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Cloud Native Network Function Virtualization

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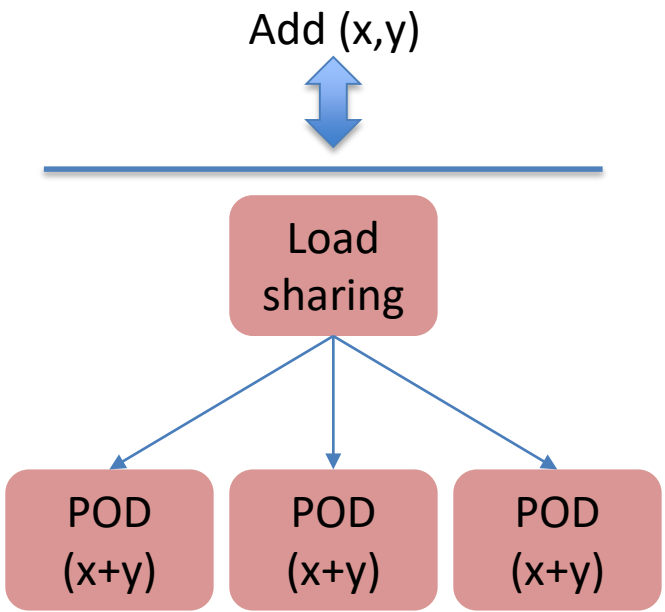
What is cloud native ?

Allows a software developer to focus on the core business logic

- Break functions to “micro services”
- Scaling/Availability are provided by the infrastructure
- Open source software tools that reduce development time (databases/buses/productivity tools etc).
- “12 factor app” and domain driven design

More in “cloud native software foundation” – need to translate to the network world.

Cloud Native By Example



Assume a very simple stateless micro-service: add two numbers. Run the micro-service in a POD.

- If a POD crashes just start another one. Almost no service impact
- If we run out of processing capacity add another POD
- If we don't need capacity remove PODs
- To upgrade the code start adding PODs with the new SW version and remove the old ones

What are the benefits of cloud native ?

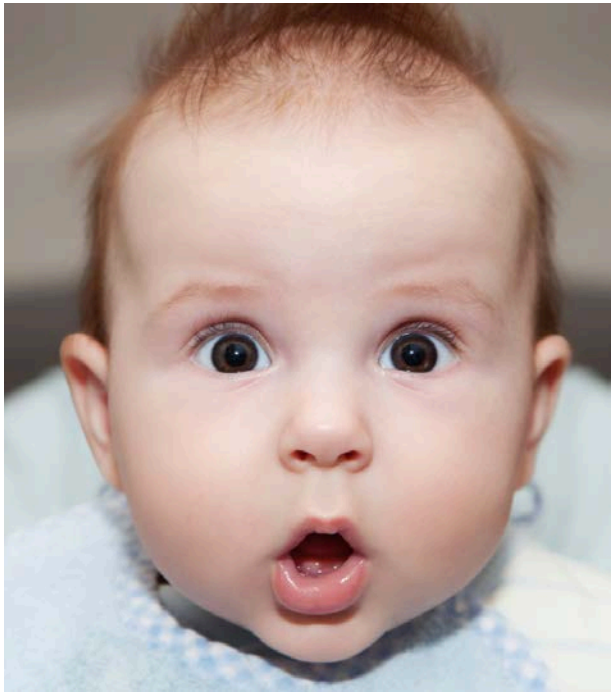
- Service velocity
- Availability
- Scale

What are the risks of cloud native ?

- Complex.
  - Just the infra consists of 20+ software packages.
  - Automation is a must.
  - Managing a highly distributed system is not easy.
- Complete rearrangement of the organization (CI/CD, devops, merge of IT/DC/access orgs)

What about performance ?

Attention grabbing, but not really an issue in the grand scheme of things.



What about containers?

