



A Brief Intro to Clouds and Containers

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 Wikipedia says "Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the common use of a cloudshaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation."







Welcome to the As-a-Service Economy

Enabling Technologies

Digitization • Automation • Analytics Mobility • Social Media • Cognitive Computing • Artificial Intelligence

Operating Models and Platforms

Outsourcing • Shared Services GBS • BPaaS/SaaS/laaS • Crowdsourcing

Tools/Infrastructure

One-to-Many • Outcome Focus
Plug-and-Play Services

Economy
Agility • Collaboration

As-a-Service

Governance

Enabling Talent

Service Governance • Defining Outcomes • Creativity • Data Science

The World We Live In

Globalization of Labor • High-growth Emerging Markets • Disruptive Business Models • Consumerization

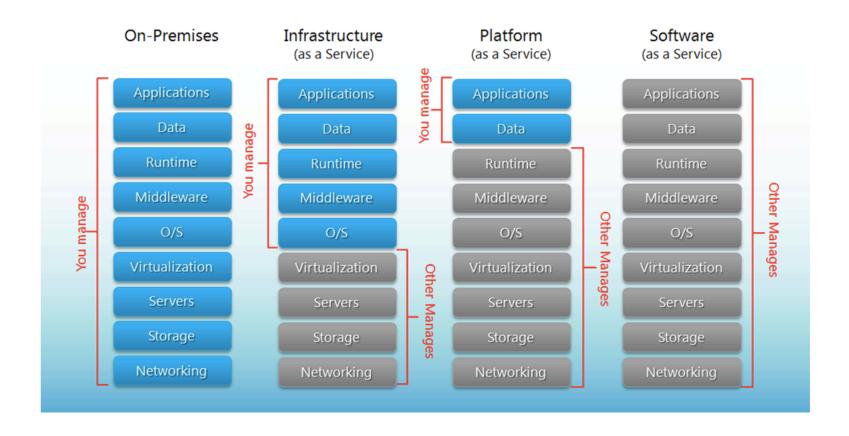
Source: HfS Research, 2014























What are containers?



- Operating System Level Virtualization
 - Lightweight, providing the minimal level of overhead for the application to function properly.
 - Super minimalist VMs
 - No Hypervisor
 - Abstracts away the operating system and hardware
 - Share the OS Kernel with other containers
 - Container size is very small and therefore quick and easy to provision





How do they differ from VMs? RESEARCH



Virtual Machines				Containers				
App 1		App 2						
Bins/Libs		Bins/Libs						
					App 1		App 2	
Guest OS		Guest OS			Bins/Libs		Bins/Libs	
Нур	visor			Container Engine				
Host OS					Host OS			
S	er			Server				





More differences...



- Size
 - Containers are usually 10s of MB
 - VMs can be several GB
- Shared hypervisor vs. shared kernel
- VMs have their own kernels so a deeper level of isolation
- Containers virtualize the OS while VMs virtualize the hardware





Container Advantages



- Size
- Less resource intensive
- Quick provisioning
- Easy allocation of resources
- Quicker development cycles
- Cost effective
- Very good for microservices





Container Disadvantages



- Security shared kernel with root access
- Less flexibility in OS
- Networking can be tricky
 - Properly configuring sufficient networking resources is challenging





Container Software



- Docker
- Singularity
- LXC, LXD
- Solaris Zones
- RKT
- BSD Jails
- chroot





Questions?



- Questions? Comments?
 - Feel free to ask me questions now or later:
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Exercises start here:

https://opensciencegrid.github.io/dosar/Materials/ials/DSP_Materials/

Presentations are also available from this URL.

