SDC
STORAGE DEVELOPER CONFERENCE
SNIA SANTA CLARA, 2015

Next Generation Data Centers: Hyperconverged Architectures Impact On Storage

Mark O'Connell
Distinguished Engineer
EMC

Abstract

A modern data center typically contains a number of **specialized storage systems** which provide centralized storage for a large collection of data center applications. These specialized systems were designed and implemented as a solution to the problems of scalable storage, 24x7 data access, centralized data protection, centralized disaster protection strategies, and more. While these issues remain in the data center environment, new applications, new workload profiles, and the changing economics of computing have introduced **new demands on the storage system** which drive towards **new architectures**, and ultimately towards a **hyperconverged architecture**. After reviewing what a hyperconverged architecture is and the building blocks in use in such architectures, there will be some predictions for the future of such architectures.

Learning Objectives

- What is a hyperconverged architecture
- How hyperconverged architectures differ from traditional architectures
- What technologies are being used to build hyperconverged architectures
- What workloads are appropriate for hyperconverged architectures

Definition

- Hyper-convergence (hyperconvergence) is a type of infrastructure system with a **software-centric architecture** that tightly integrates **compute, storage, networking and virtualization** resources and other technologies from scratch in a **commodity hardware box** supported by a single vendor
  - http://searchvirtualstorage.techtarget.com/definition/hyper-convergence

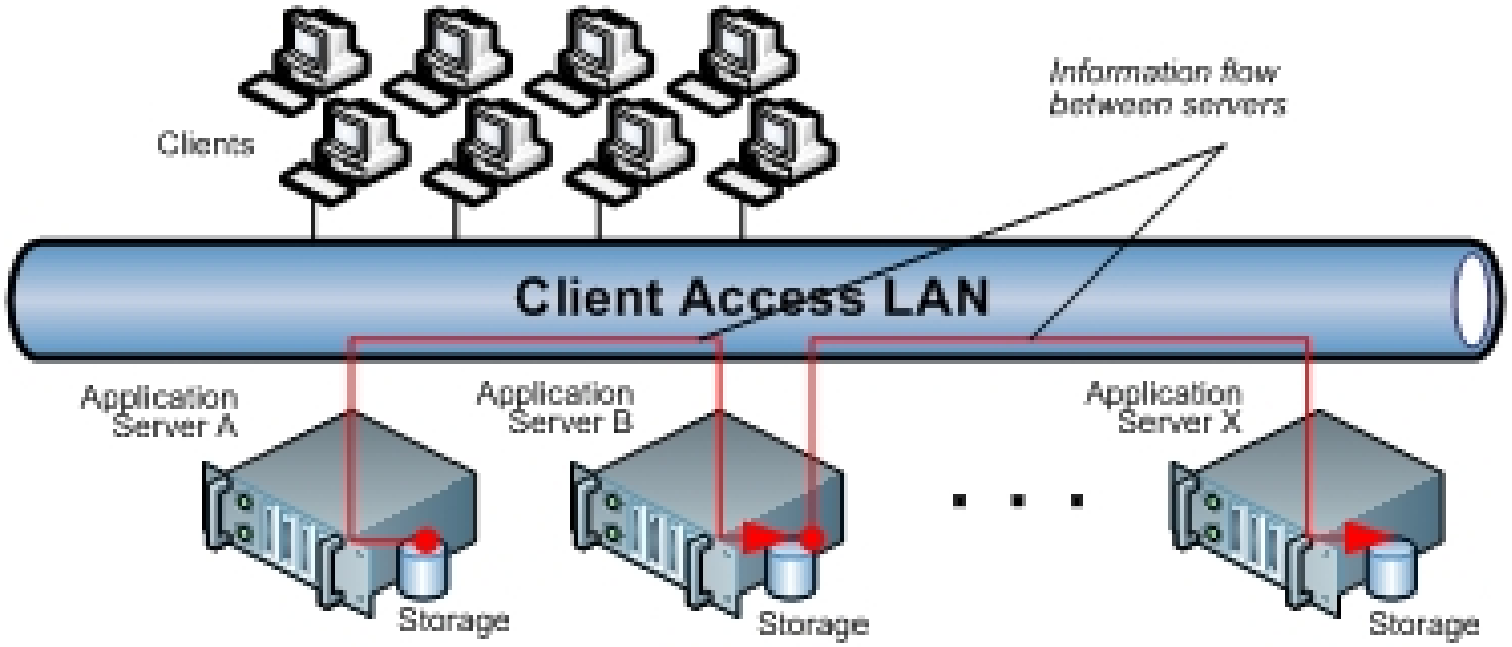
Converged vs Hyperconverged

- Converged infrastructures
  - Multi-protocol NAS boxes
  - Combined block/file with iSCSI
- Hyperconverged
  - SW defined
  - Client and server run together

Why Hyperconverged

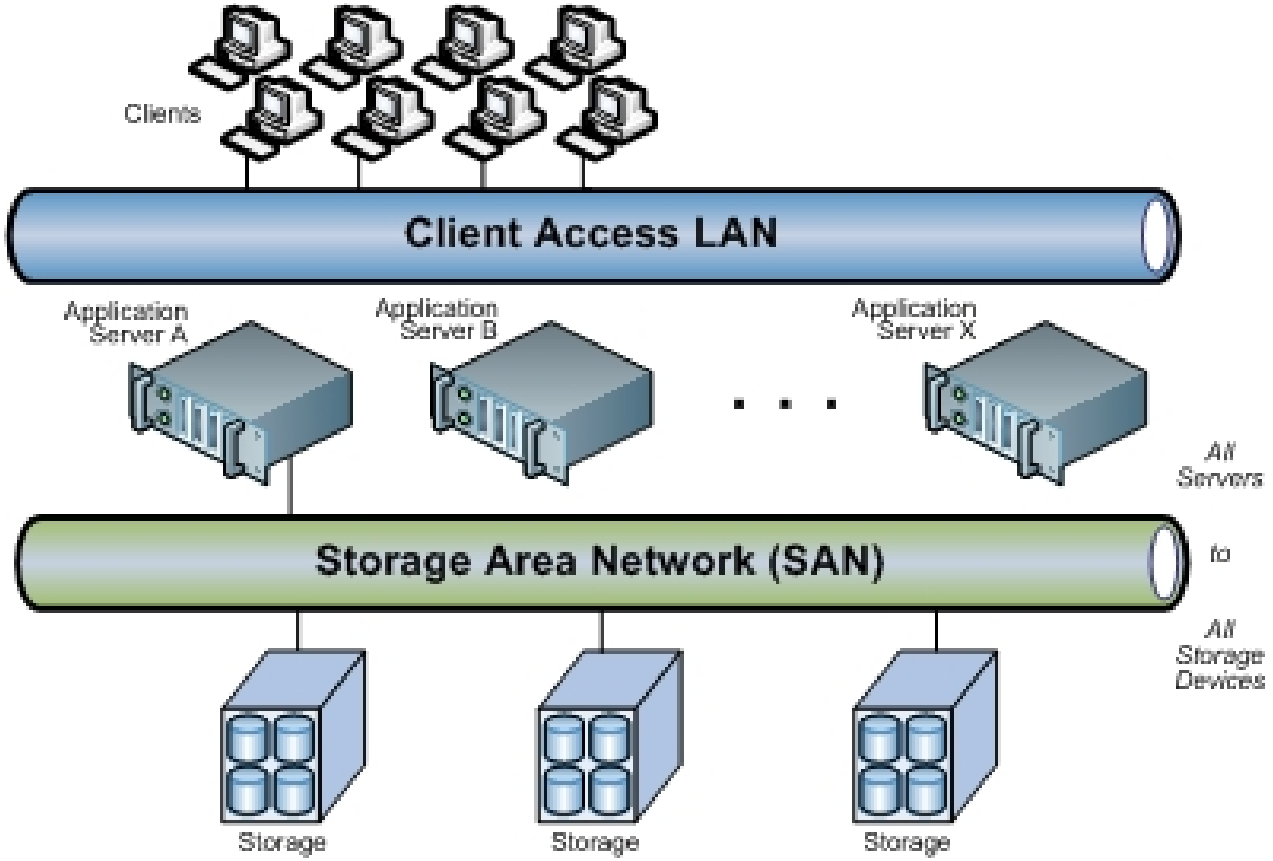
If it's so good,
why haven't we been
using it all along?

