MCN: Beyond NFV

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• On-demand and self-service
• Elastic
• Multi-tenant
• Pay-as-you-go
• On-demand and self-service
• Elastic
• Multi-tenant
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• **Service Manager**: receives requests for new tenant service instances

• **Cloud Controller**: manages the lifecycle of a tenant service instance

• **Service Orchestrator**: manages and abstracts underlying resources and SOs
lifecycle

- applies to all entities
- service/resource entities also and their **graphs** too
graphs

- There are two graphs
  - 1 for the SO's Services - STG
  - 1 for the infrastructure - ITG
    - that is: services enabling the SO's service

- Both are inter-related
  - “horizontal” & “vertical”
graphs

service-level

infra-level

create/update/delete graph

SO
SDK

CloudController

CSP: compute, storage & networking

Service Registry

Orch Exe.

admin domain
orchestration

providing a service instance to tenant
service deployment unit: service bundle
• **Service Orchestrator**: Your service’s logic
• **Service Manifest**: Your service dependencies
• **Resource Manifest**: The resources your service needs

SO executes in a container
SO manages according to lifecycle
composition

lifecycle allows for parallel deployment
reliability

• SMs, SO, CC are stateless processes, backed by keyval stores
• Monitoring and scaling of resources is provided by the CC
reliability

Problem: Upgrade a running distributed application without stopping it?

Updating the graph requires:
- safe service routing
- possibly state transfer
- correct replacement service
(re)placement

Problem: right service…
• Multi-parameter selection…

very much the placement needed in FluidCloud…
How to intrinsically enable and fully **automate relocation** of service instances between clouds?
FluidCloud Architecture

Instance Relocation

Service Data Adaptation

Data Relocation

read more: http://blog.zhaw.ch/icclab/fluidcloud-presented-at-usenix/

has a graph

orchestrator

Network services (VNFs?)
Orchestration software now released

www.hurtle.it

Thanks!
Questions?
Backup
The network differs from the computing environment in 2 key factors...

1. Data plane workloads (which are huge!)
2. Network requires shape (+ E2E interconnection)

...which are big challenges for vanilla cloud computing.

An adapted virtualisation environment is needed to obtain carrier-class behaviour.
1. PERFORMANCE BOUND TO CPU
2. AGGREGATED VIEW OF RESOURCES (CPU, memory, etc.)
3. ENDPOINTS
   Applications need the OS
4. NODE-CENTRIC
   Shapeless interconnection
5. MANY AND SMALL VMs

1. PERFORMANCE BOUND TO I/O & MEMORY ACCESS
2. NUMA VIEW
   Internal architecture is relevant for guests
3. MIDDLEPOINTS
   Data-plane network functions bypass the OS
4. NETWORK-CENTRIC
   The network has a shape
5. FEW AND LARGE VMs