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A Virtualized Computing Platform for Fusion Control Systems

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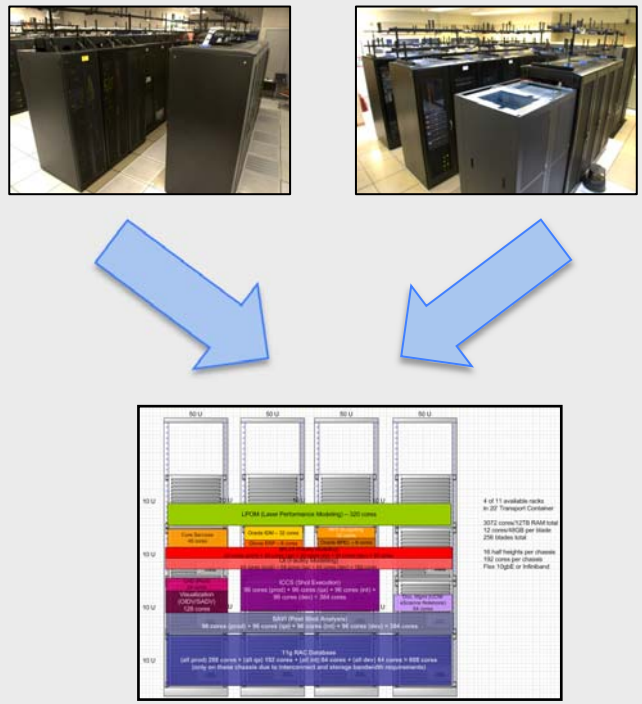
Why Virtualize?

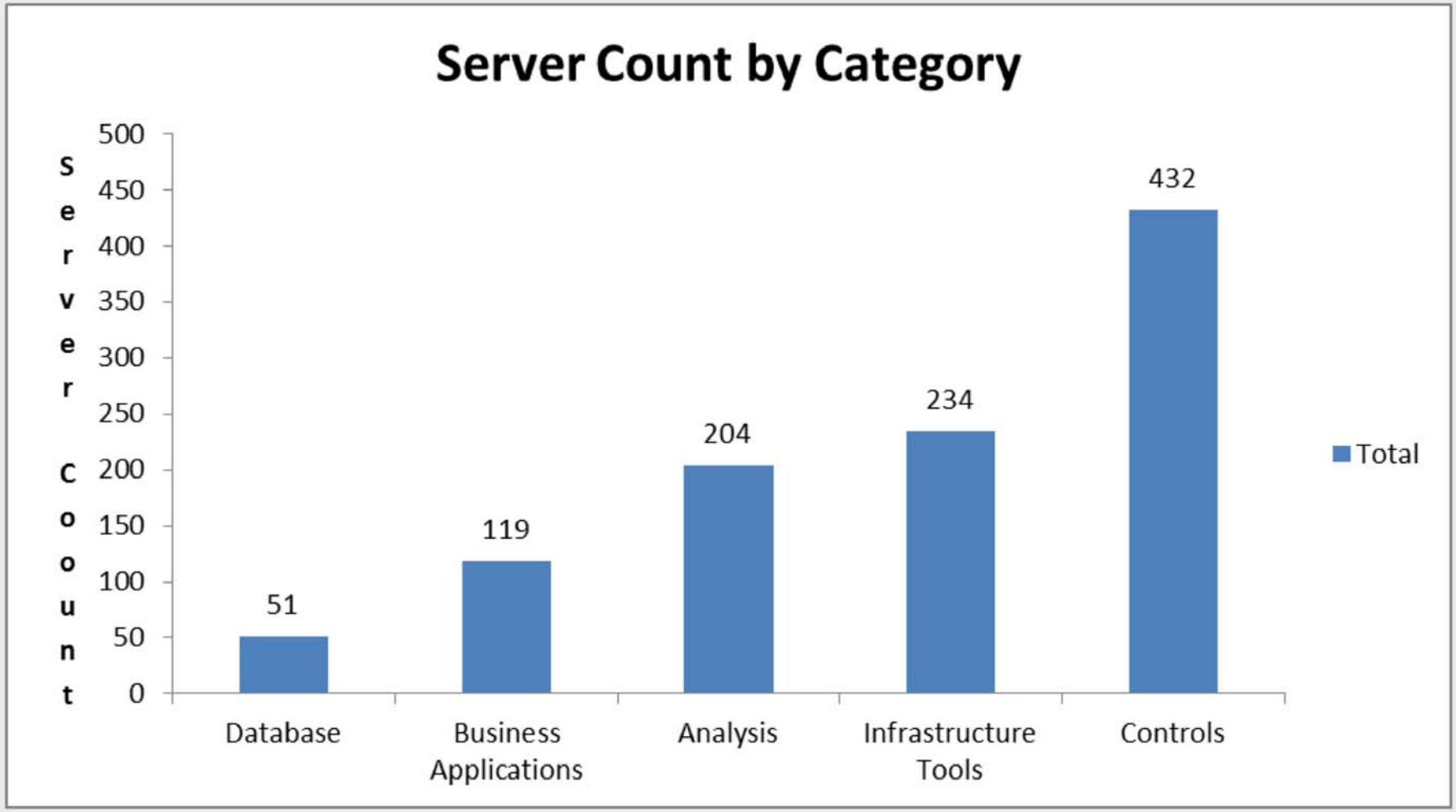
- Better utilization of computational resources
- Higher quality server builds
- Faster server provisioning
- Higher availability through clustering and live migration
- Nearly instantaneous recovery from hardware failures

Virtualization is NOT Just About Consolidation!



Virtualization, although more than 20 years old, may be looked at by your organization as a disruptive technology