Classical architecture



Source: http://www.snia.org/education/storage_networking_primer/san/what_san

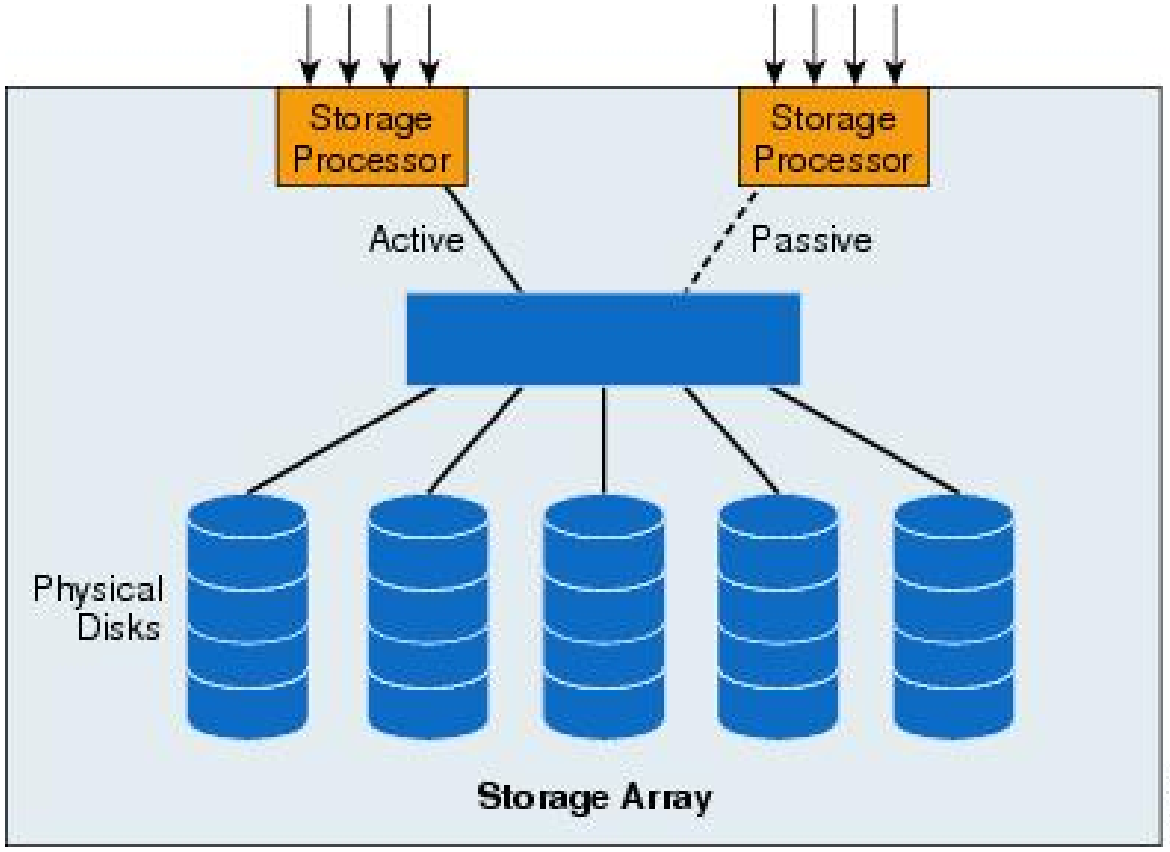
Classical architecture



Source: http://www.snia.org/education/storage_networking_primer/san/what_san

Classical architecture

- Speed limited
- Scaling SPs expensive
- Inefficient at small scale
- DR makes overall utilization worse



Scale-out storage architecture

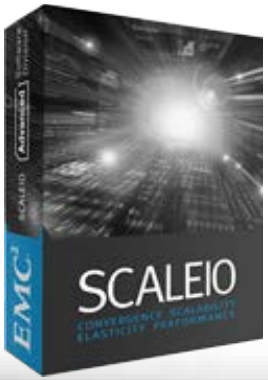
- Commodity nodes, commodity drives
- Failure impact?
- Need to go faster?