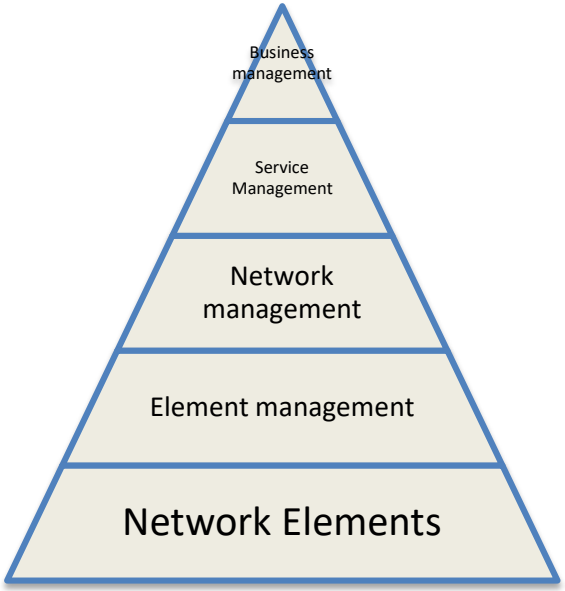
- Containers are a packaging option. Its not what cloud native is about.
- Cloud native uses containers, but it's possible to build a container system that is not cloud native.
- Containers are useful in the cloud native context because of the breakup to micro-services (lots of lightweight functions).

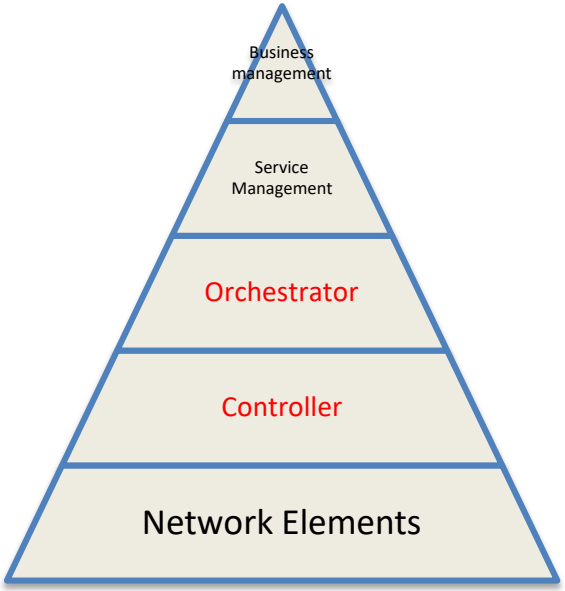
Cloud Native For NFV

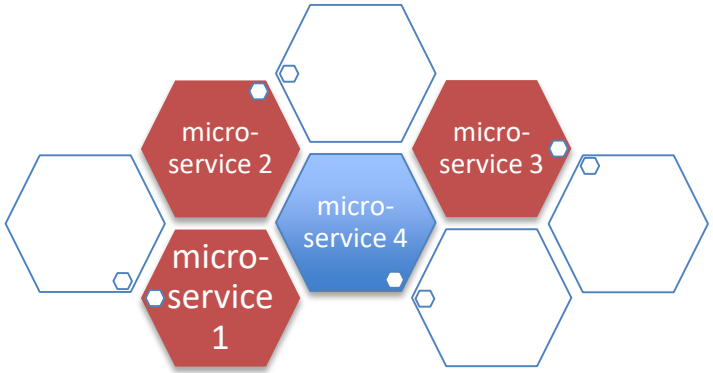
- Current reference for NFV is ETSI-NFV which is a “lift-and-shift” architecture; create an equivalent network appliance in a VM and place it in the data center.
- Cloud native is focused on web and e-commerce. Some adjustments need to be made for NFV.

NFV	Cloud Native
Goal: implement networking functions in a data center environment. Network focused	Goal: treat a data center as a single OS. Application focused
Orchestration	Scheduling
Relies on active/standby and orchestration for scaling/availability/upgrade	Relies on load balancing for scaling/availability/upgrade
Network Management Framework	Application Deployment Framework
ETSI-NFV is a common framework	Depends on the tools used
Long lived application, dynamic configuration	Short lived application, configuration stored centrally, immutable

Cloud Native NFV







Traditional network management

SDN

Cloud Native

Availability

- Breakdown to micro-services is the first line of defense
- Cattle vs. Pets

Two key applications

- Control plane: for the most part “classic cloud native”
- Data plane: not supported out-of-the-box

Issues with cloud native data plane

- IP packet streams are not HTTP transactions – how does load balancing work?
- CPU and memory are counted as resource in the Kubernetes scheduler – but what about bandwidth?
- Solutions have to be built; they don’t come as part as the basic package

Conclusion

Back to basics. We are talking about :

- ABCs of software engineering
- Parallel computing
- Distributed systems

All of the above can be, and should be applied to NFV

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THANK YOU!

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