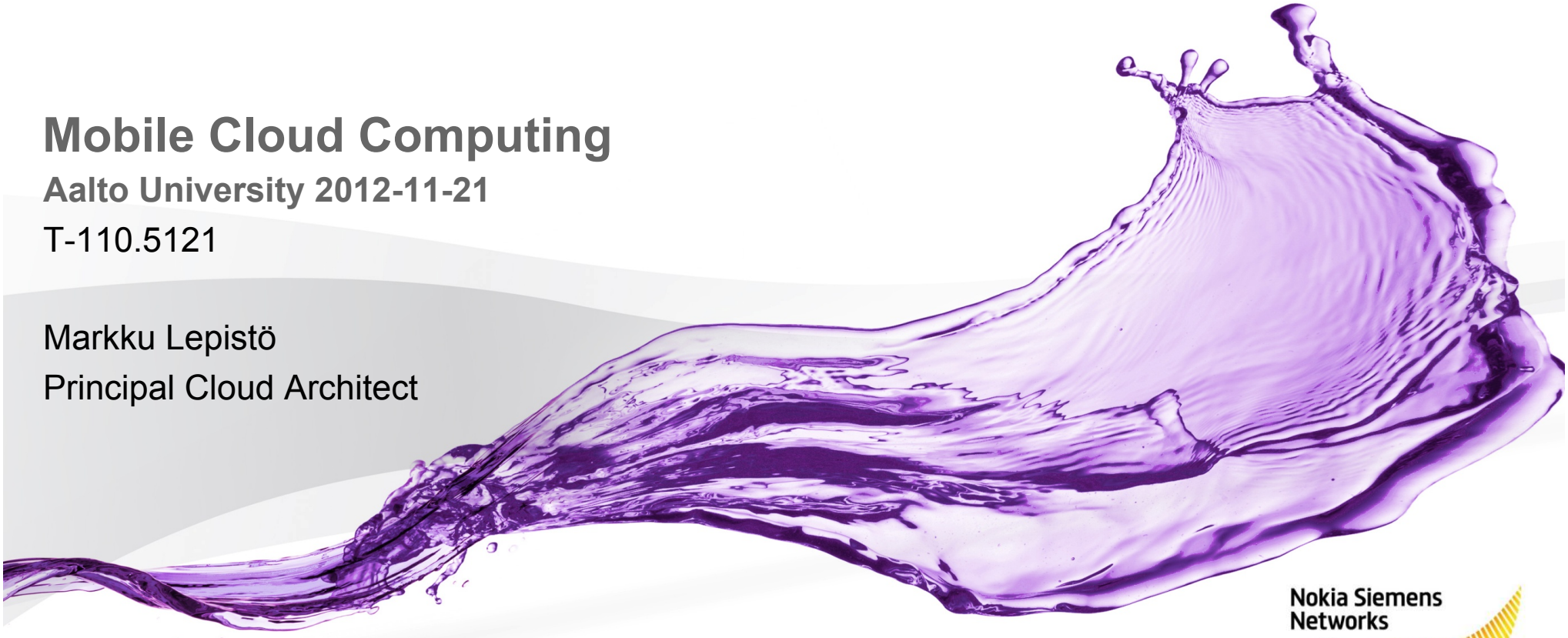
Liquid Net
Powered by Nokia Siemens Networks

Mobile Cloud Computing

Aalto University 2012-11-21

T-110.5121

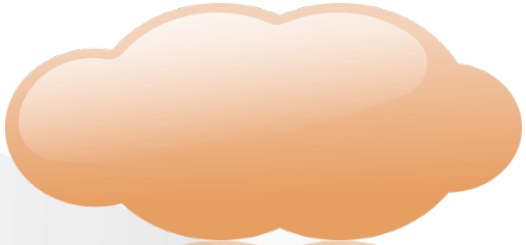
Markku Lepistö
Principal Cloud Architect



