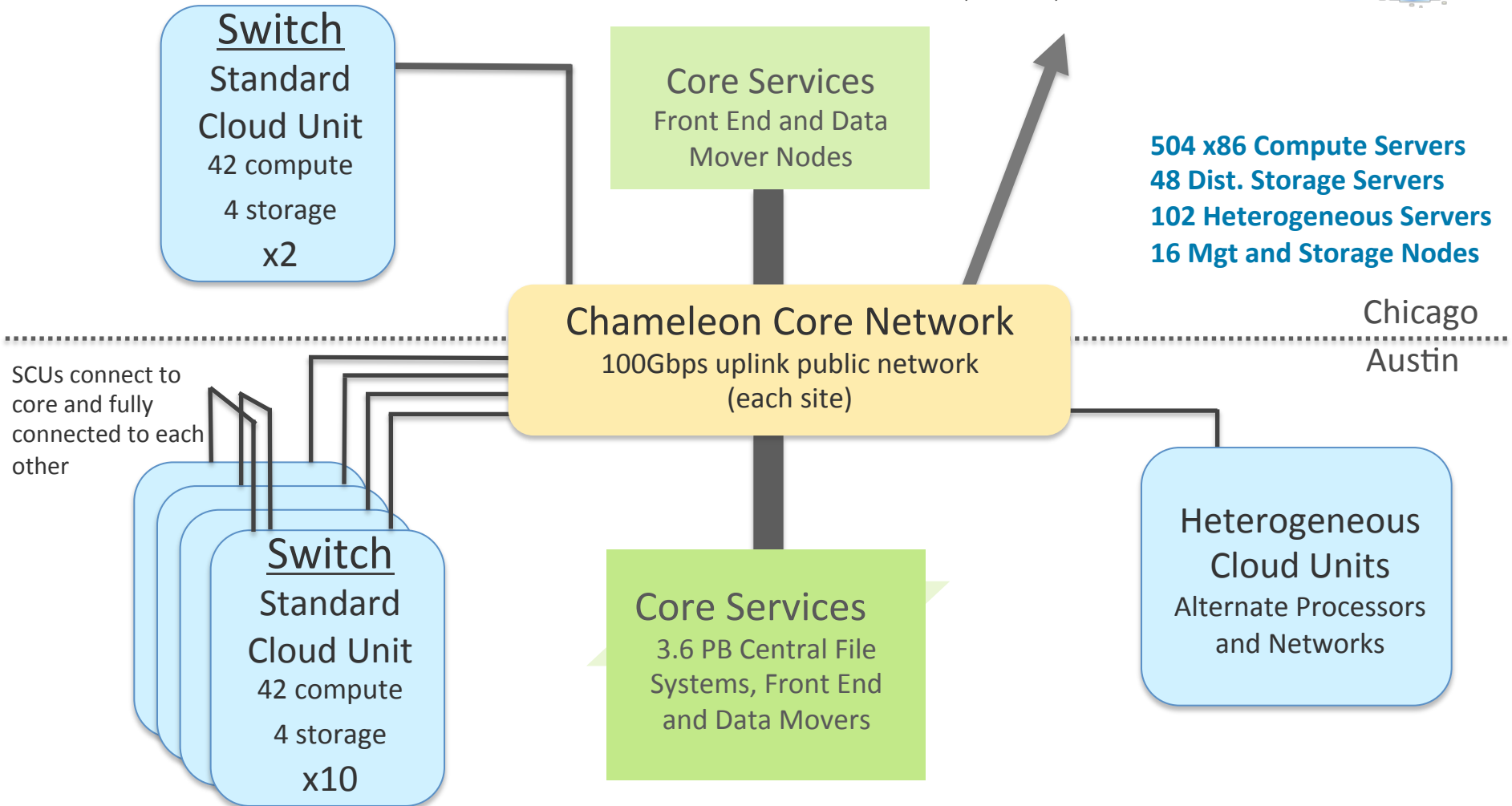
CHAMELEON: A FLEXIBLE AND POWERFUL EXPERIMENTAL INSTRUMENT

- ▶ **Large-scale:** “Big Data, Big Compute, Big Instrument research”
 - ▶ ~650 nodes (~14,500 cores), 5 PB disk over two sites, 2 sites connected with 100G network
- ▶ **Reconfigurable:** “As close as possible to having it in your lab”
 - ▶ From bare metal reconfiguration to clouds
 - ▶ Support for repeatable and reproducible experiments
- ▶ **Connected:** “One stop shopping for experimental needs”
 - ▶ Workload and Trace Archive
 - ▶ Partnerships with production clouds: CERN, OSDC, Rackspace, Google, and others
 - ▶ Partnerships with users
- ▶ **Complementary:** “Can’t do everything ourselves”
 - ▶ Complementing GENI, Grid’5000, and other experimental testbeds

CHAMELEON HARDWARE



To UTSA, GENI, Future Partners



CAPABILITIES AND SUPPORTED RESEARCH

Development of new models, algorithms, platforms, auto-scaling HA, etc., innovative application and educational uses

Persistent, reliable, shared clouds

Repeatable experiments in new models, algorithms, platforms, auto-scaling, high-availability, cloud federation, etc.

Isolated partition, Chameleon Appliances

Virtualization technology (e.g., SR-IOV, accelerators), systems, networking, infrastructure-level resource management, etc.

Isolated partition, bare metal reconfiguration: OpenStack and Grid'5000

CHI: CHAMELEON SOFTWARE

Persistent Clouds
(OpenStack)

User Cloud

User Cloud

Chameleon Appliance Catalog

A library of generic, special-purpose, and educational appliances

CHI: Discovery, Provisioning, Configuration, and Monitoring

Fine-grained Resource Representation and Discovery (**Grid'5000** tools)

Provisioning (**OpenStack** Nova and Blazar, incl. advance reservations)

Configuration (**OpenStack** Ironic)

Monitoring (**OpenStack** Ceilometer)

PROJECT STATUS AND TIMELINE

- ▶ 09/14: Project Start
- ▶ 12/14: FutureGrid@Chameleon (OpenStack KVM)
- ▶ 04/15: Chameleon Technology Preview (bare metal)
- ▶ 06/15: Early Uses availability (new hardware)
- ▶ Yesterday: Public availability!
- ▶ 2015/2016: Hardware and software upgrades
- ▶ Fall 2016: Heterogeneous hardware

Overall: 68 projects, 122 users, 46 institutions

PARTING THOUGHTS

- ▶ Focus complementary to XSEDE resources
 - ▶ Pioneering new resource management methods
 - ▶ A platform for experimenting with new methods
 - ▶ The testbed itself is pioneering new methods
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- ▶ Work on your next research project @ www.chameleoncloud.org!

The most important element of any experimental testbed is users and the research they work on