

New Paradigms

Torino Cloud Users Mini-workshop, May 26 2016

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Concepts wrap-up

Virtualization

- **pack** in and go green
- **reduce** the datacenter footprint (less networking, racks...)
- server consolidation and R&D coexistence
- **fast** provisioning
- reduce vendor lock-in (abstract away hardware)
- increase **uptime** (management platforms, migrations)
- improve disaster recovery (cheaper hardware on DR site)
- **isolate** applications
- support legacy applications

But what exactly is a Cloud?



*Gartner defines cloud computing as a style of computing in which **scalable** and **elastic** IT-enabled capabilities are delivered as a **service** using Internet technologies.*

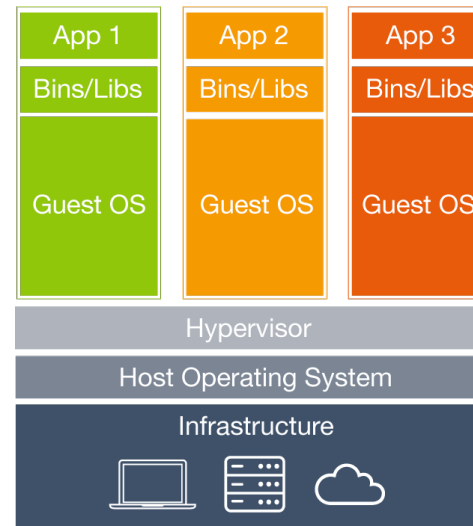


So VMs are not necessarily implied...

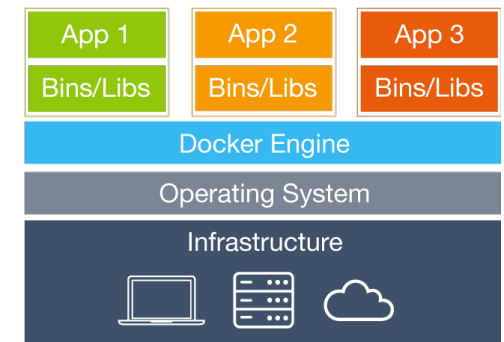


- Kernel based Virtual Machine
- turns the Linux kernel into an hypervisor
- **hypervisor**: a piece of computer software, firmware or hardware that creates and runs virtual machines

Virtual Machines



Containers



Actual model: IaaS sandboxes

Network isolation (level 2):

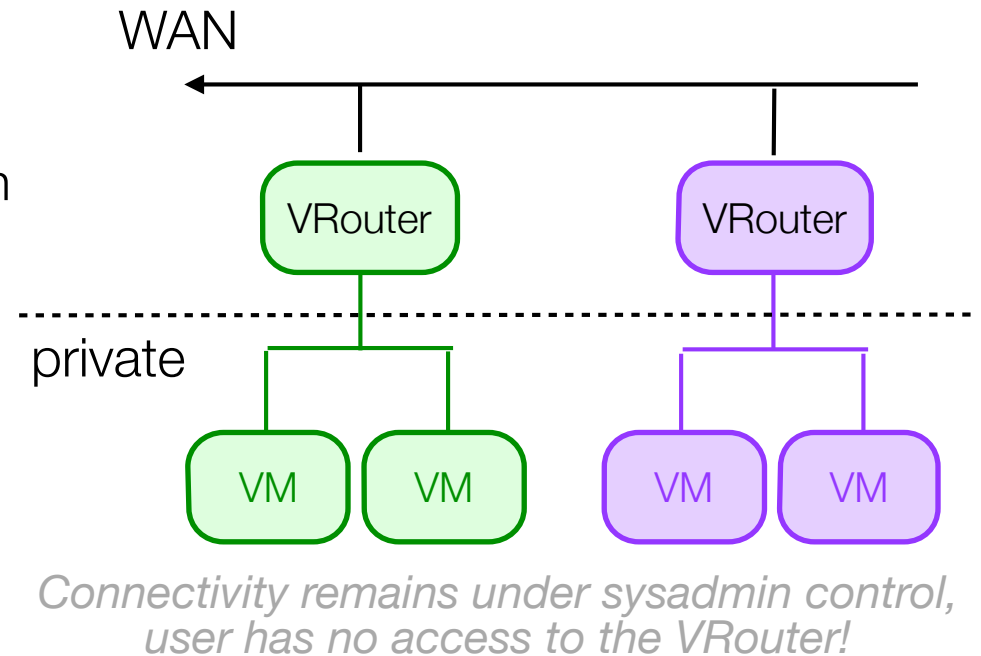
- each user is assigned a Virtual Network
- each network is isolated with ebtables rules on the hypervisor bridge (OpenNebula V-net driver)