Nokia Siemens Networks

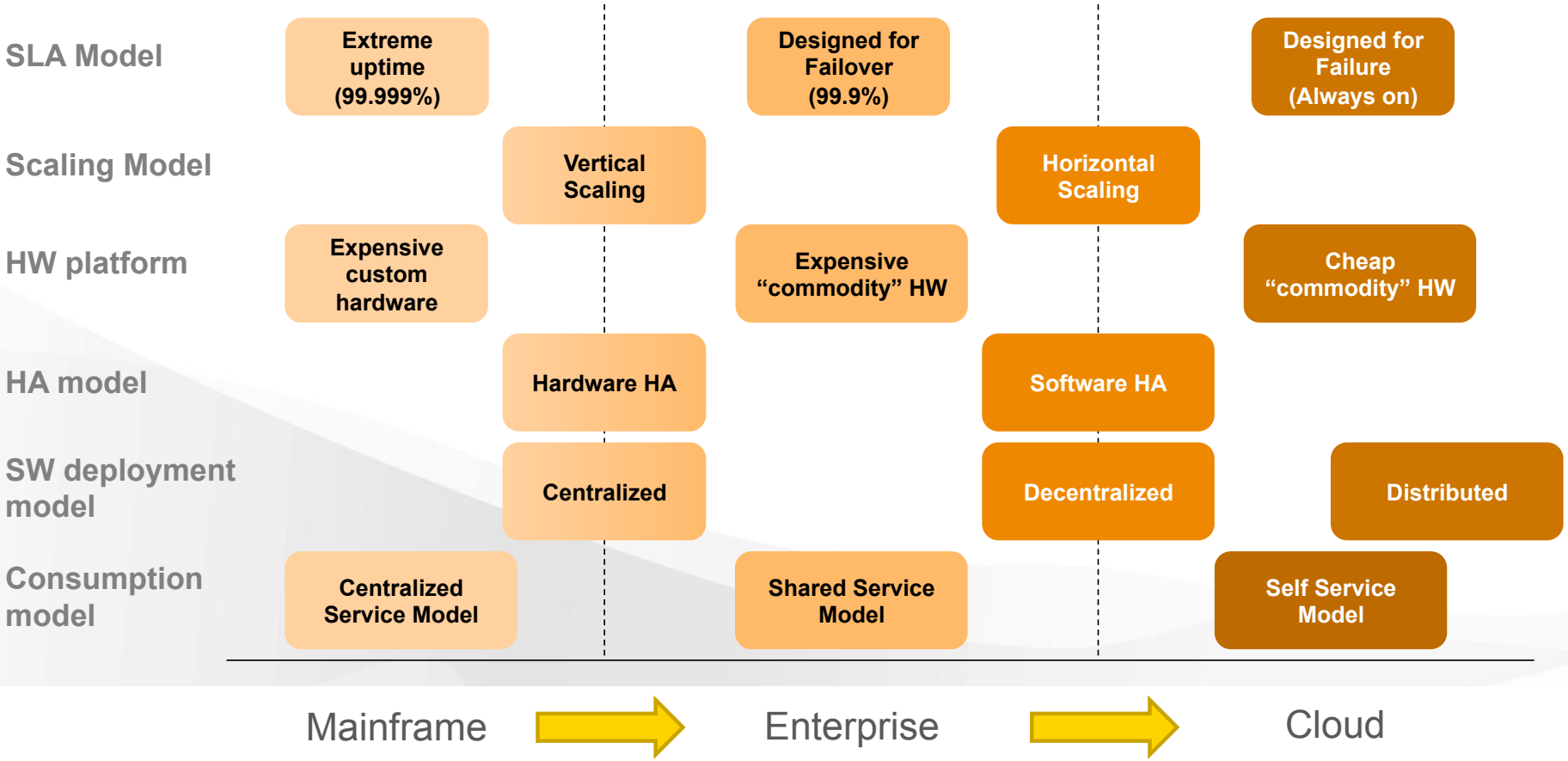
Document classification

Cloud Computing Principle



“Physical infrastructure, controlled programmatically through API calls”
- Programmable Datacenter

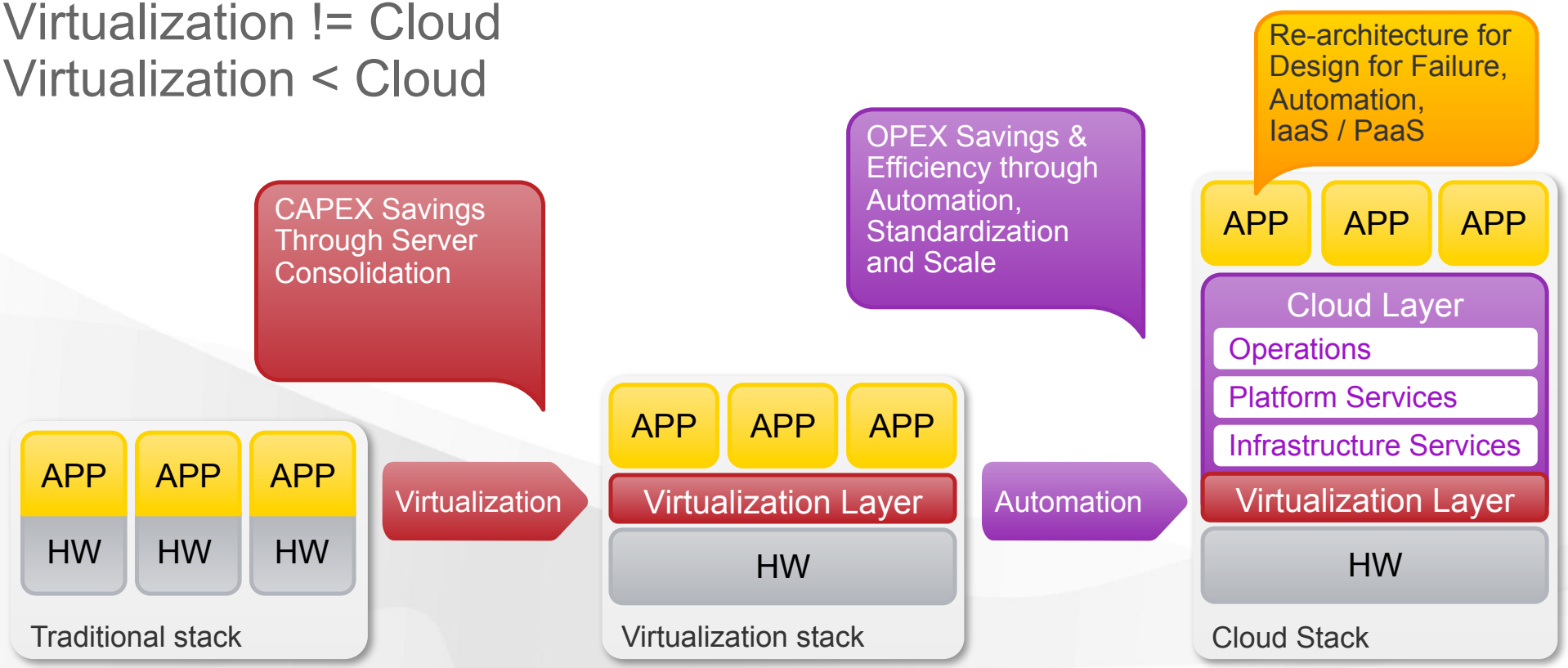
Cloud Computing is an IT Transformation



http://www.cloudscaling.com/blog/cloud-computing/the-evolution-of-it-towards-cloud-computing-vmworld/

From Traditional through Virtualization to Cloud Datacenters

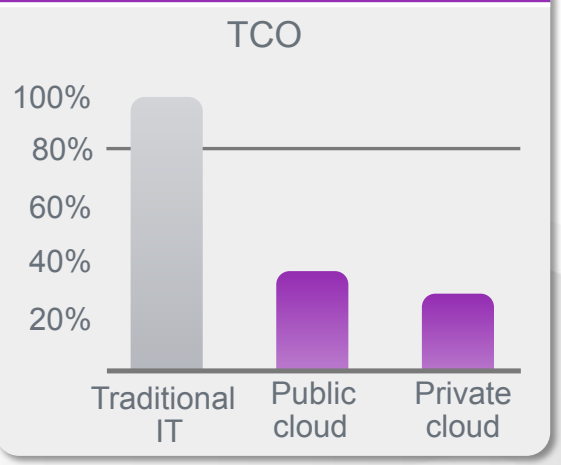
Virtualization != Cloud
Virtualization < Cloud