Enterprise scale-out systems

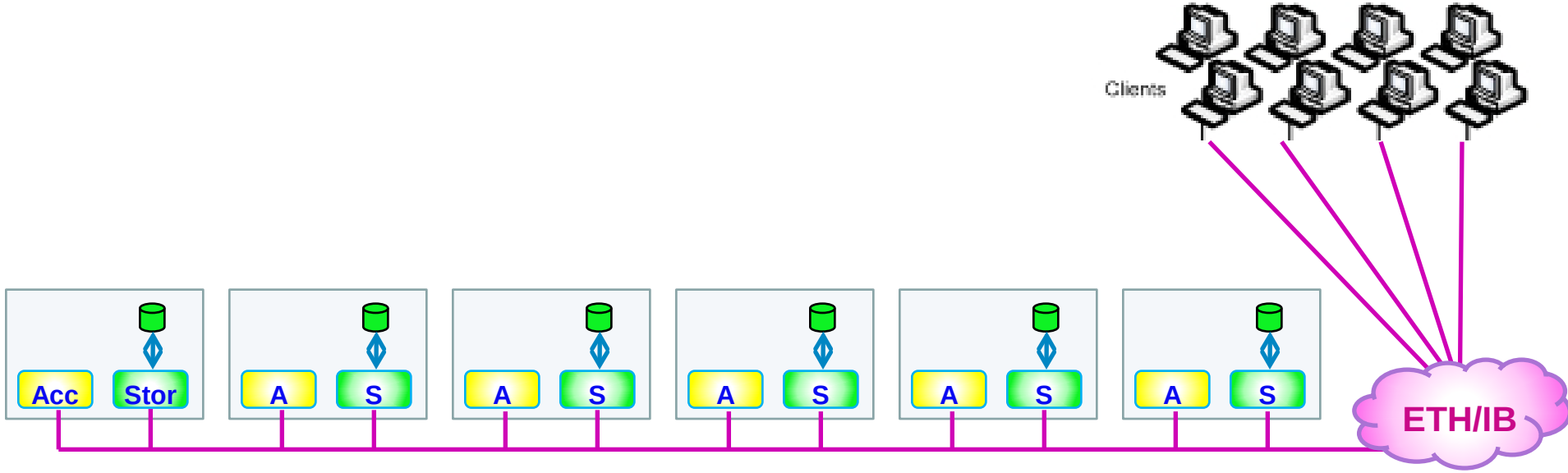
CENTERA

2002 2007 2008 2011 2014

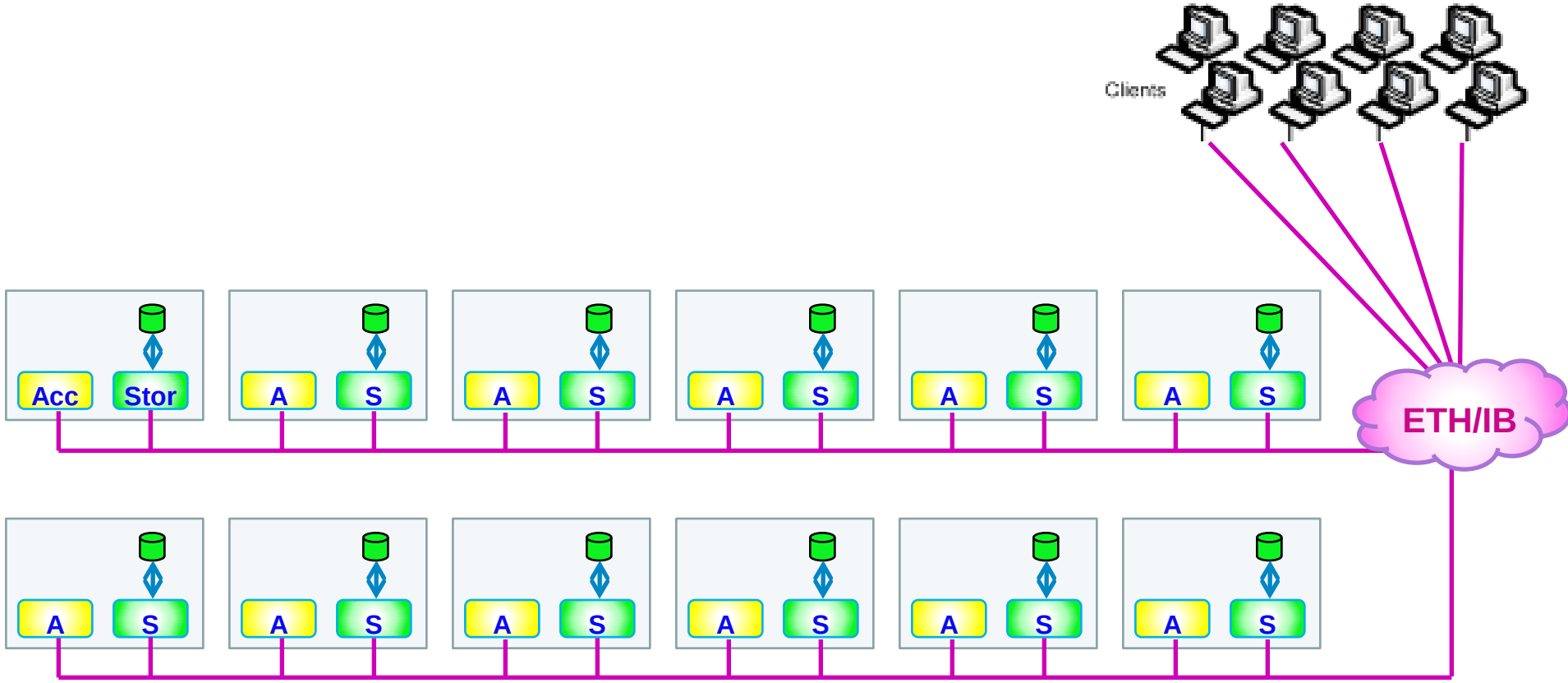
EMC ISILON



Scale-out systems: Internal architecture

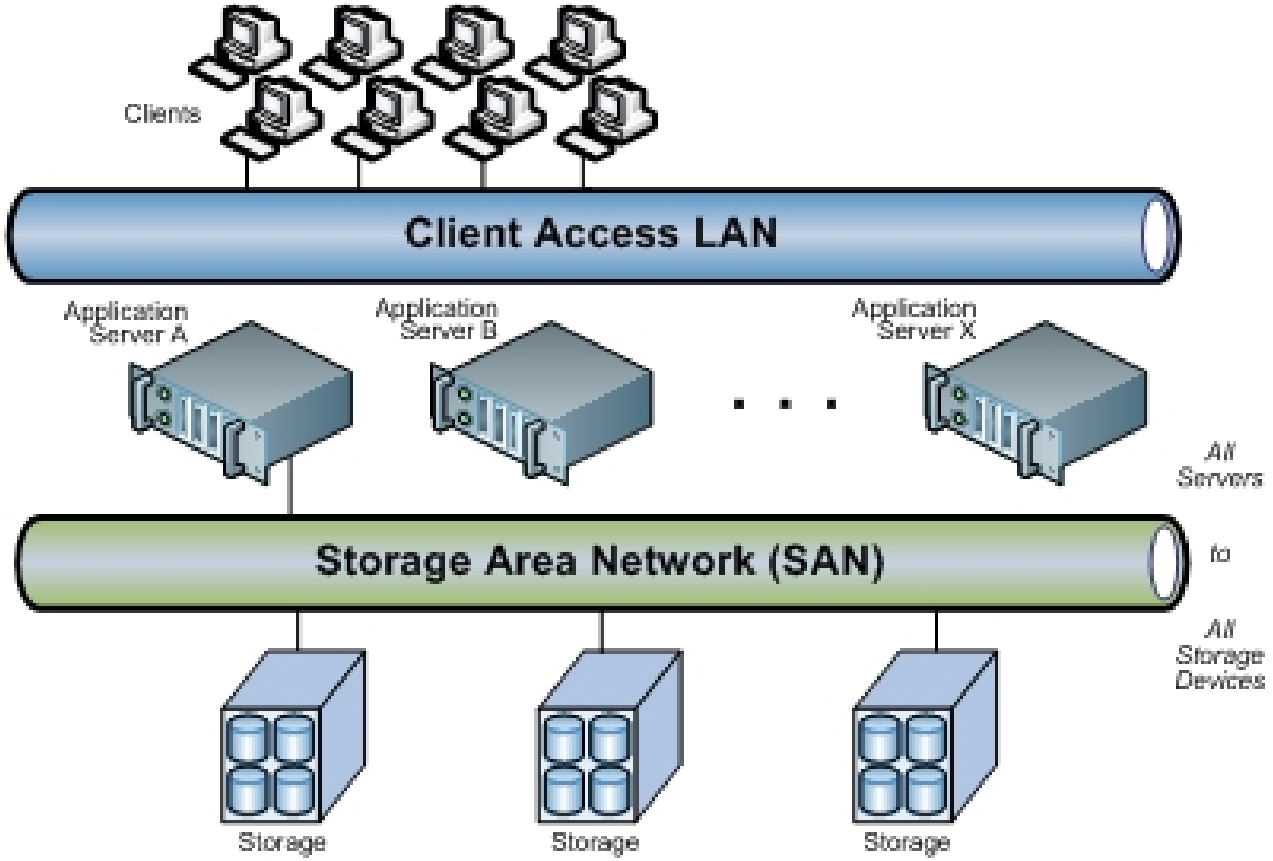