NIF is blazing a trail toward a 100% virtualized computing environment



Partnership with the Silicon Valley was an integral part of our success

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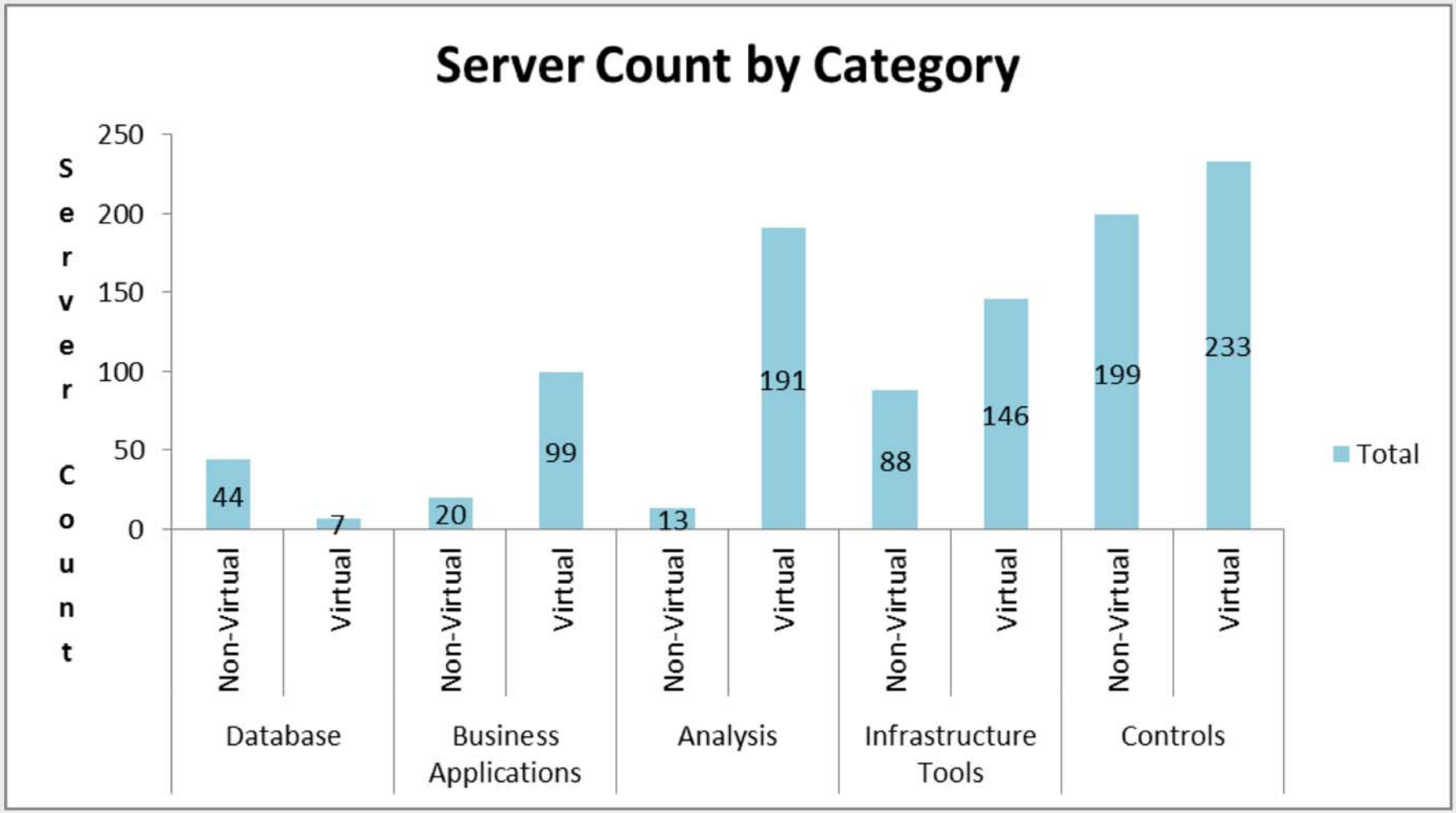

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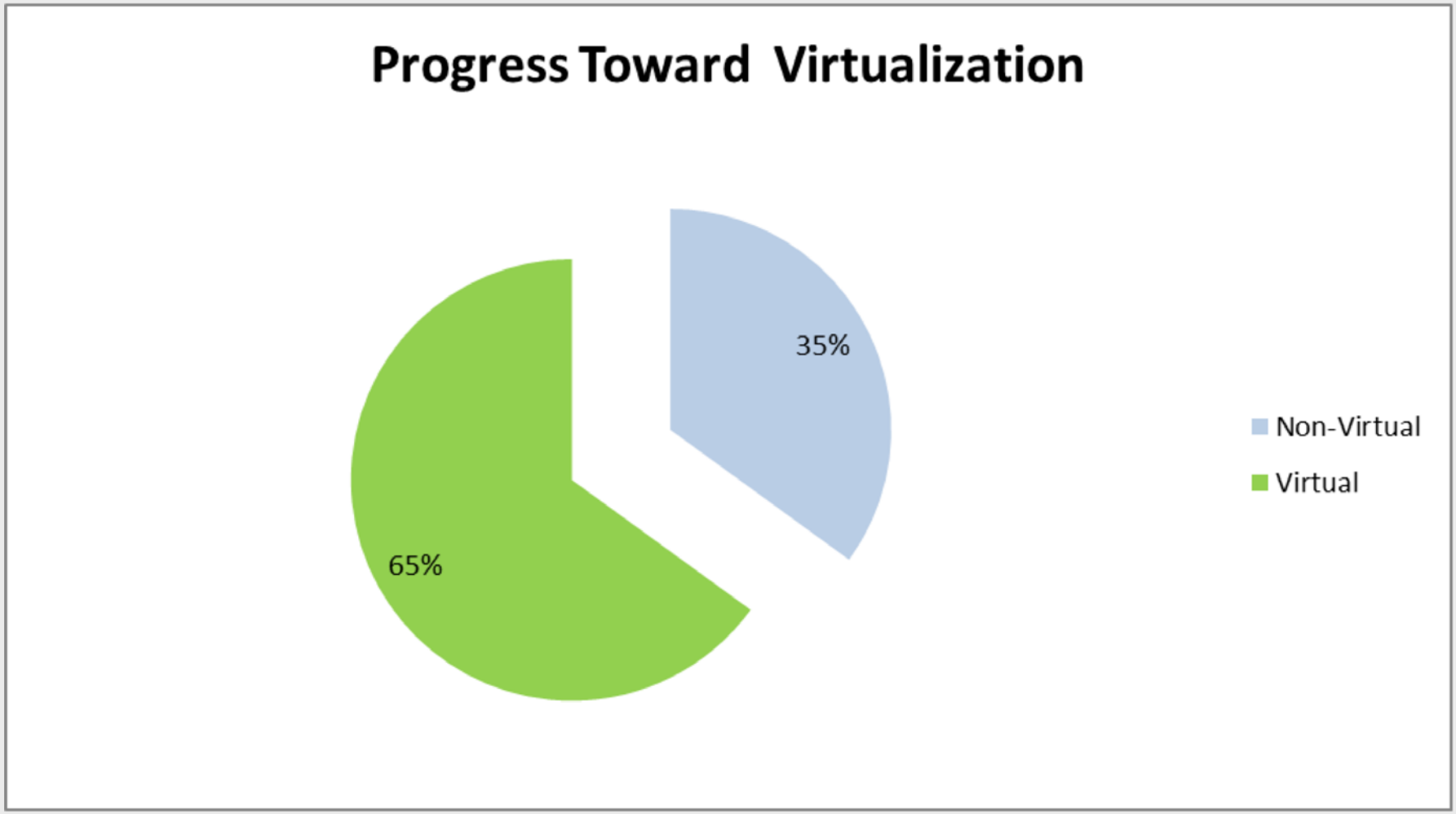