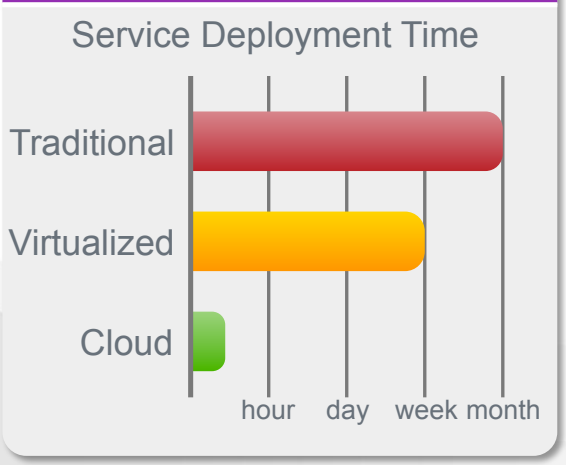
Jevon's Paradox *"Increasing efficiency of a resource increases its consumption"*

Create more

Cost Reduction and Right-sizing



Business Agility



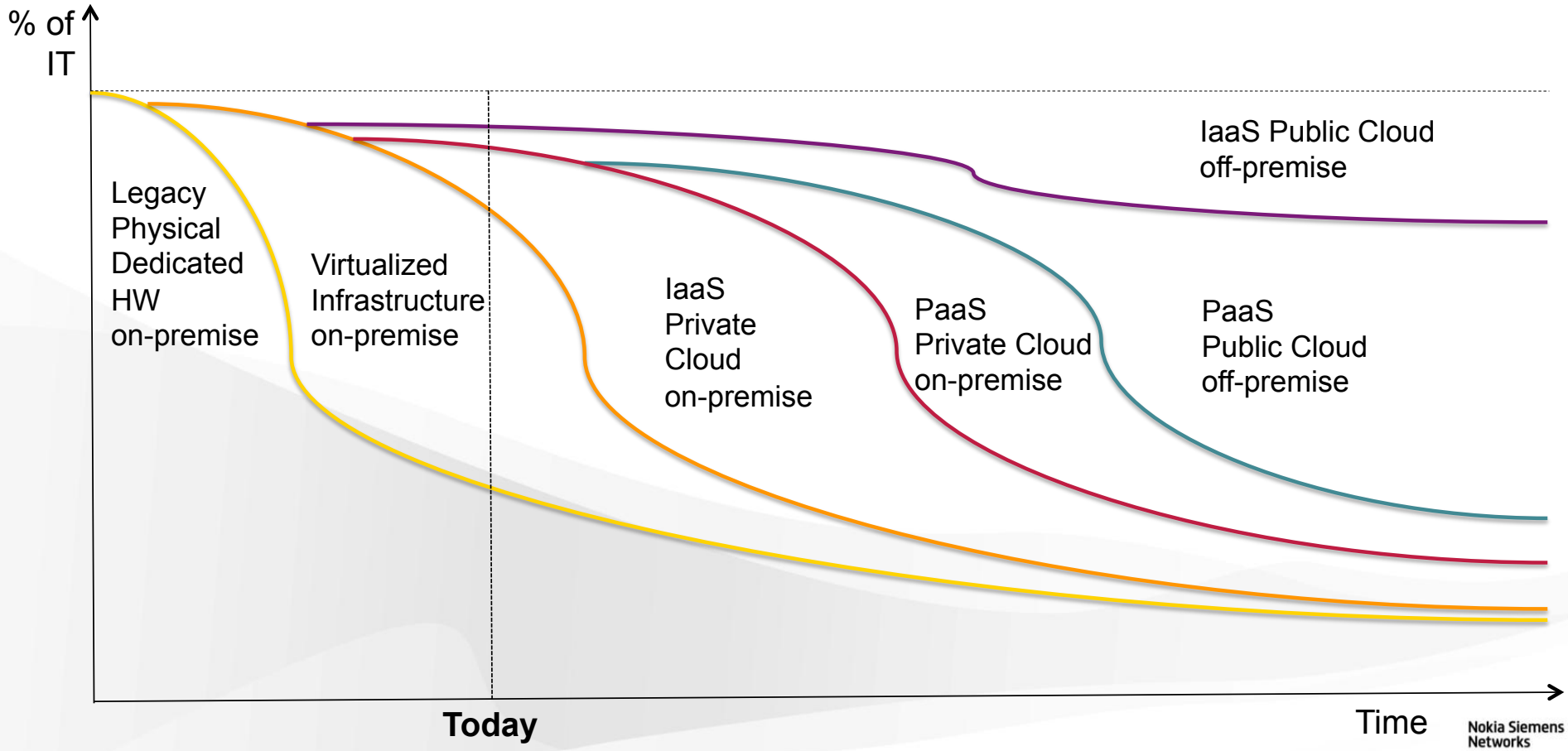
Innovation

Revenue Generating Services

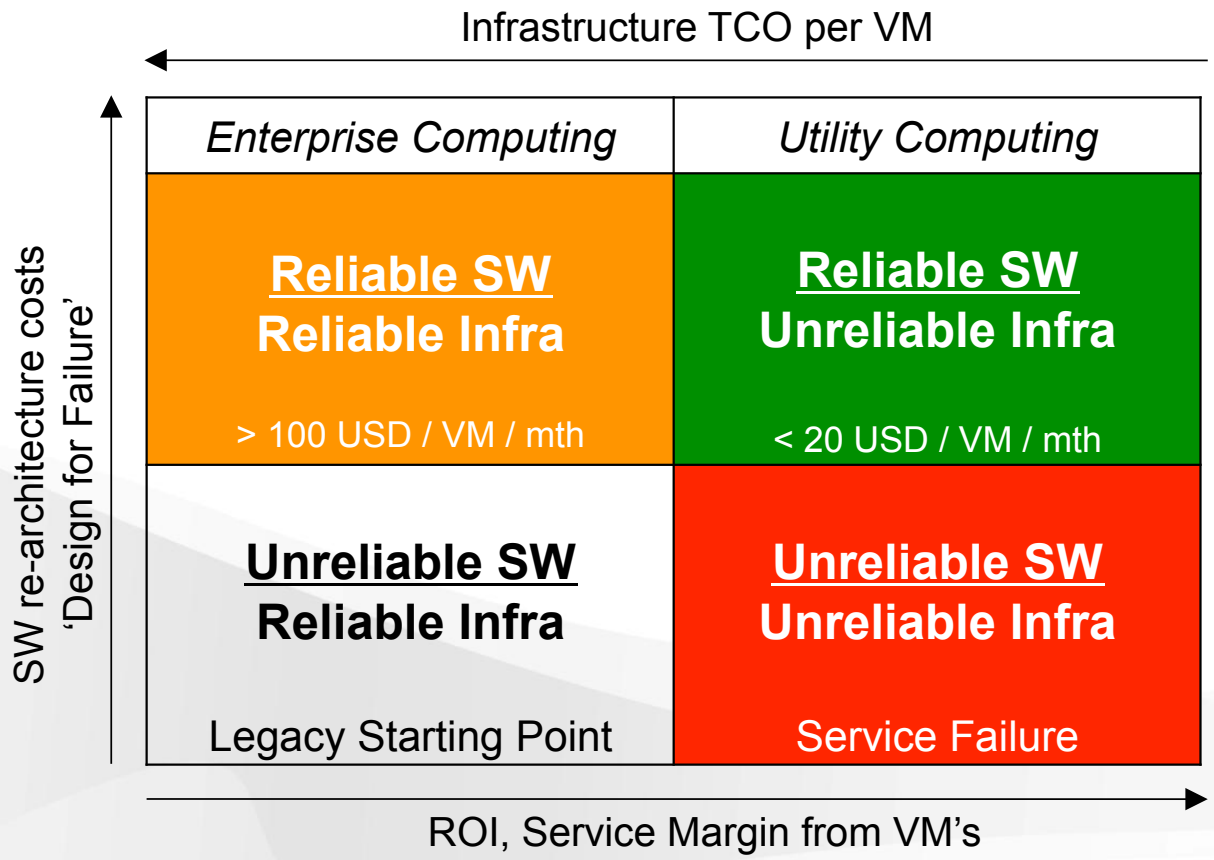
..thus you consume more