Scale-out systems: Expansion



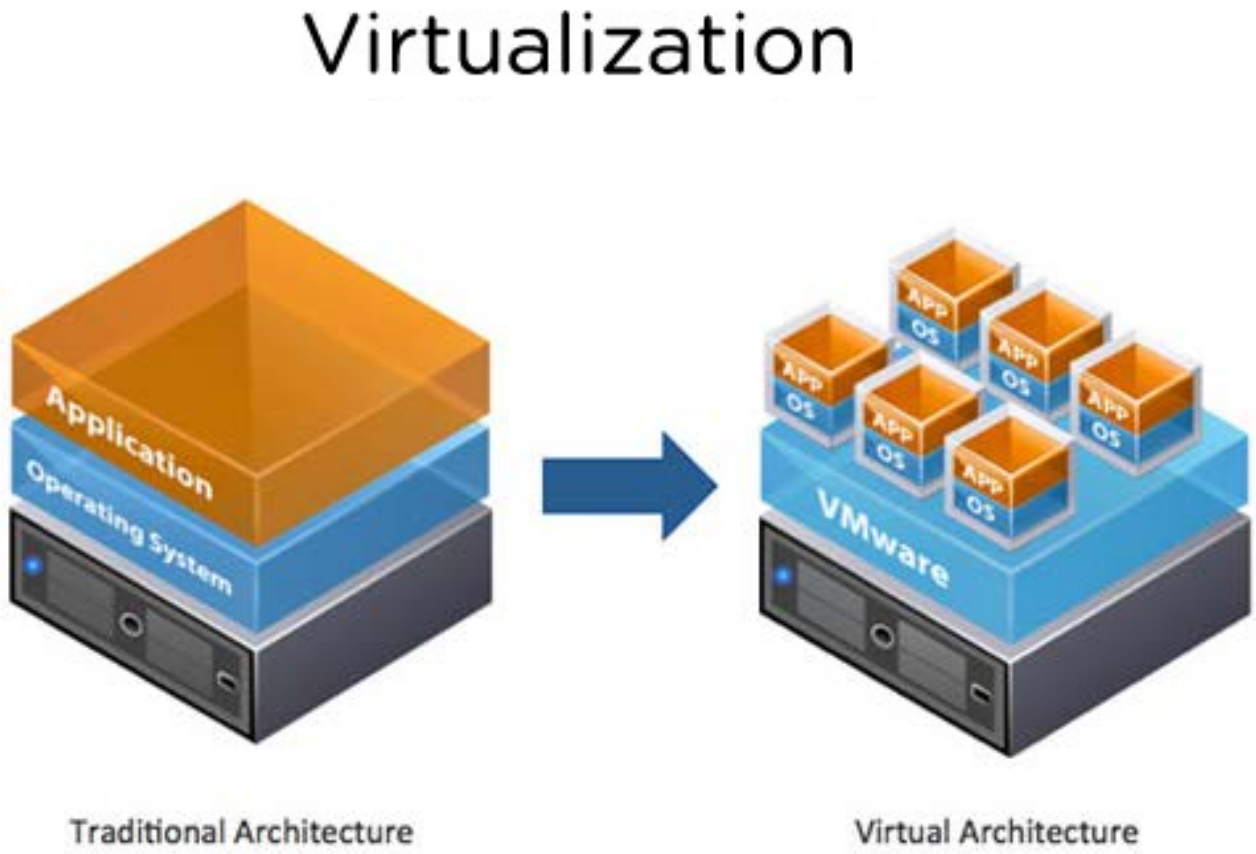
Scale-out systems: 2nd expansion

There's more than just storage

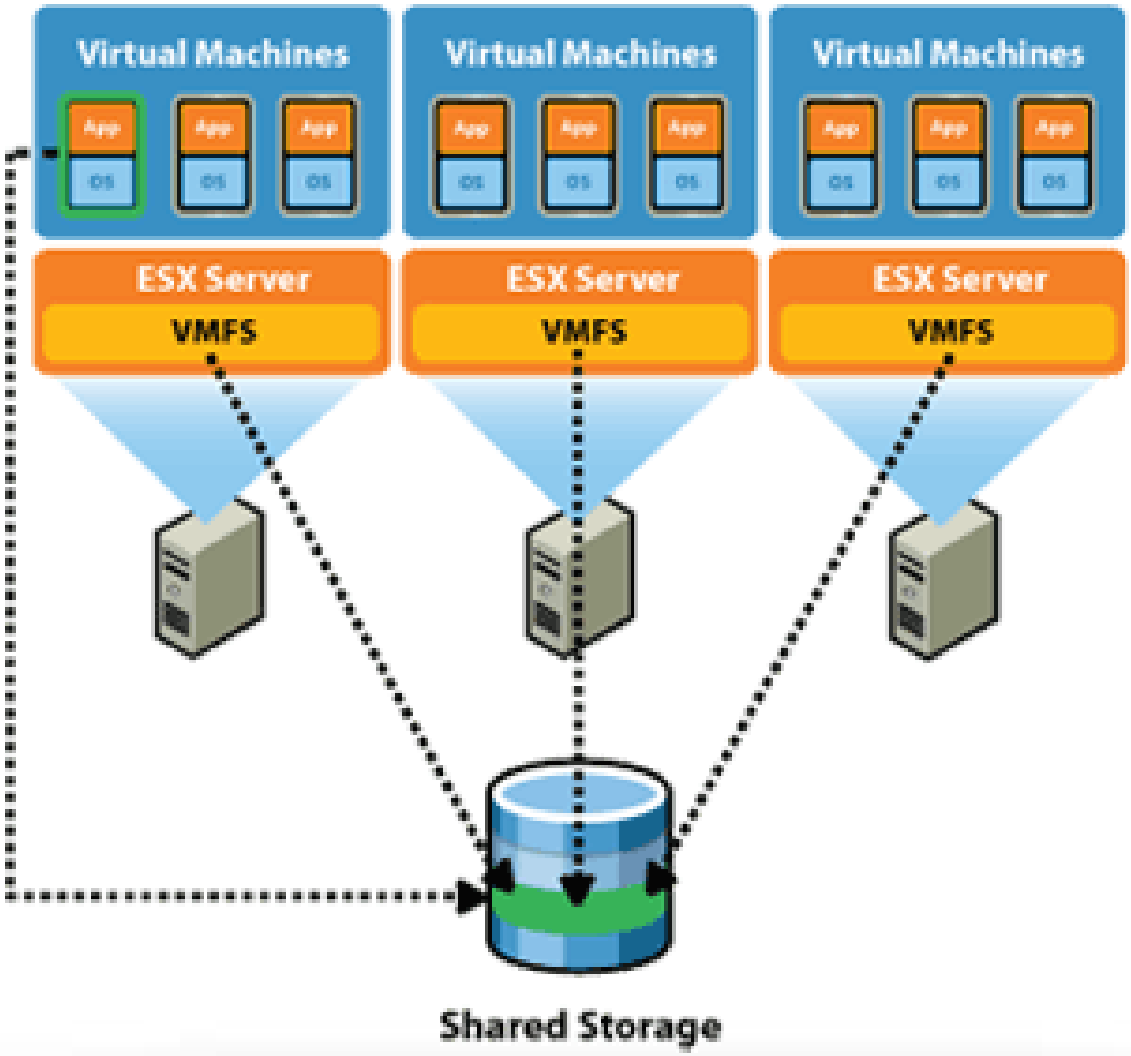


Source: http://www.snia.org/education/storage_networking_primer/san/what_san

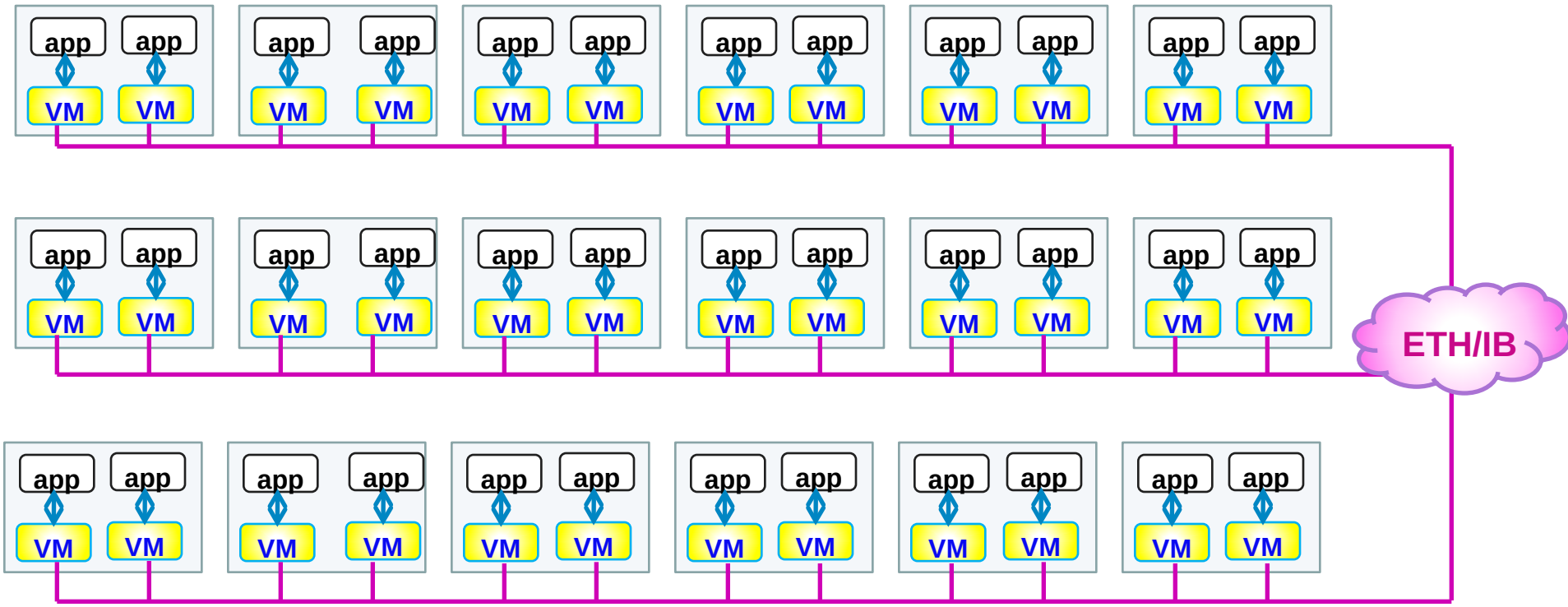
Evolution of the application platform



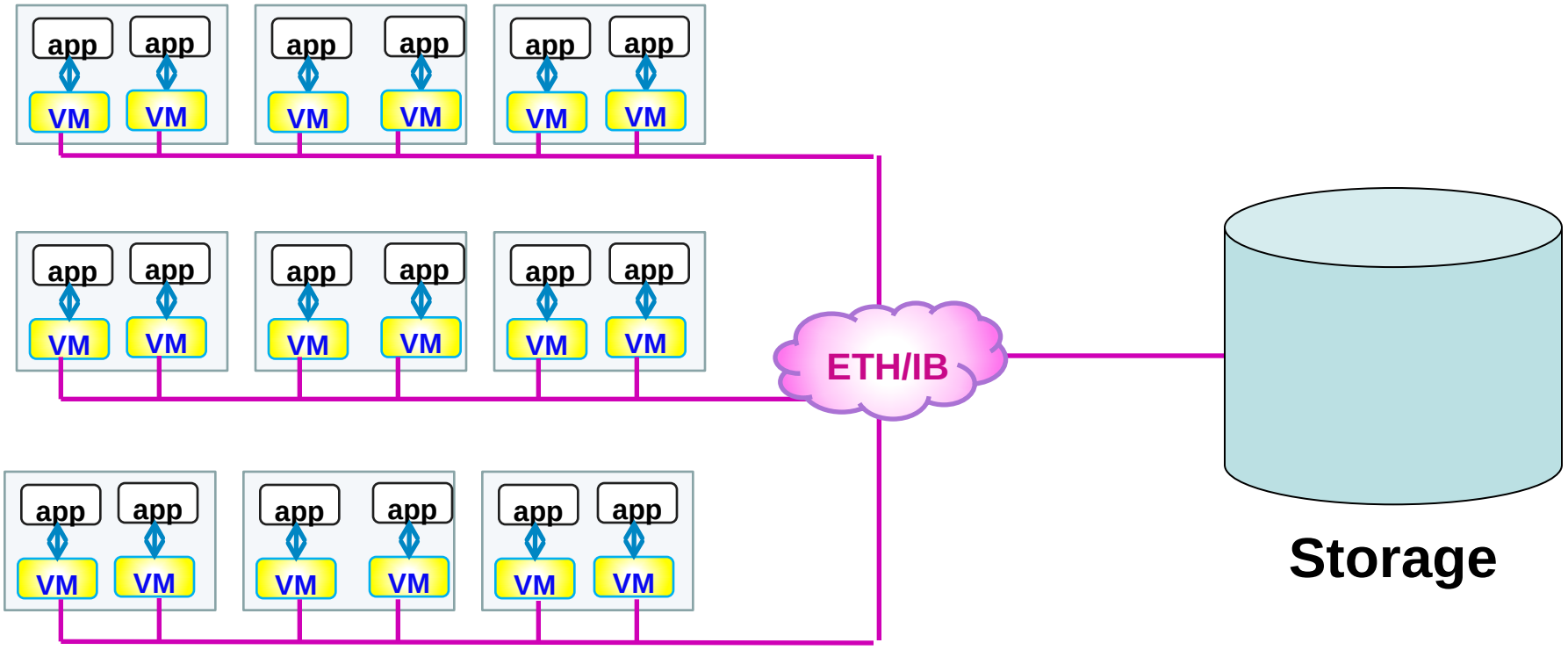
Evolution of the application platform



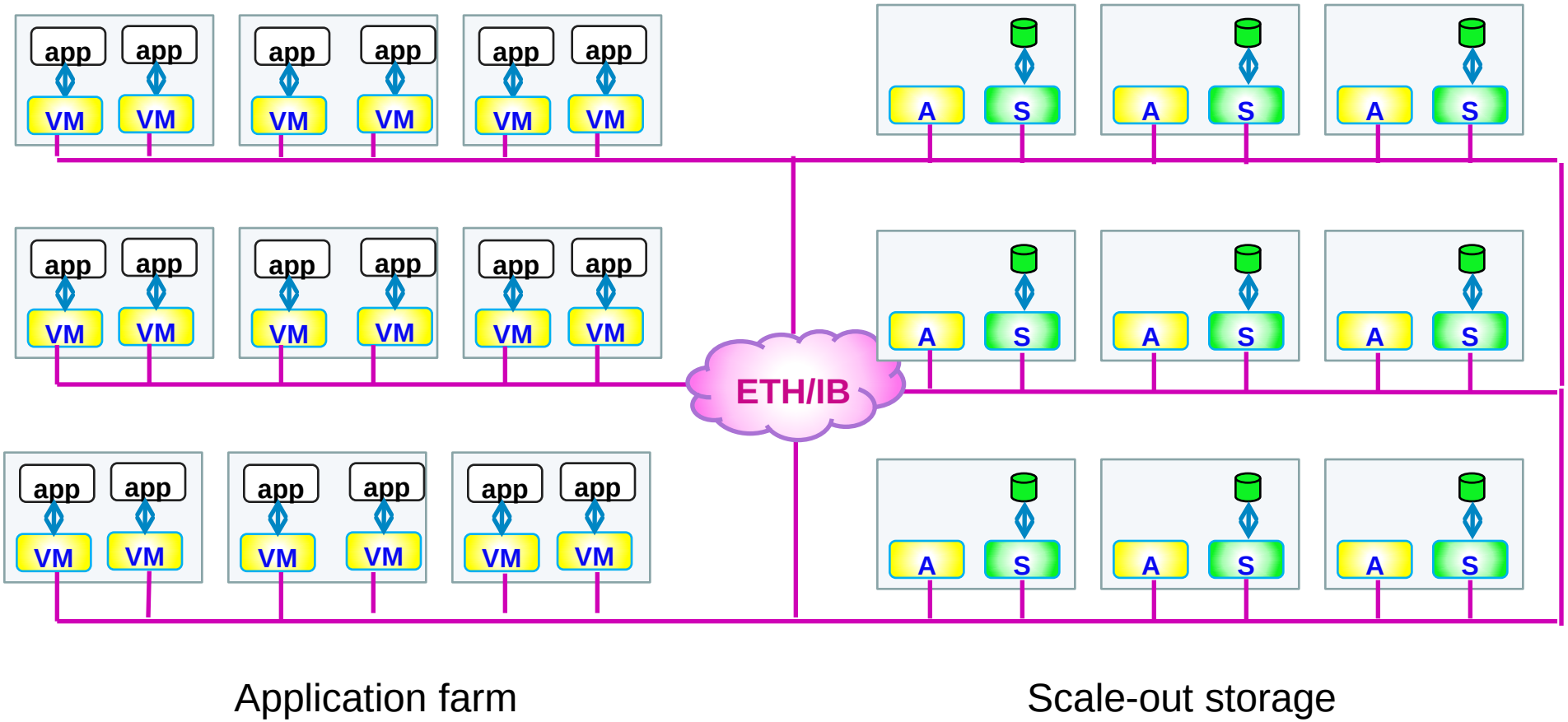