Virtual Routers (level 3):

- private and public IP
- light-weight OpenWRT VM (1CPU, 150 MB)
- DHCP, DNS, NAT functionalities
- Firewalling / port-forwarding
- configuration possible via HTTPS or SSH

Elastic IPs

- bind dynamically a public IP to one of the private VM instances



Provisioning:

- configuration simplified through the definition of Amazon-like flavours
- VM instantiation via **EC2 interface** (euca-tools)

A new approach to multi-tenancy

Reading here and there on the WEB...

4 Reasons to use Apache Mesos frameworks

Encapsulating tasks into higher and higher abstractions is being shown by various large companies to provide a competitive advantage...

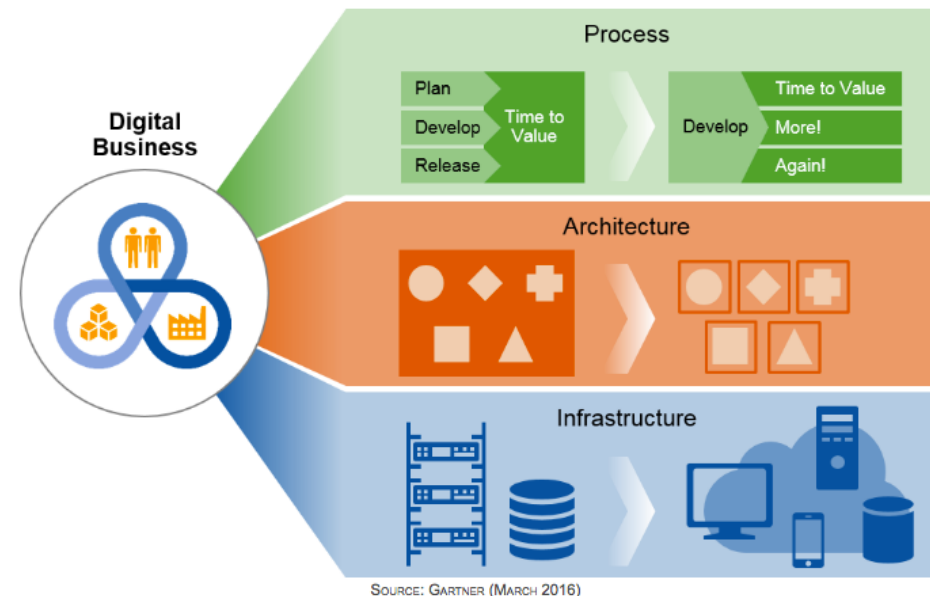
...virtual machines with little to no democratic process over how resources are utilised...

...free a developer from antiquated bureaucracy so that they are able to spend time on developing products and services, not work-arounds for legacy systems.

Containerizing application workloads (GARTNER)

...to package, ship and run distributed application components with guaranteed platform parity across different environments.

..."democratizing" virtualization by providing it to developers in a usable, application-focused form. Whereas access to virtual machine virtualisation tends to be provided through, and governed by, gatekeepers in infrastructure and operations, Docker is being adopted from the ground up by developers using a DevOpes approach.



Our next step (in the INDIGO context): the dockerized Virtual Farm

- provide batch farm on-demand in a Linux **container**
- **HTCondor**
- application orchestration/elasticity with Apache **Mesos**
- Calico for sandboxing (**L3 approach**)

If you are interested...

- Docker: <https://www.docker.com/>



- Apache Mesos: <http://mesos.apache.org/>



- Calico: <https://www.projectcalico.org/>



- Gartner: <http://www.gartner.com/technology/home.jsp>