Potential On/Off-premise Evolution for SW Runtime Env's

- for overall IT, not Telco-specific



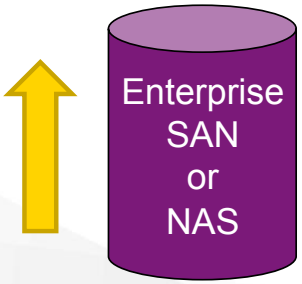
Enterprise vs Utility Clouds - SLA Assurance & Cost



http://samj.net/2012/03/simplifying-cloud-reliability.html

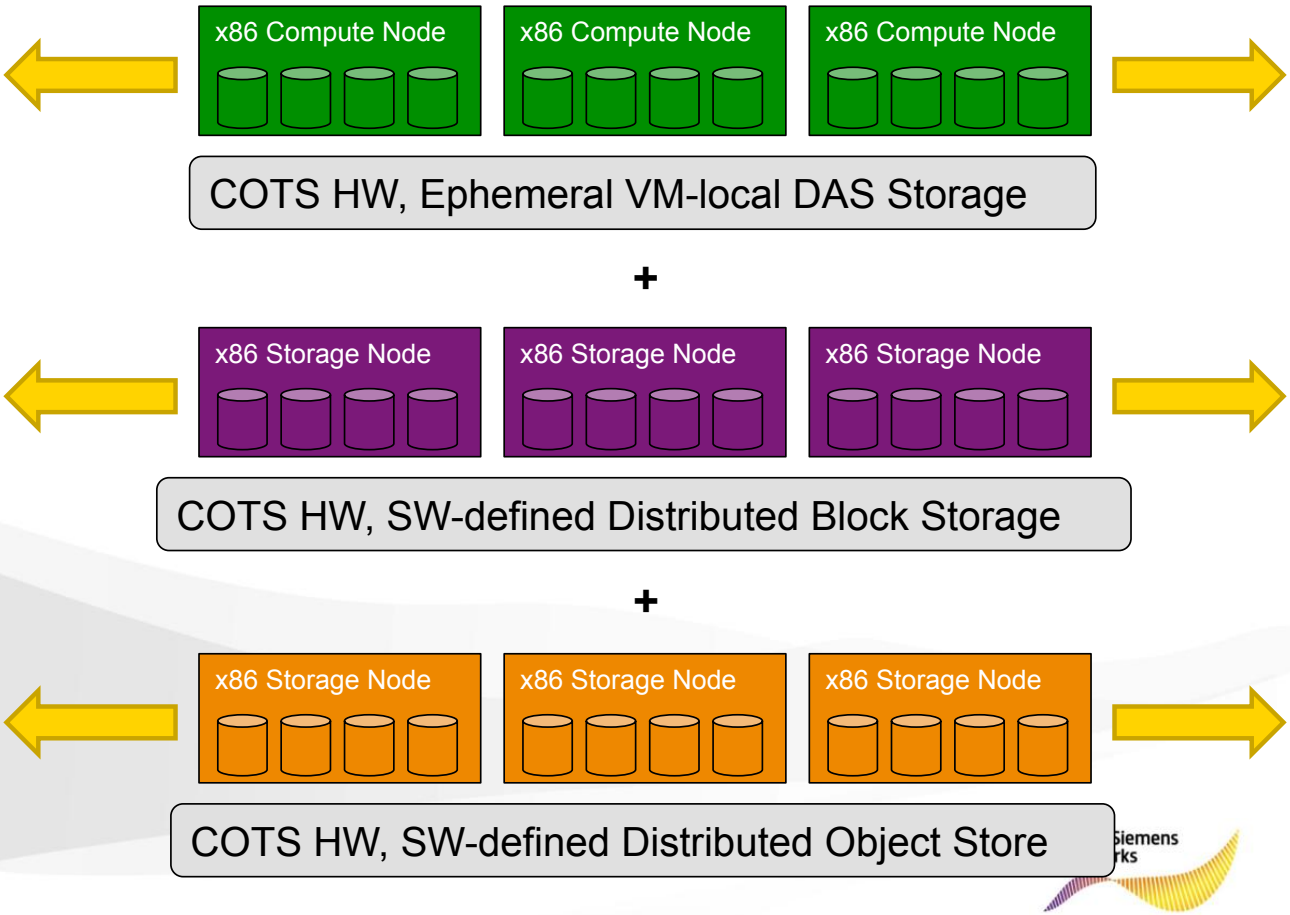
Data Layer Evolution 1) – Storage
➔ towards Distributed SW on COTS