Virtualized application farm



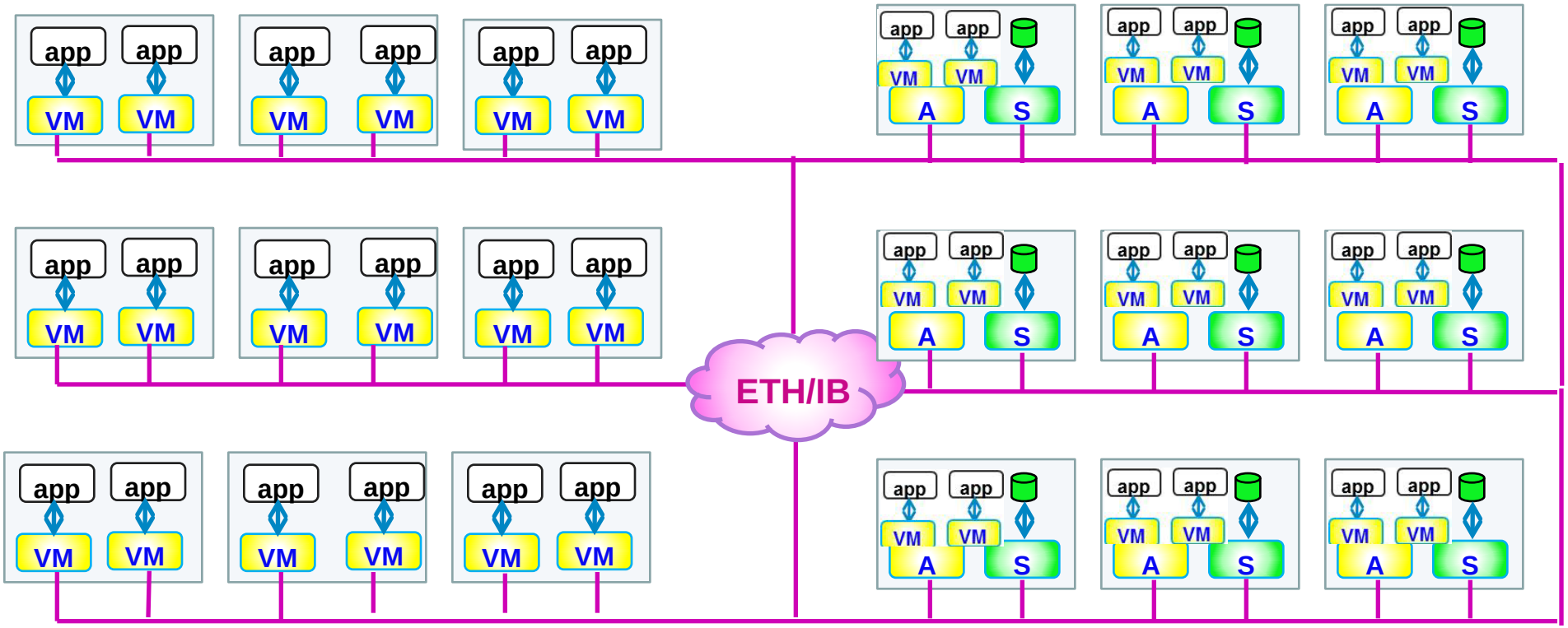
Virtualized application farm



Application farms with Scale-out storage



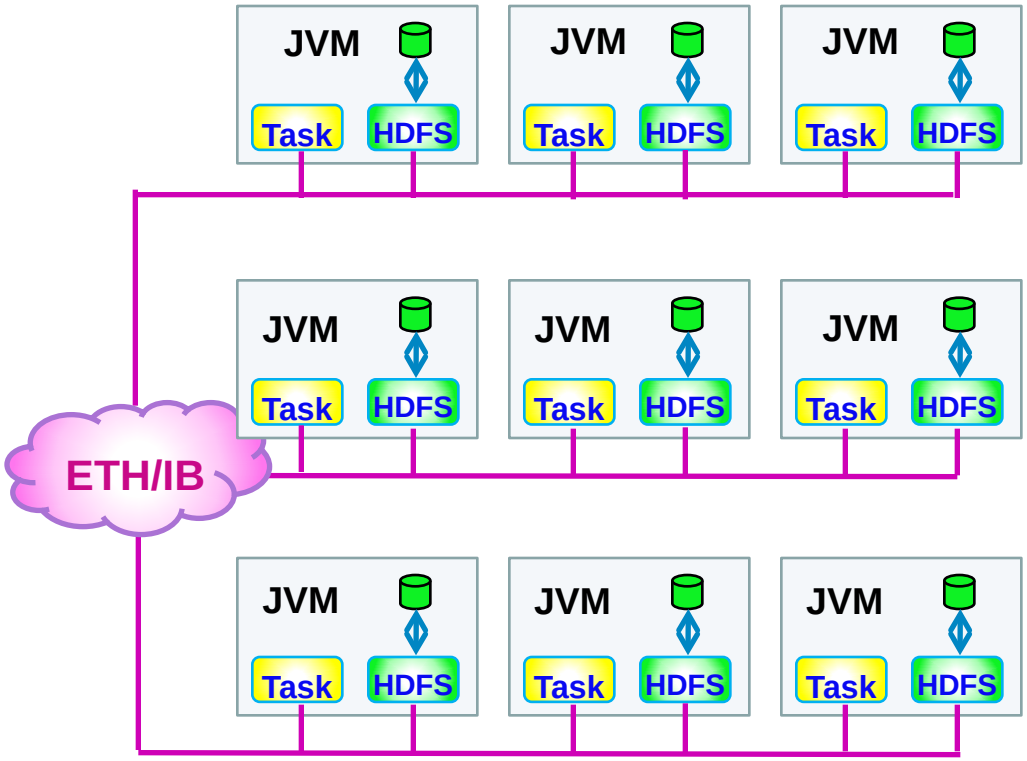
Why two server farms? Hyperconverge!