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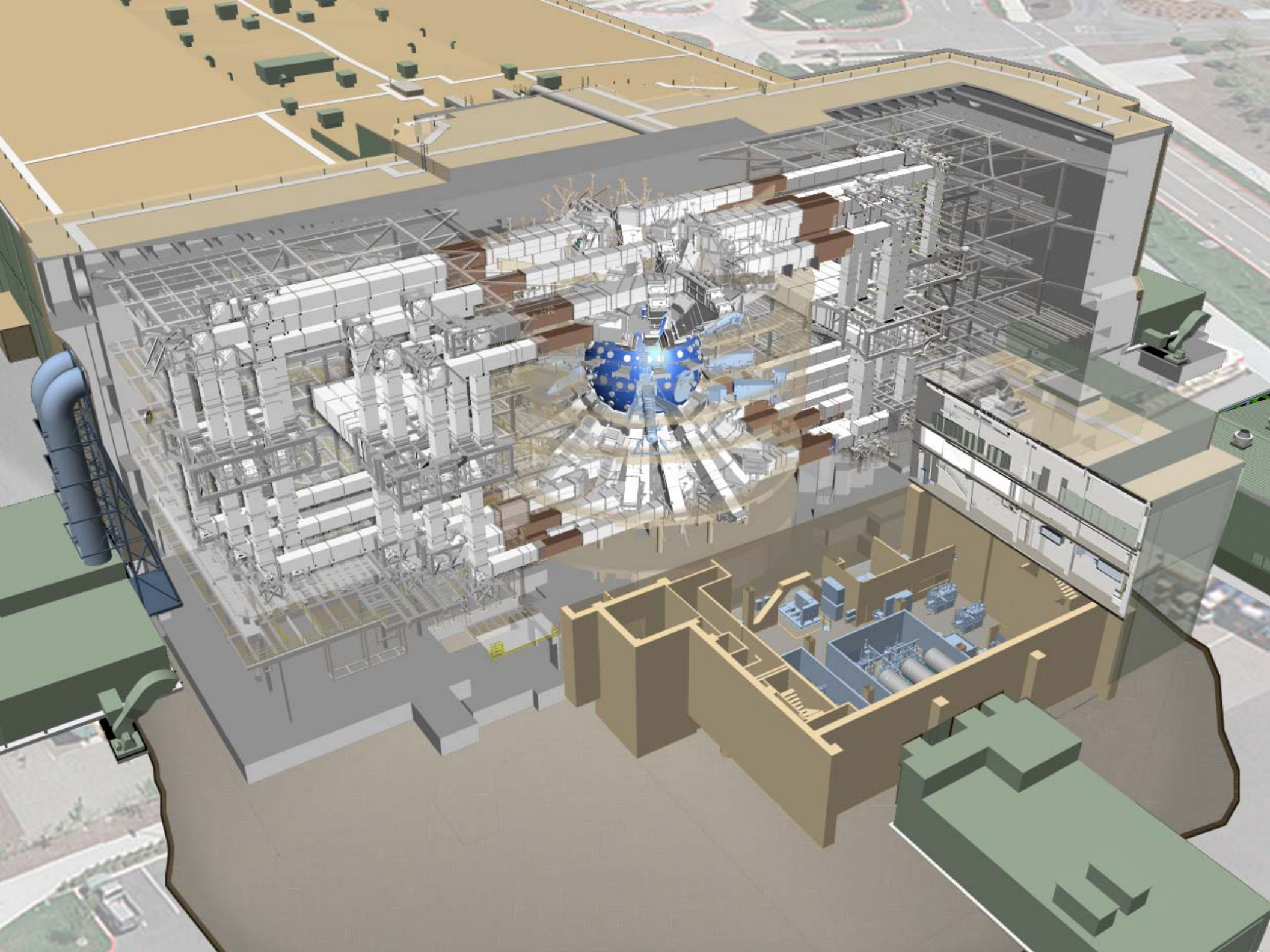