From..



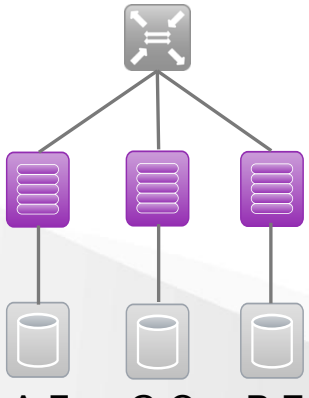
Vertically scaling
Forklift upgrades
Fiber-Channel, iSCSI, NFS
Expensive Appliances
2 heads' limit for
I/O paths and performance

..To

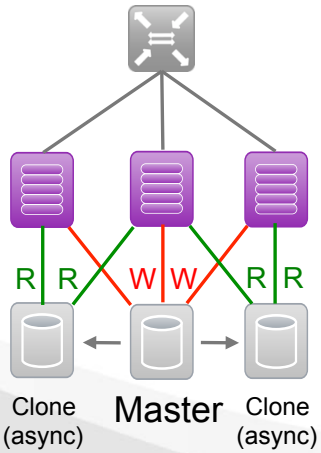


Data Layer Evolution 2) – Databases
➔ towards Distributed SW on COTS

SQL RDBMS Sharding

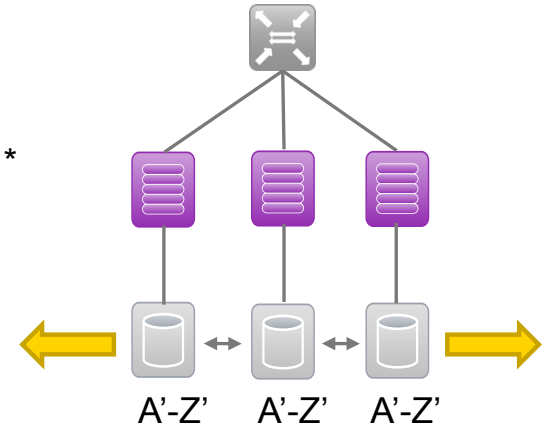


SQL RDBMS Write Master, Read Clones



*

Eventually Consistent NoSQL



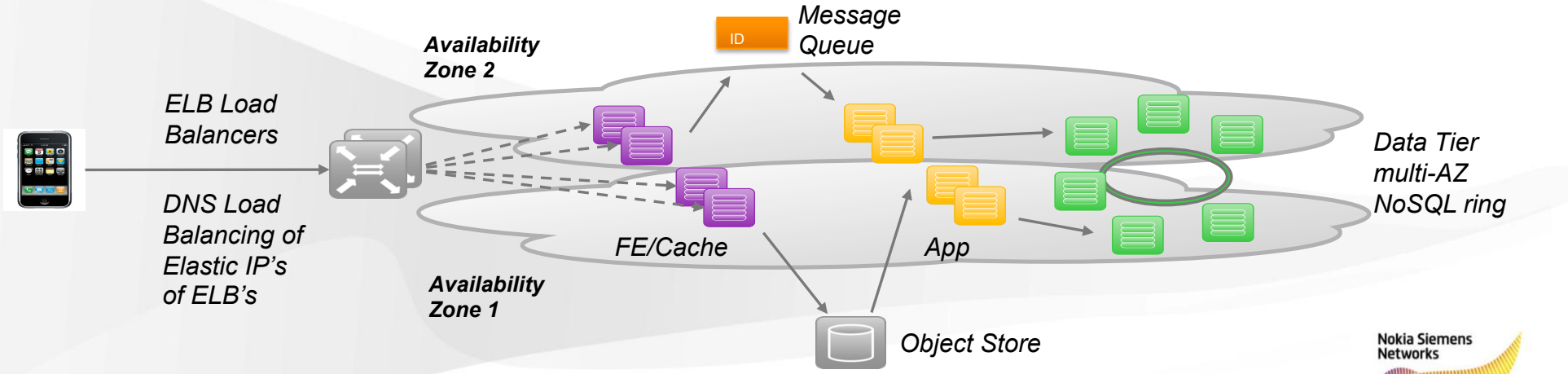
Limited Scalability and Data Redundancy
No or small changes to legacy apps
Reliable Servers & Storage Expected