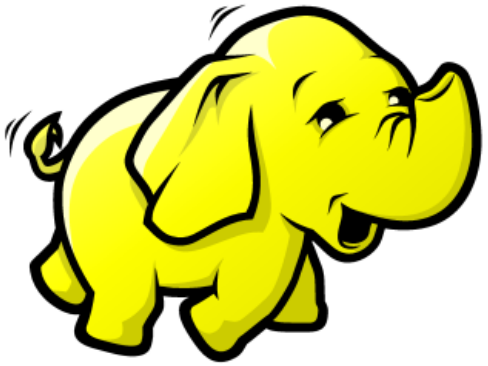


Application farm

Scale-out storage

Early Hyperconverged system

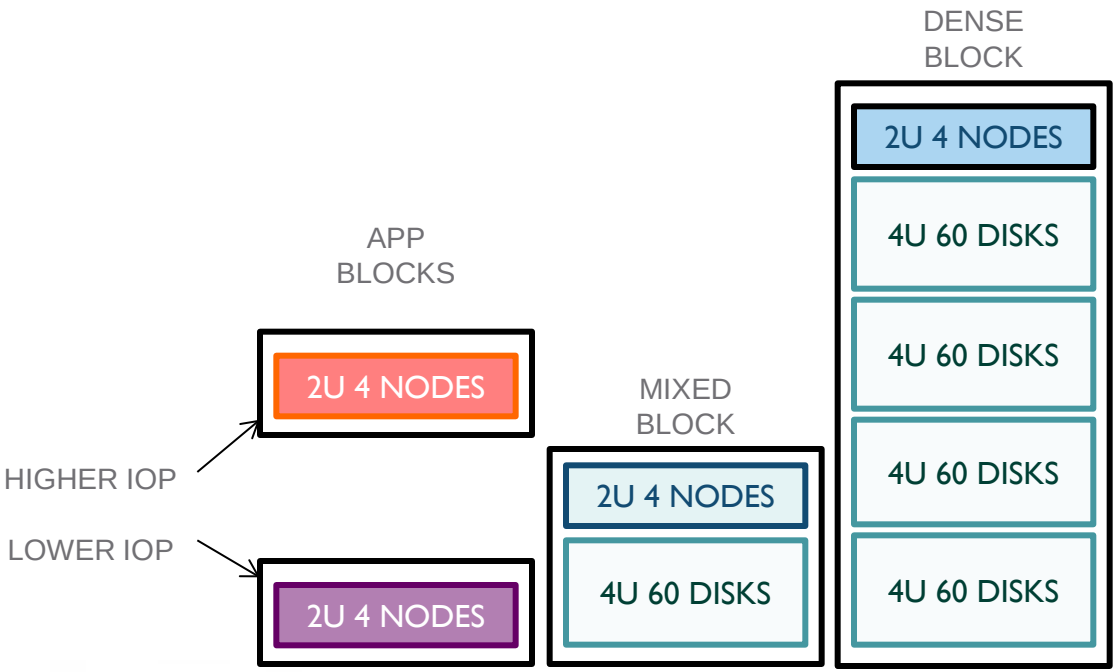




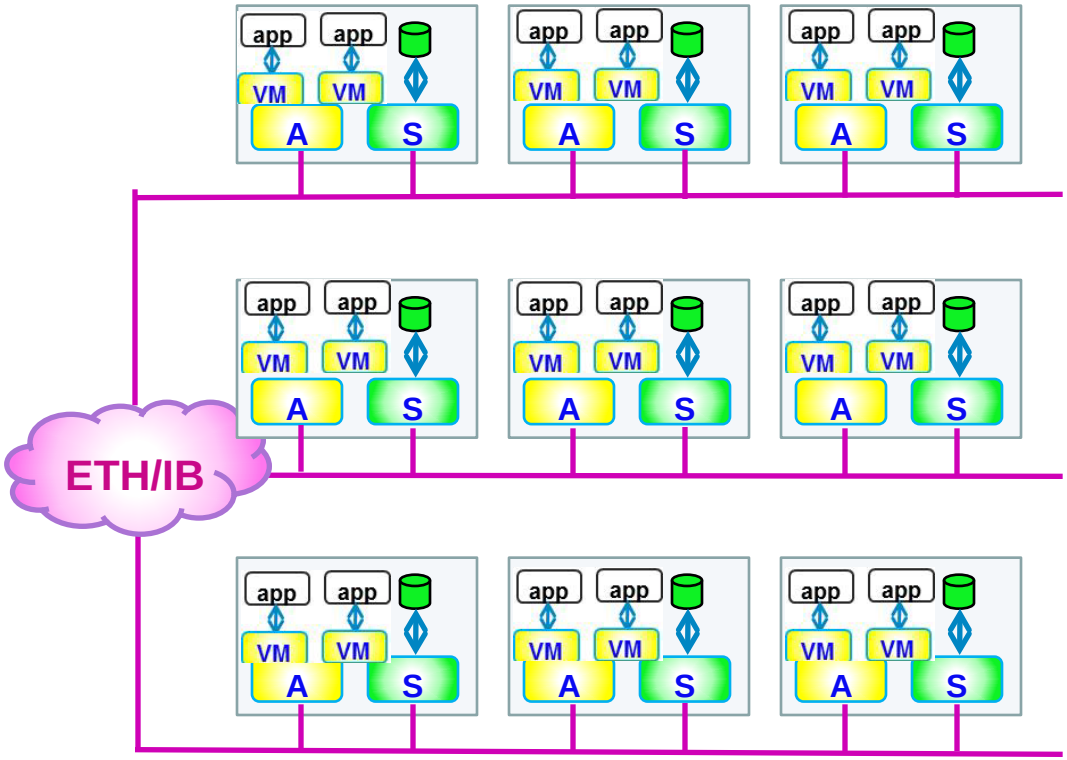
Scale-out storage

Effects of Hyperconverged systems: Elasticity

- Elasticity in scaling overall environment



Effects of Hyperconverged systems
App management



MESOS

CLOUD FOUNDRY™

Effects of Hyperconverged systems: Storage provisioning

- Application frameworks will provision for apps
- Drive adoption of standard provisioning mechanisms
- Pure service architecture for storage

Effects of Hyperconverged systems: Hybrid cloud enablement

- Apps are now a self-describing bundle
- Storage is a dynamically bound service
- Enable movement on-prem/off-prem

Summary

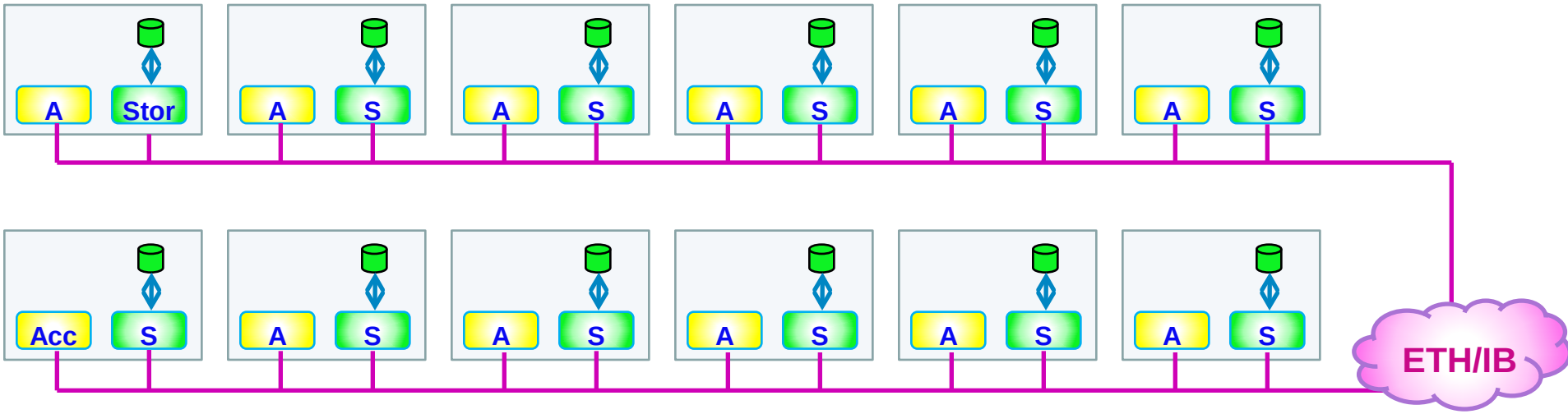
- Hyperconvergence is the result of ongoing industry trends
- Hyperconvergence will drive
  - Application management frameworks
  - Standardized provisioning
  - Hybrid cloud