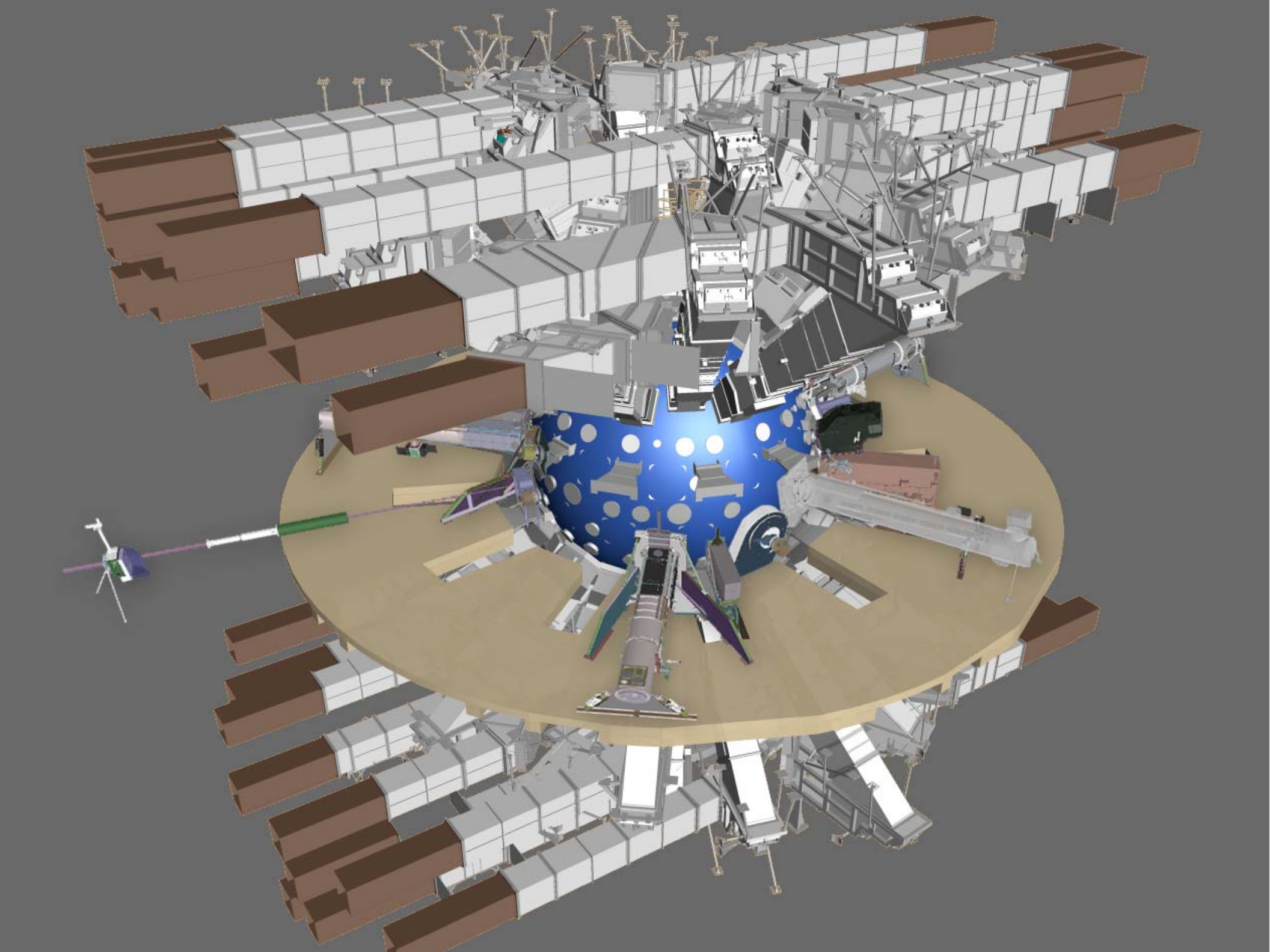

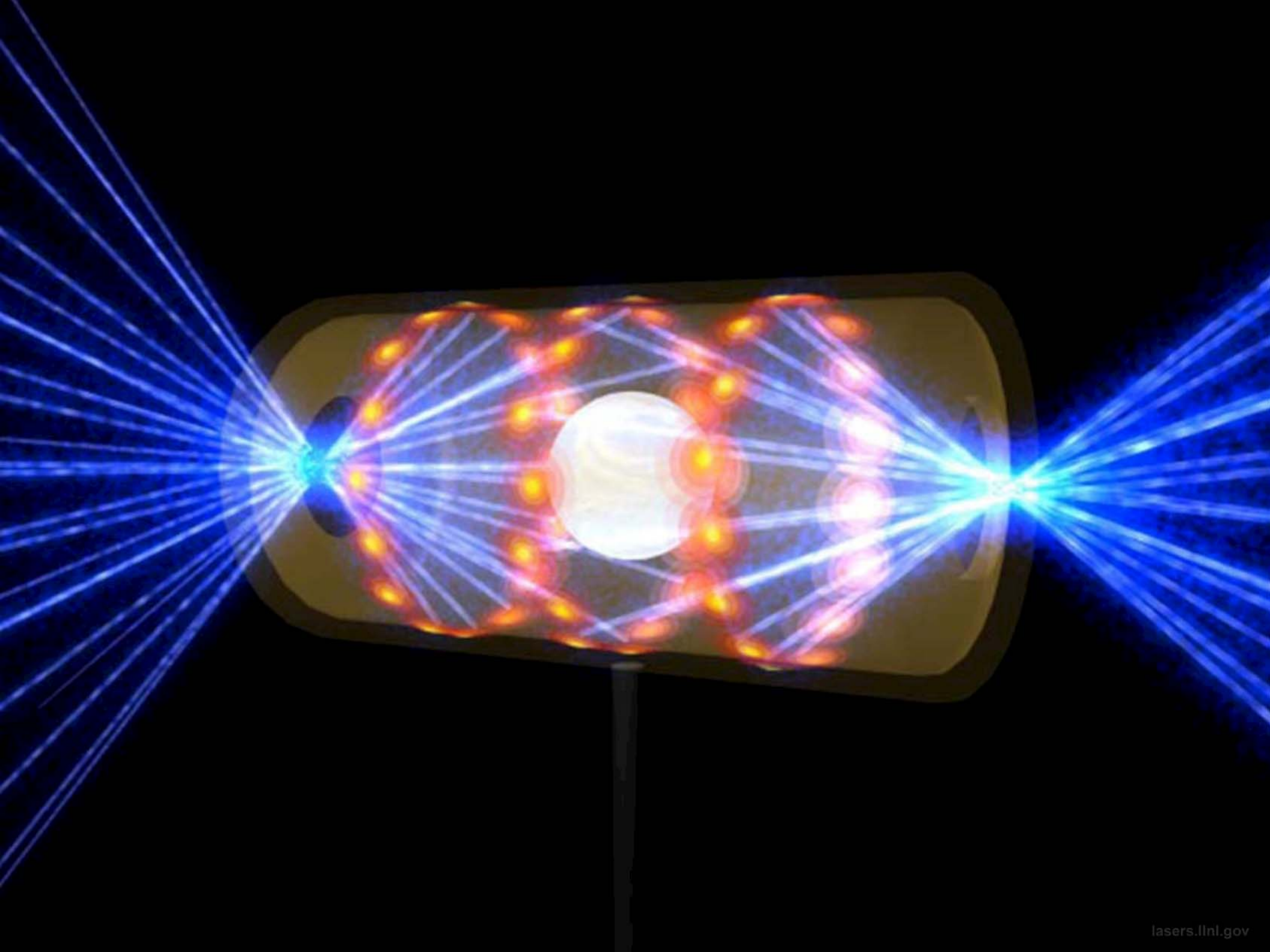
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