Large horizontal scalability
Distributed redundancy
New apps or major re-write

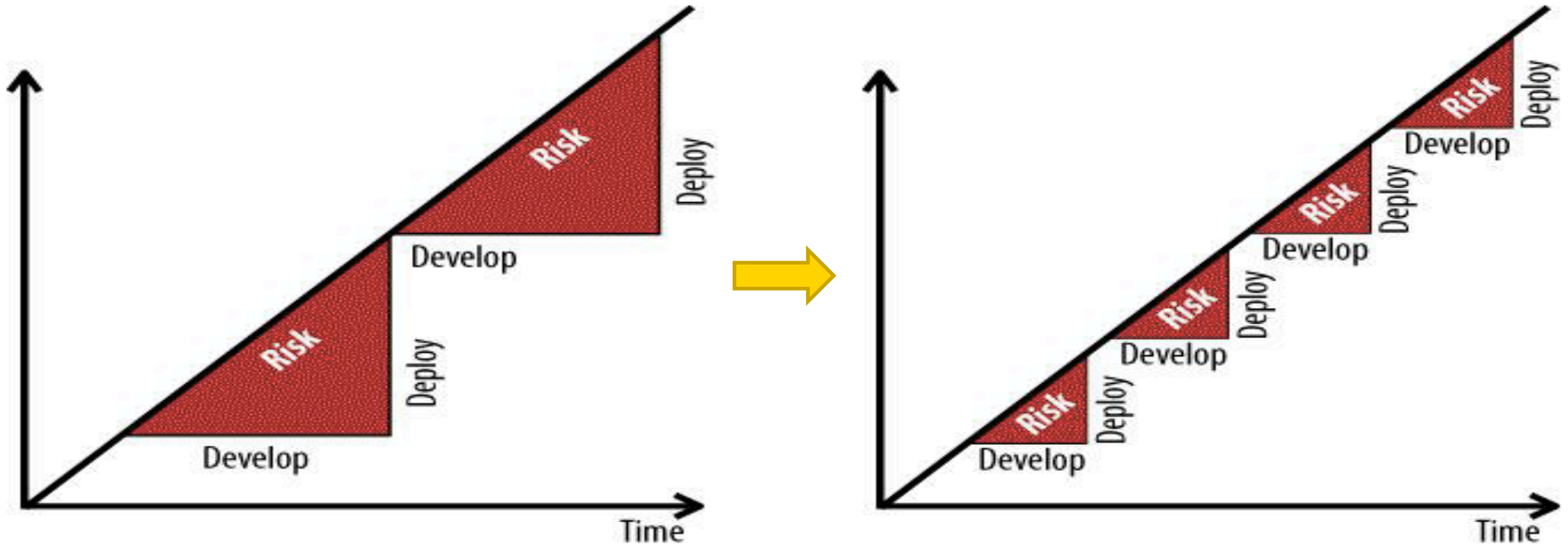
*) Depending on needs, NoSQL can be a RDBMS replacement or an additional DB-like service

Scalability & Fault Isolation Examples

- DNS Round-Robin of Elastic IP's for multiple Elastic Load Balancers
- Memcached Front-End VMs
- Asynchronous Message Queue, Event-driven Processing
  - Scale out/in worker nodes based on queue length, execution time
  - Avoid dependencies – workers do not rely on, or wait for other VMs
- Use Vertical scalability, reboot VM with bigger instance type
- Use Horizontal scale-out & in of VMs based on load, business rules
- NoSQL or SQL DB replicated across multiple Availability Zones



Small, Frequent Releases Reduce Risk



Agile Development, Continuous Integration & Continuous Deployment (DevOps Principle)

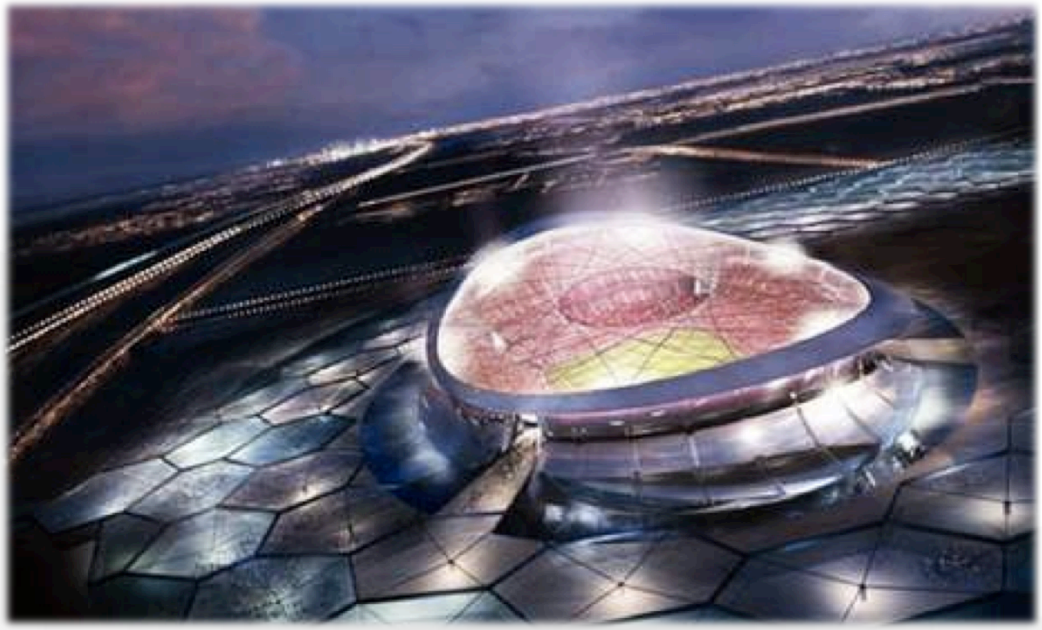
Agile R&D Sprints

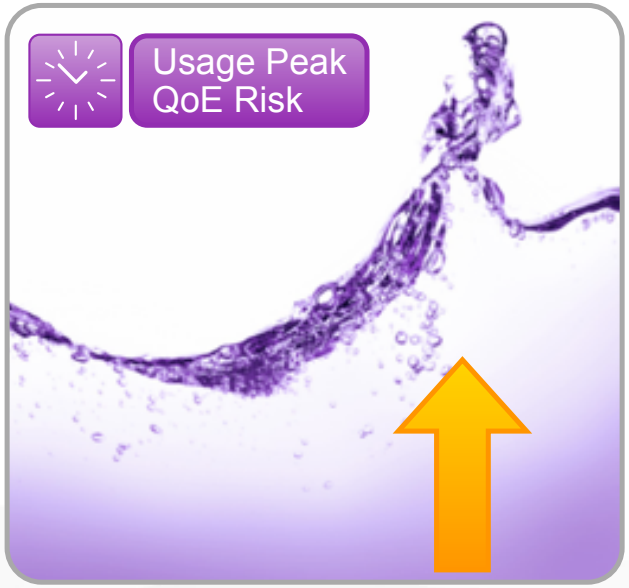
Automated Unit Tests
per developer

Automated Integration & Staging Tests
- Infrastructure as Code - Agile datacenter
- Provision build farm on cloud, compile new packages
- Provision App VMs on cloud, Orchestrate from new packages
- Deploy test tool VMs on cloud
- Run, Monitor, Report

