

# Ceph Applications in HPC Environments

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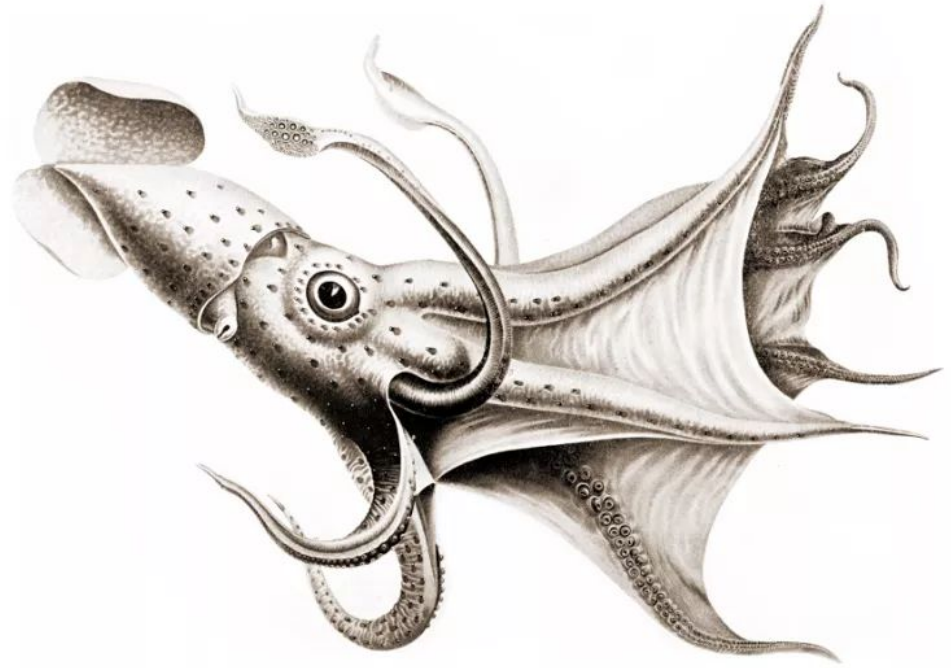
Phil Straw

Douglas Fuller

Brian Balderston

# 5th Year of Ceph BoF at SC

- Thanks for coming



# Why Are we Here?

- Share experiences with Ceph
- Meet fellow members of the [ceph-users] community
- Learn about new features in Ceph
- Learn about how other HPC centers are using Ceph

# BoF Format

- 5 short talks
- Panel discussion

# What is Ceph?

- Vendor agnostic data storage system with **Object**, **Block**, and **File** interfaces.
- Ecosystem of tools to help monitor, manage, and connect the storage system
- Community-driven storage system

# How is Ceph used in HPC?

# Ceph in Research Workflows

- Second-tier storage
- Block storage for VMs

# Ceph at MSI - timeline

Test clusters Early 2014 -

Emperor - Firefly - Giant - Hammer - Jewel - Luminous - Mimic

Production object store "Tier 2"

Late 2014 - Firefly - Hammer - Jewel - Luminous  
8 PB - EC object store - S3 and globus

Cloud storage "Stratus"

Late 2016 - Jewel - Luminous  
1.5 PB block storage with some object store

Test

Late 2018  
1 PB SoftIron



# 5 Years of Tier 2 Storage

SGI IS 4600

20 x 10 TB OSDs

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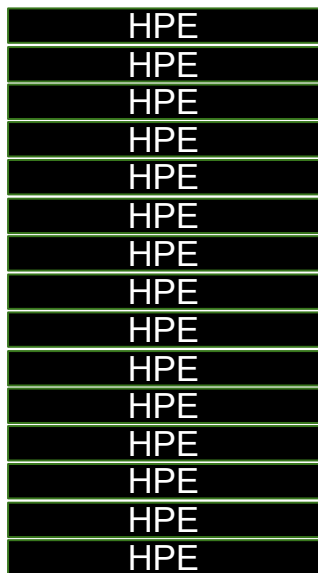
2014