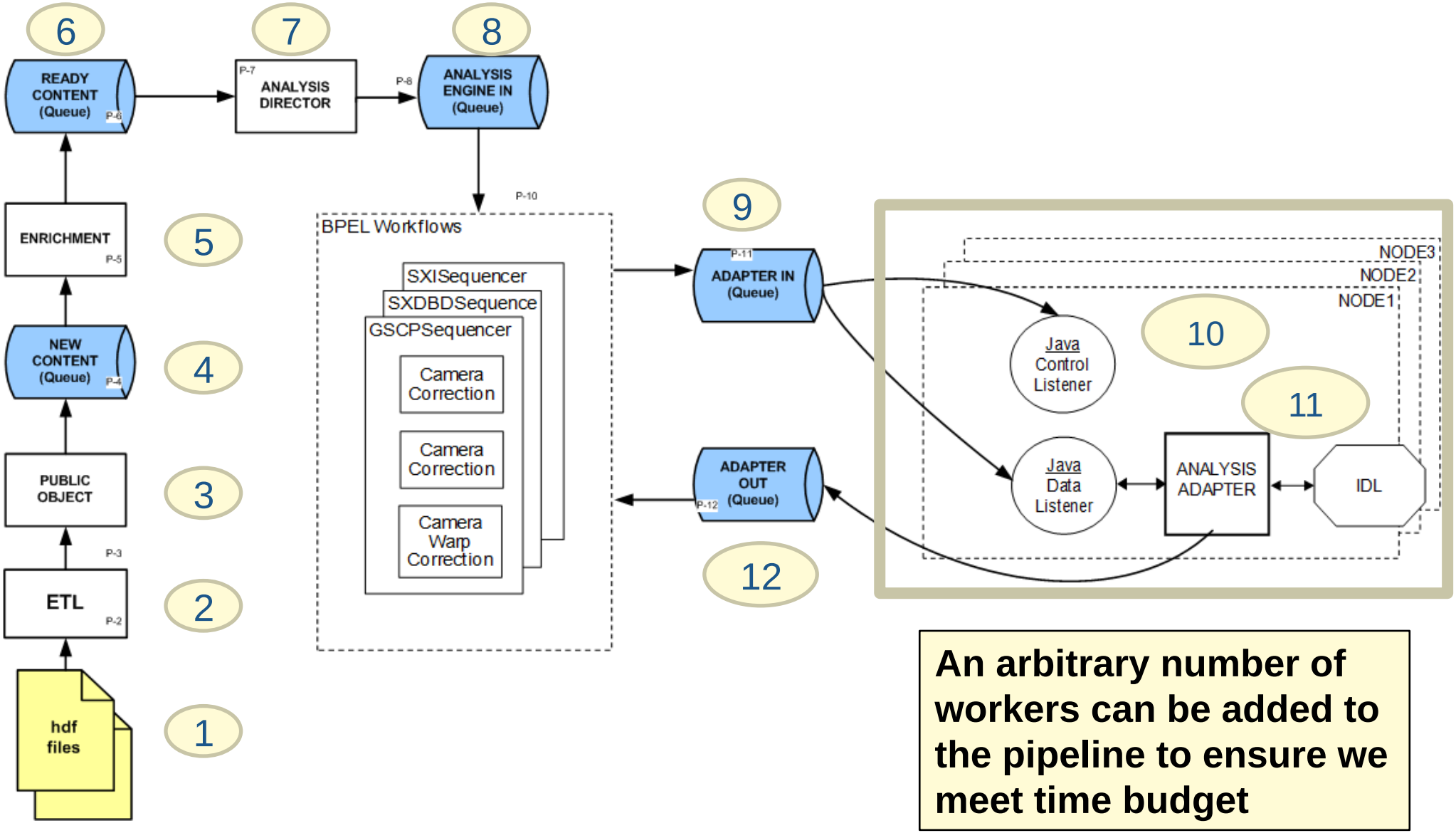
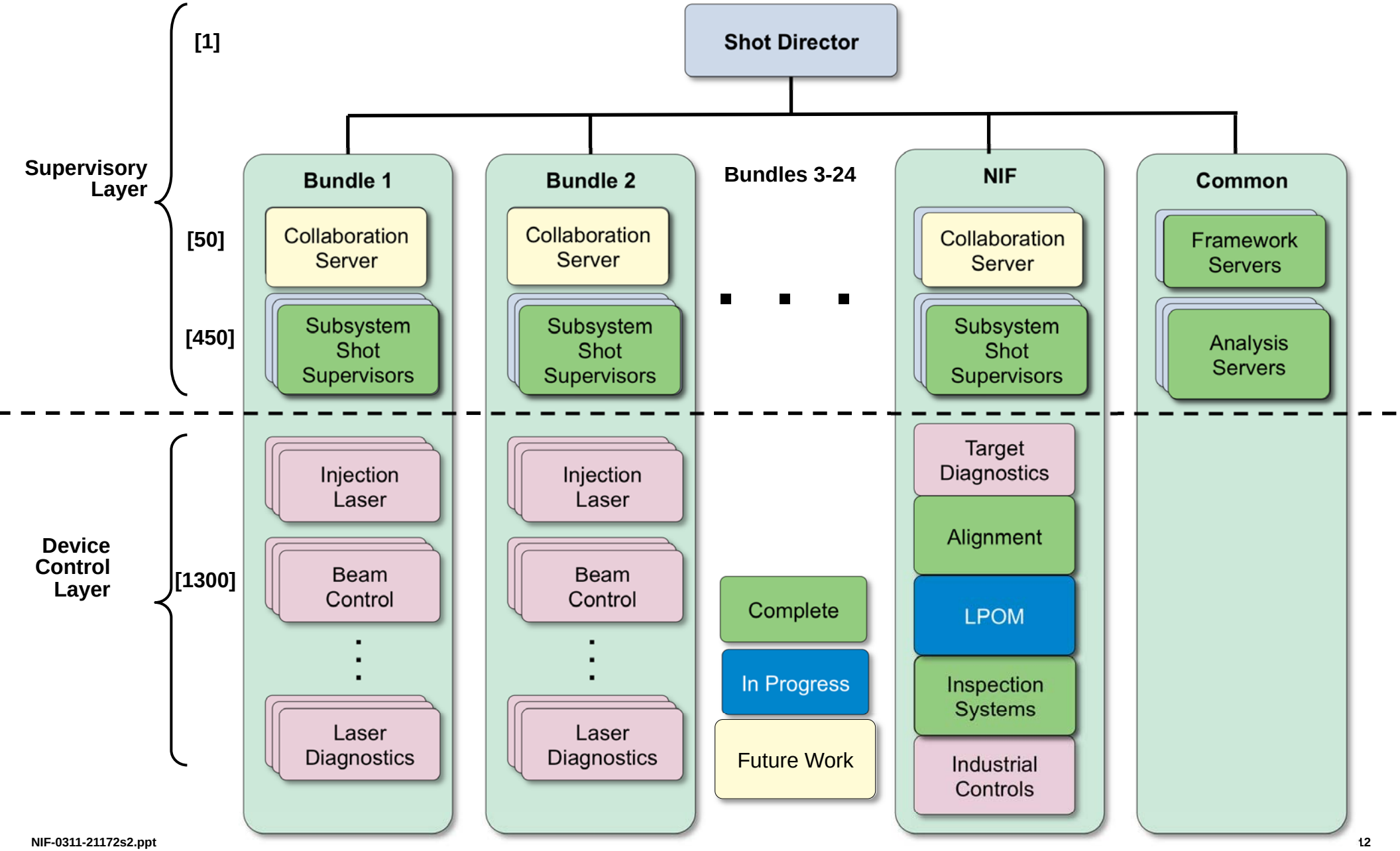
The analysis pipeline was the first system to be virtualized