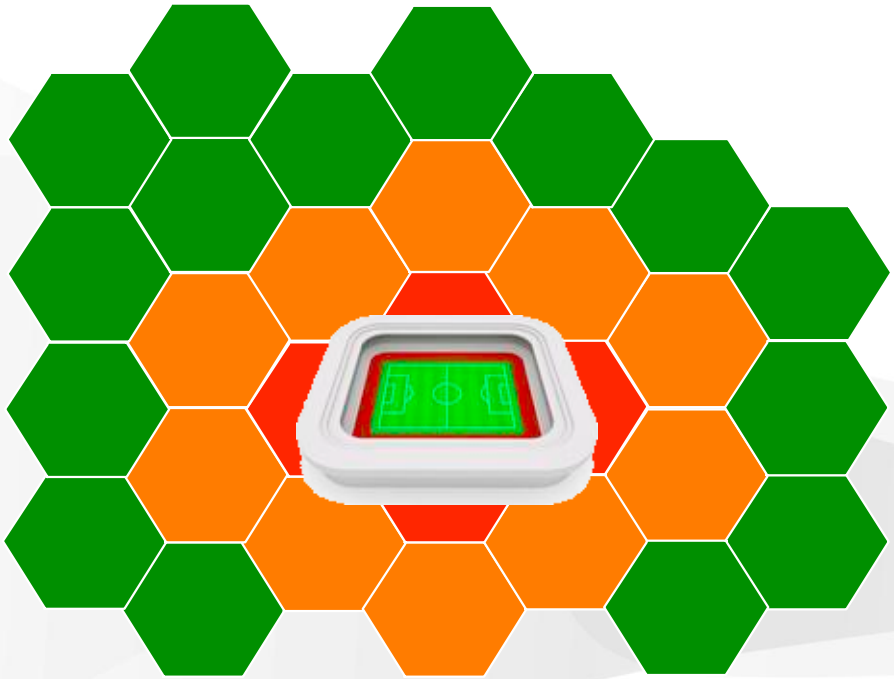
(SaaS only)
Manually Triggered, Automated Push to Production
- Introduce frequent, small updates to production
- Test on a subset of customers first
- Automated regularly practiced rollbacks