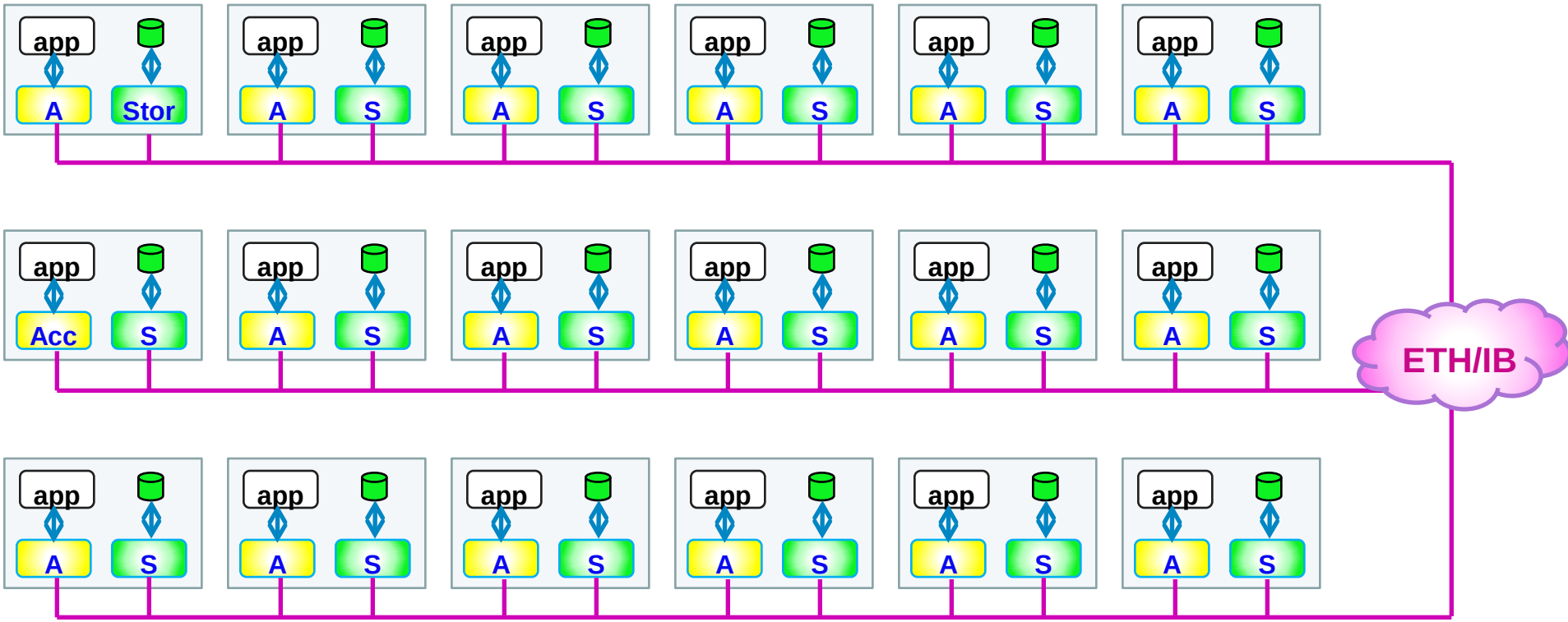
Questions?

Backup slides

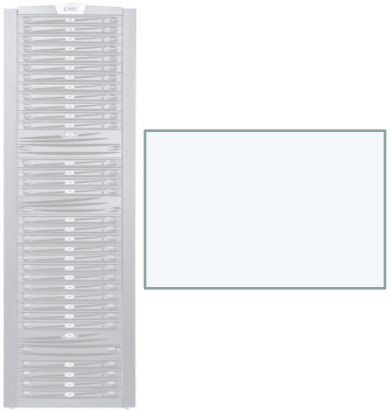
What's coming?

- Scale and multi-sized building blocks
  - Elasticity of building systems
- App management
  - Containers
  - Kubernetes etc
  - More complex app farms
- OpenStack, containers, provisioning – standard provisioning
- Service architecture across B, F, O
- Hybrid cloud bridge?





Enterprise scale-out systems



CENTERA

ATMOS
CLOUD OPTIMIZED STORAGE

openstack™
CLOUD SOFTWARE

EMC²
ECS

ceph

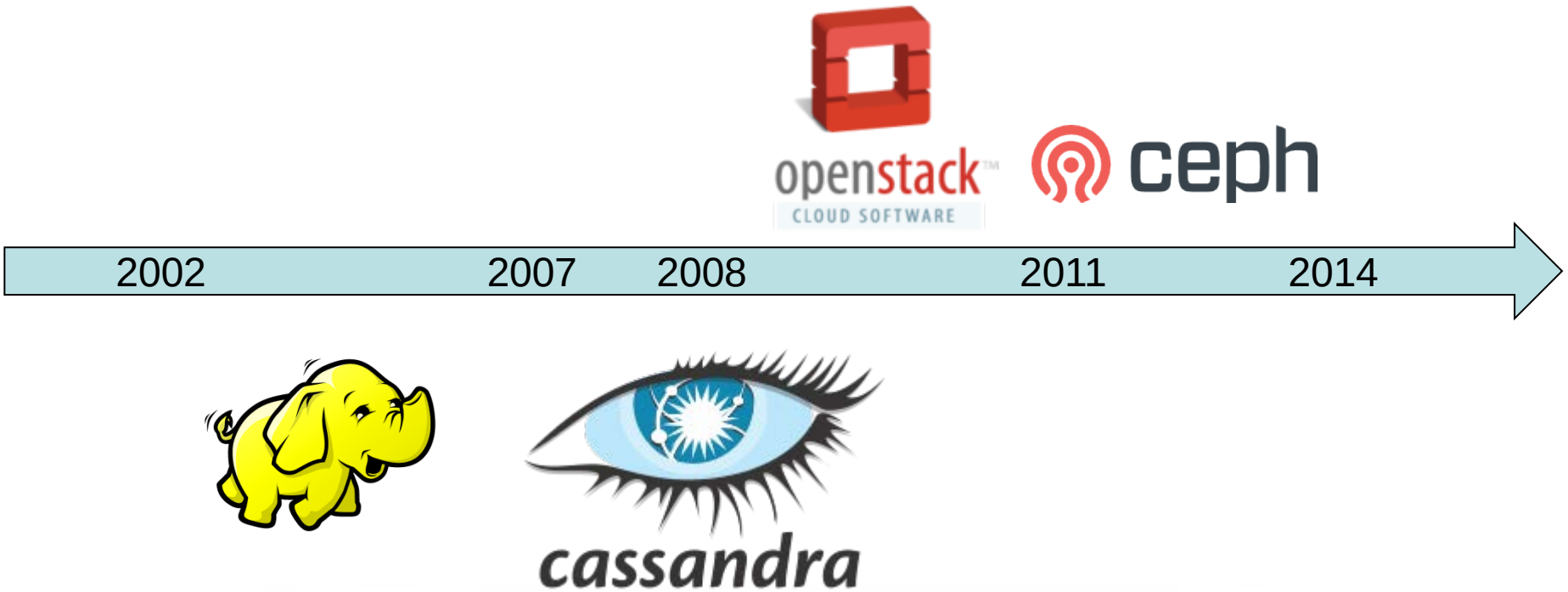
2002 2007 2008 2011 2014

EMC ISILON

cassandra

SCALEIO

Enterprise scale-out systems



Slide Title Here

- Hello
- How are you?

- Subhead
  - Example 1
  - Example 2
- Subhead

Next Generation Data Centers: Hyperconverged Architectures Impact On Storage

Mark O'Connell

Distinguished Engineer

EMC

Enterprise scale-out systems

EMC ISILON