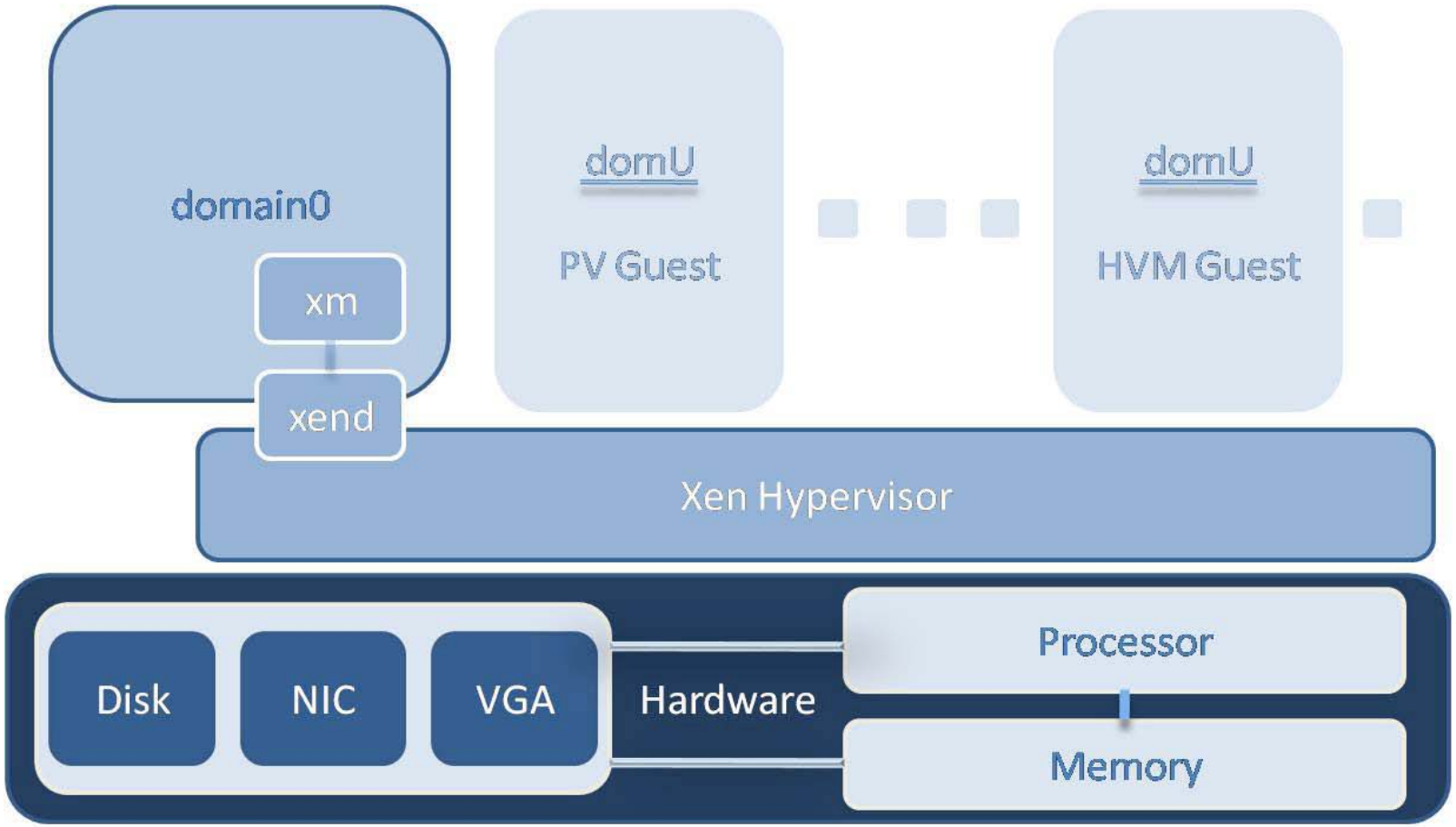


An arbitrary number of workers can be added to the pipeline to ensure we meet time budget

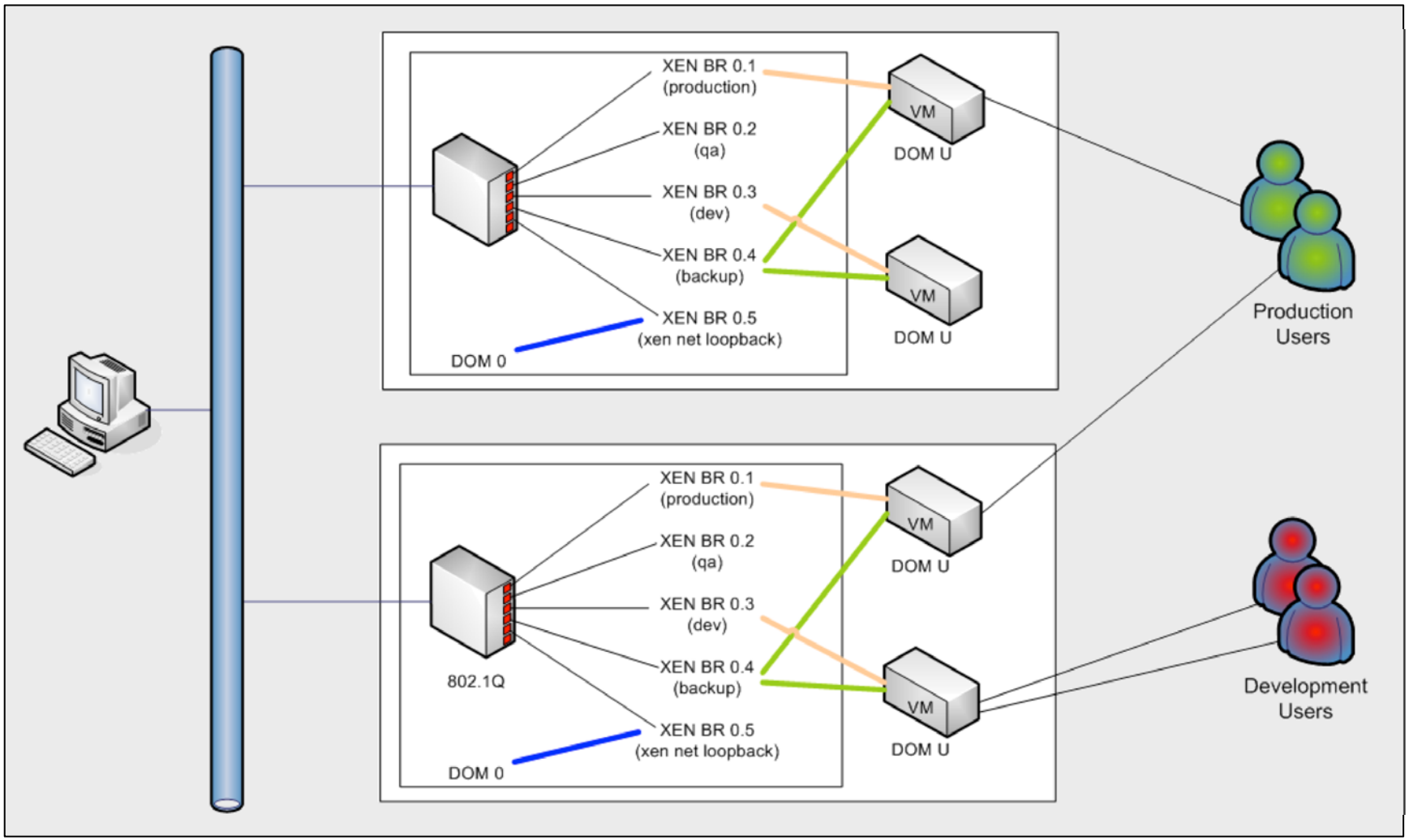
Virtualization of our Integrated Computer Control System (ICCS) is underway