Emperor

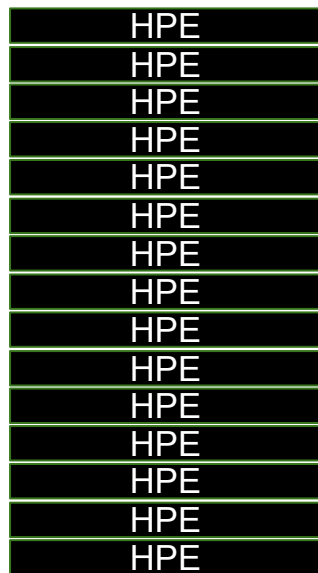
0.6 PB raw

**Testing**

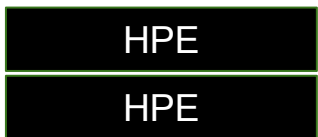
# 5 Years of Tier 2 Storage



360 x 10TB OSDs



360 x 10TB OSDs



60 x 8 TB OSDs

60 x 8 TB OSDs

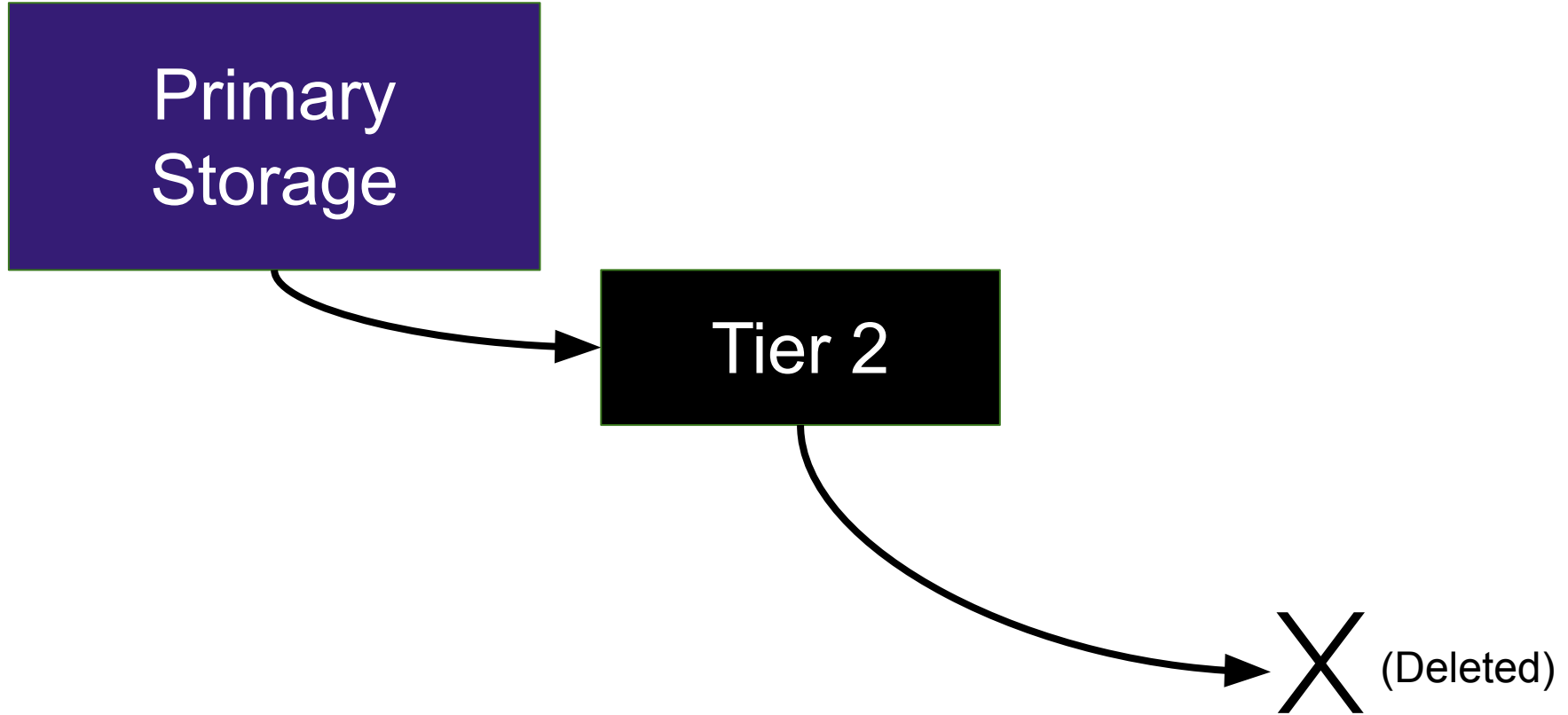
2019

Luminous

8.1 PB raw

**Production**

# Short-term Archive



# Cache of External Data

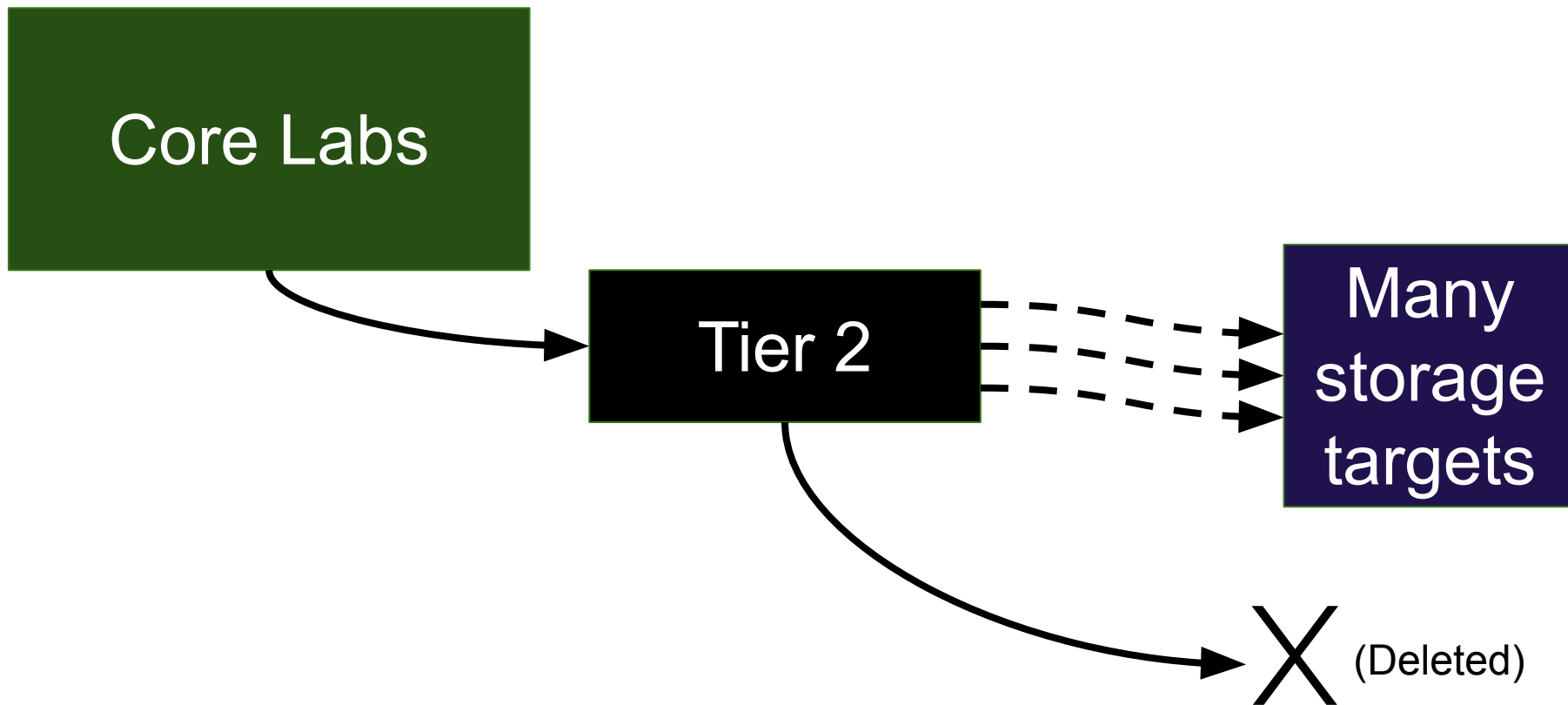
Public Dataset

Tier 2

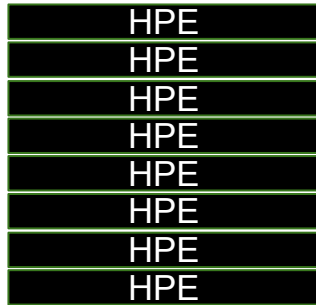
Batch  
Jobs

X (Deleted)

# Data Dissemination



# 3 Years of RBD Storage



192 x 8TB OSDs

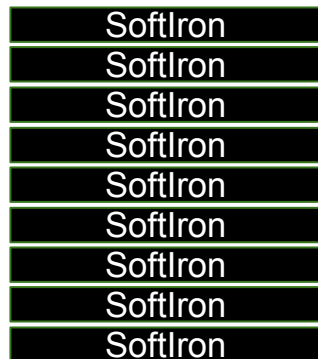
2016

Jewel

1.5 PB raw

**Production**

# 1 Year of new Test Storage



96 x 8 TB OSDs

2019

Luminous

0.8 PB raw

**Testing**

# Acknowledgements

- Edward Munsell - System Administrator
- Graham Allan - Associate Director for Operations



# Schedule

- Andras Pataki
- Brian Balderston
- Phil Straw
- Douglas Fuller
- Questions and panel discussion with speakers