NSN Cloud Solution Example for Mobile Broadband





Experience Mgmt, Self-Organizing Networks



SaaS Web & iPad
QoE Insights & Actions

amazon web services™

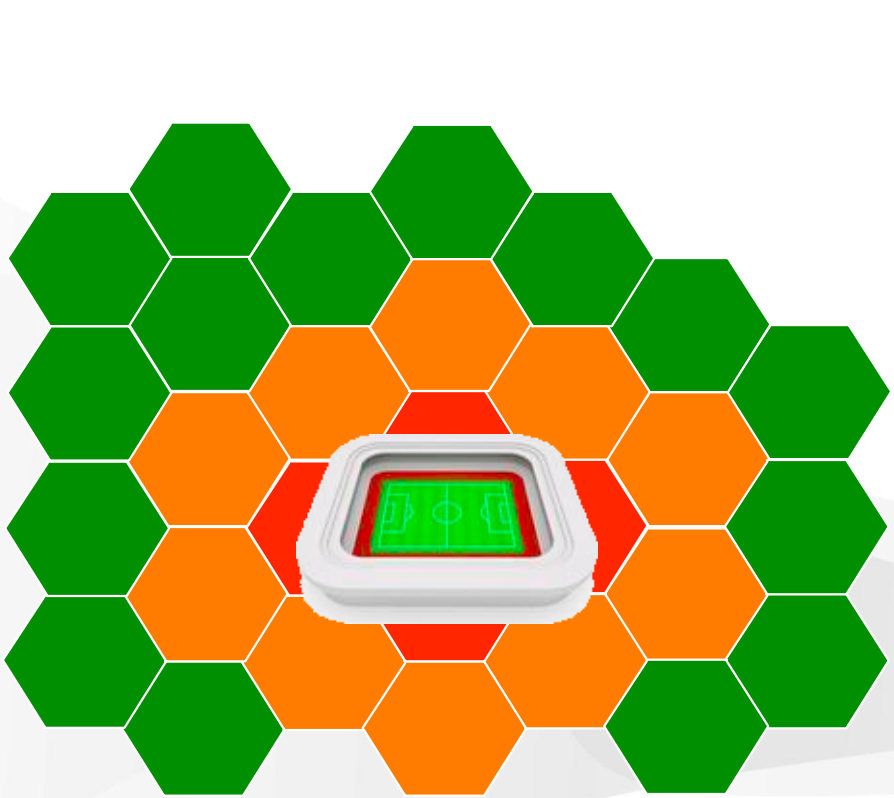
NSN Analytics

Data collection, obfuscation, compression, encryption, upload

Teleoperator
Radio Access & Core

Nokia Siemens Networks

Experience Mgmt, Self-Organizing Networks



On-Premise Option
QoE Insights & Actions

Teleoperator
Radio Access & Core

NSN Analytics

NSN Cloud Platform

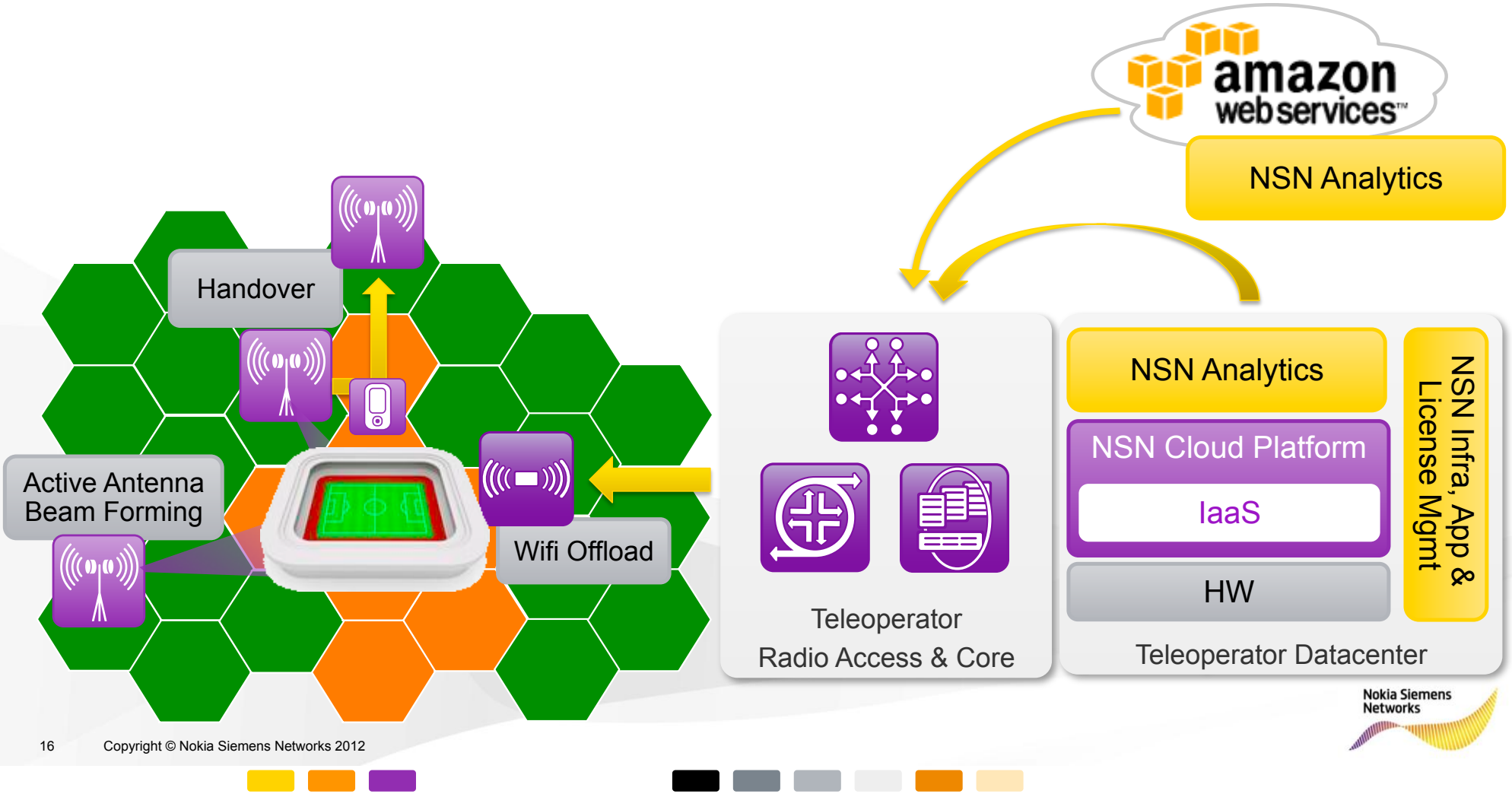
IaaS

HW

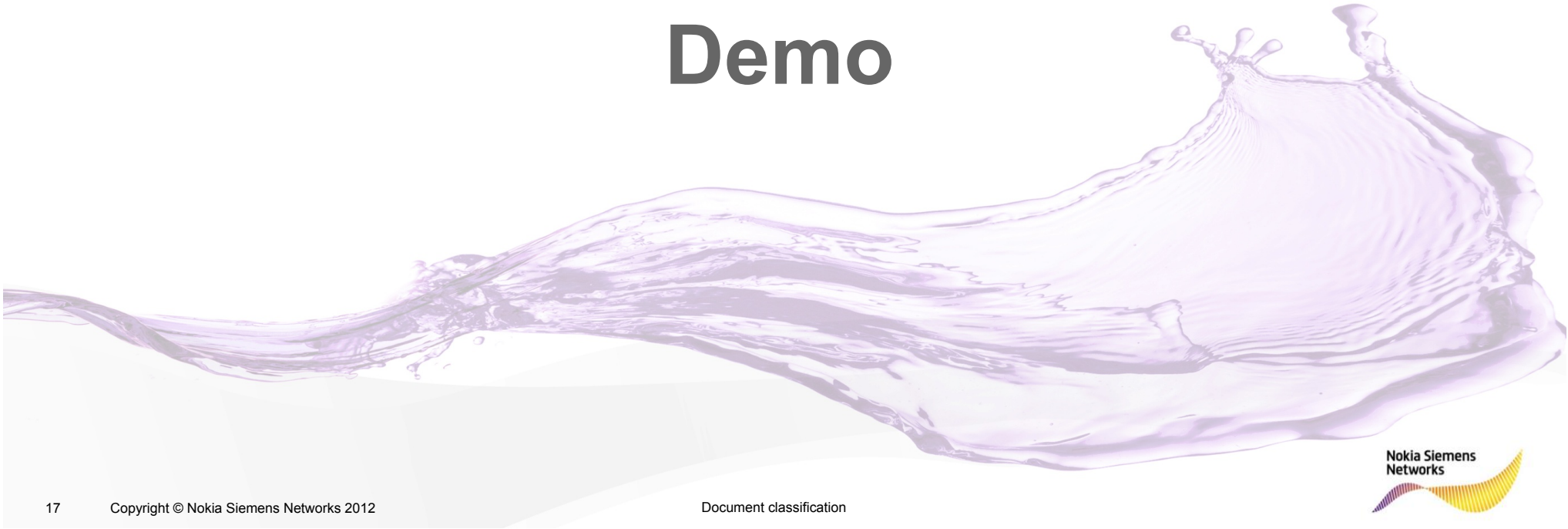
NSN Infra, App & License Mgmt

Teleoperator Datacenter

Experience Mgmt, Self-Organizing Networks



Demo



Thank you