Xen, the Linux-open-source approach to virtualization



802.1Q (VLAN Tagging) provides networking separation within the cluster



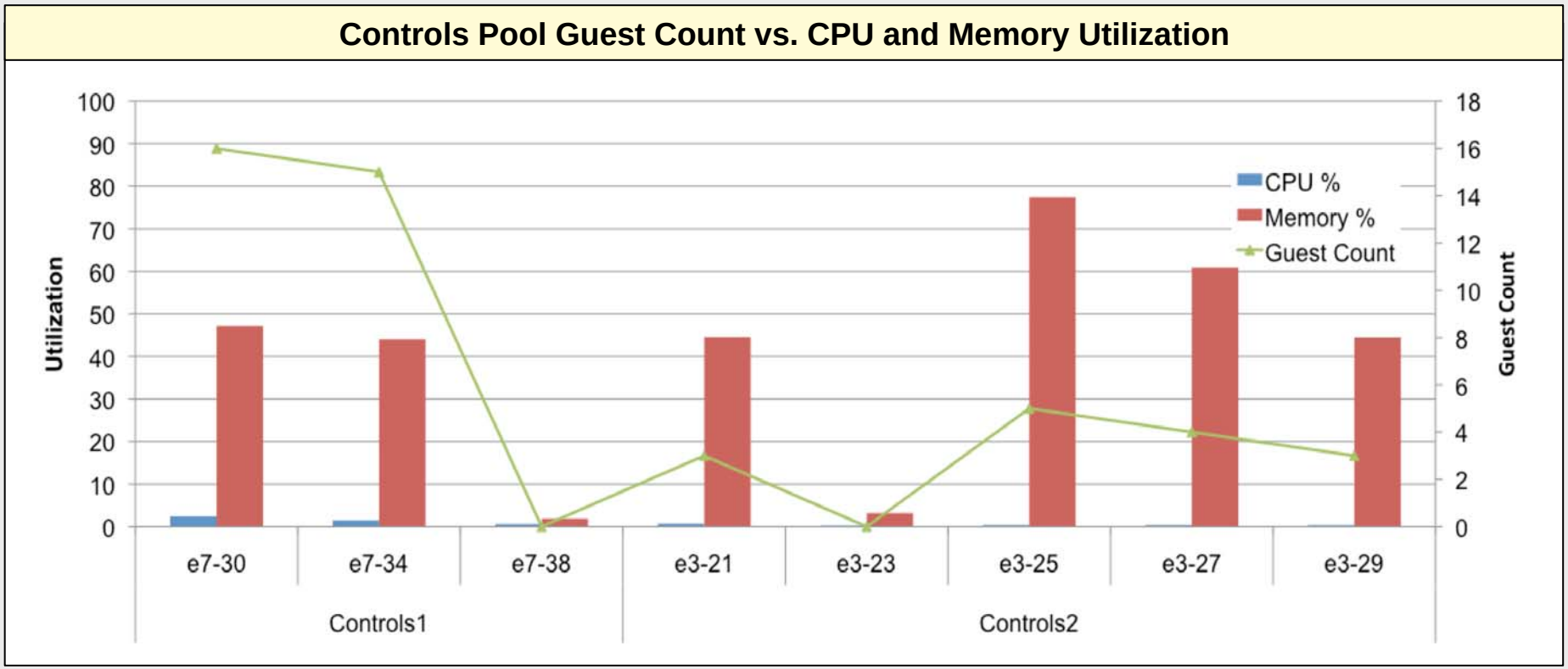
802.1Q is an industry standard originated by Cisco Systems

Virtualization “Notes from the field”

- Understand the context and constraints in which you operate
- Develop high level requirements to guide your efforts
- Leverage the learning of others whenever possible
- Choose a simple architecture
- Have tools at the ready to measure performance of systems
- Learn and adapt as you go
- Measure and share your progress toward virtualization

The National Ignition Facility

An unexpected lesson learned



Memory, NOT CPU or network bandwidth, is the scarce resource!

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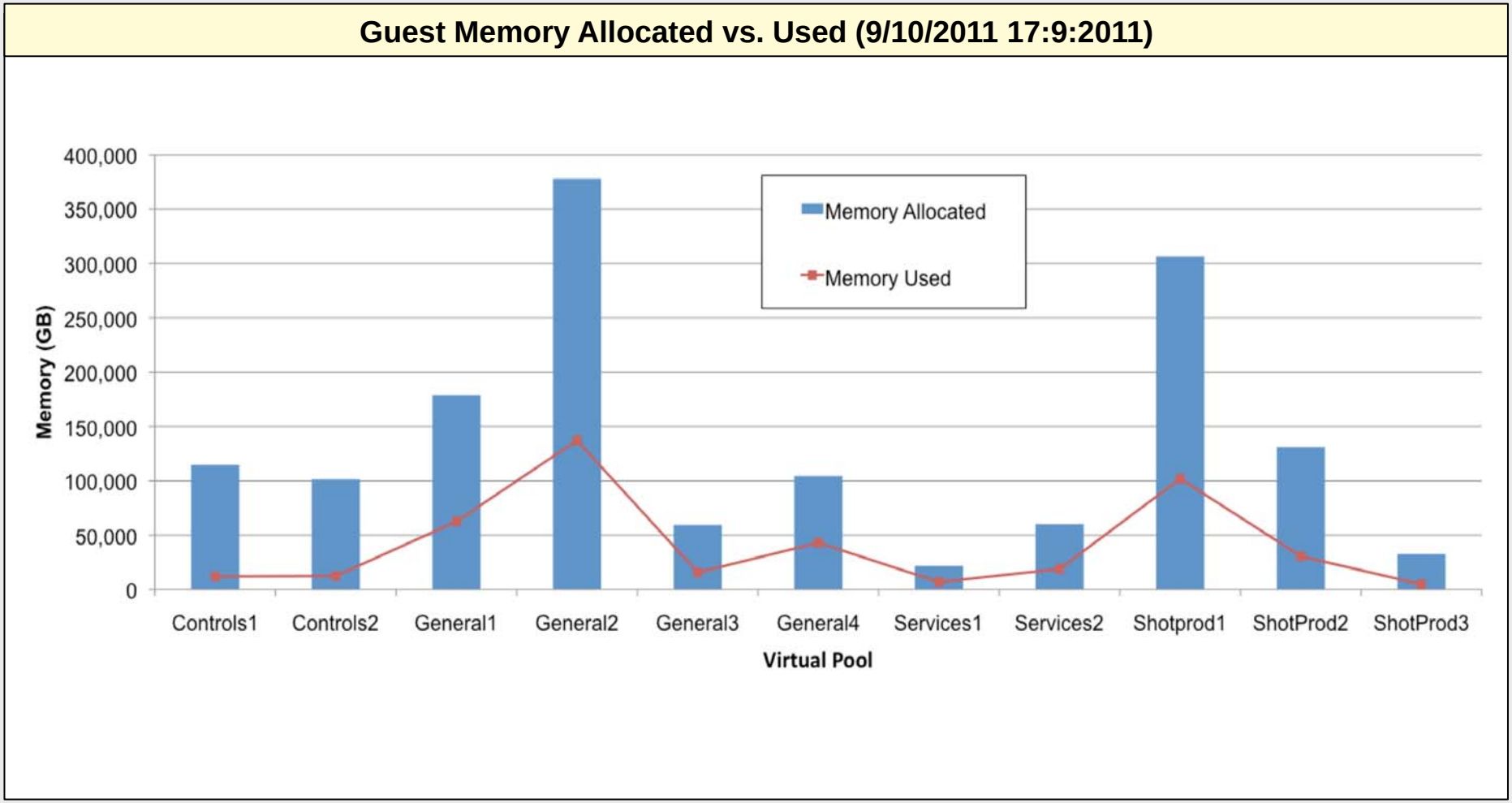

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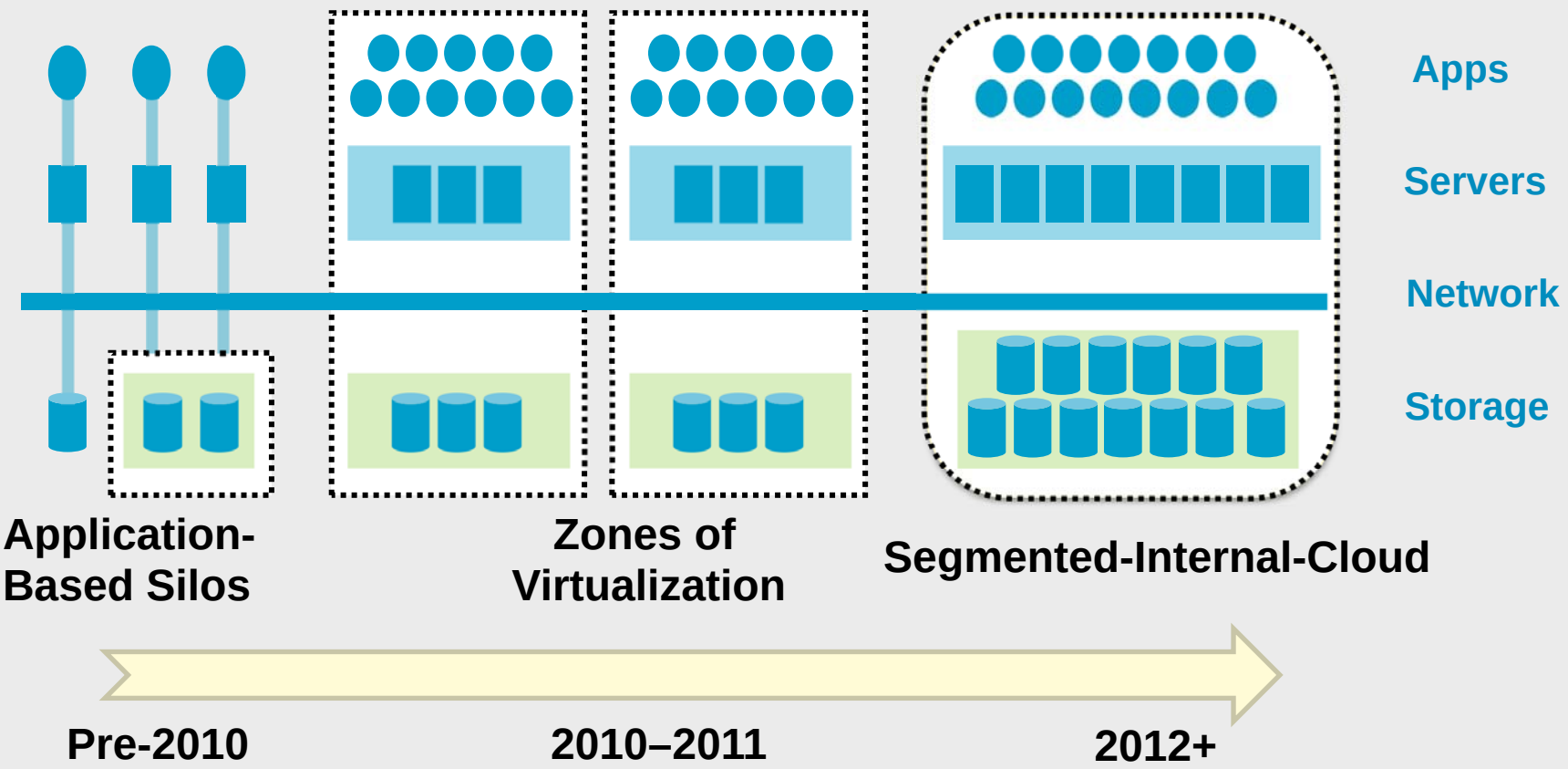
We are migrating from the legacy architecture used to commission the NIF to the architecture for 30 years of experimentation



VLAN separation will ensure control system functions remain isolated from other workload

The future NIF cloud is being realized in highly energy efficient portable data centers


NIF