

Enabling user-centric cloud scheduling on the Open Cloud Exchange

Cosmin Dumitru
c.dumitru@uva.nl

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Introduction

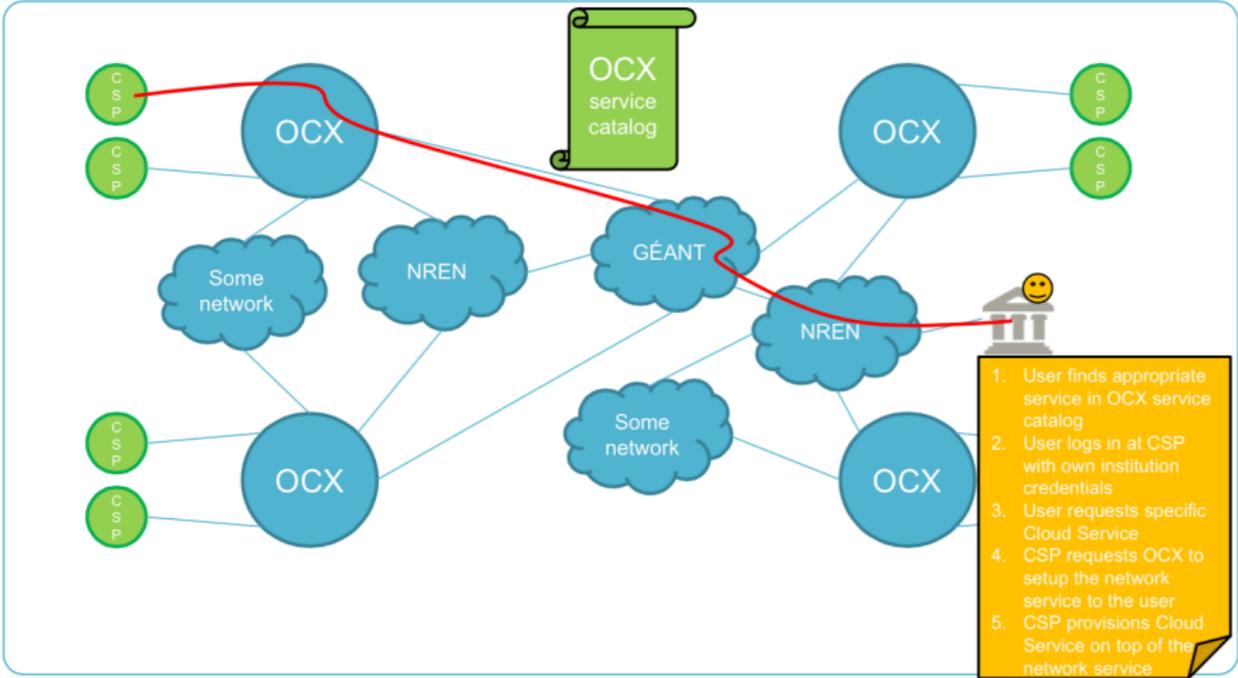
- ▶ Open Cloud Exchange - OCX
- ▶ Interconnection between multiple cloud providers and users - campus/organization networks
- ▶ Increased QoS and end-to-end transparency for researches and other (power) users

Benefits

- ▶ Connectivity-as-a-Service - bypass regular internet links and achieve predictable performance
- ▶ Solves the last-mile problem for cloud end-users
- ▶ Market Place for services and resources - lowers cost for users
- ▶ Great usecase for SDN and bandwidth-on-demand services!

- ▶ GÉANT 's implementation of the Open Cloud Exchange
- ▶ transport via the GÉANT network
- ▶ Users - single port data source/sink
- ▶ OCX clients - provide connectivity to users
- ▶ OCX Servers - interconnect OCX clients and Cloud Service Providers(CSP)

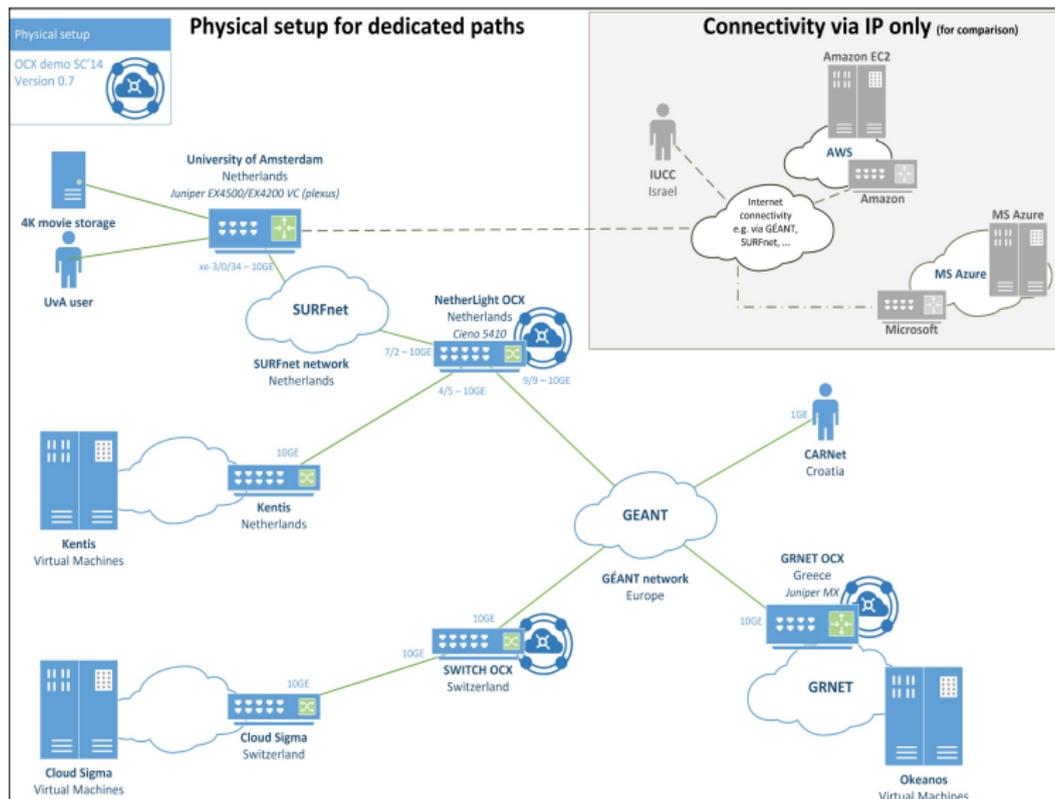
OCX



GÉANT OCX Overview

- ▶ Target application: scientific workloads with high compute and network demands
- ▶ Users: University of Amsterdam(NL), CARNET(HR), IUCC(IL)
- ▶ OCX Servers: Surfnet, GRNET, CARNET
- ▶ Cloud Service Providers:
 - ▶ CloudSigma (CH) - Commercial CSP
 - ▶ Okeanos(GR) - Academic CSP
 - ▶ Kentis(NL) - Commercial CSP Surfnet BoD enabled
 - ▶ Amazon - Commercial CSP

SC14 Demo Topology

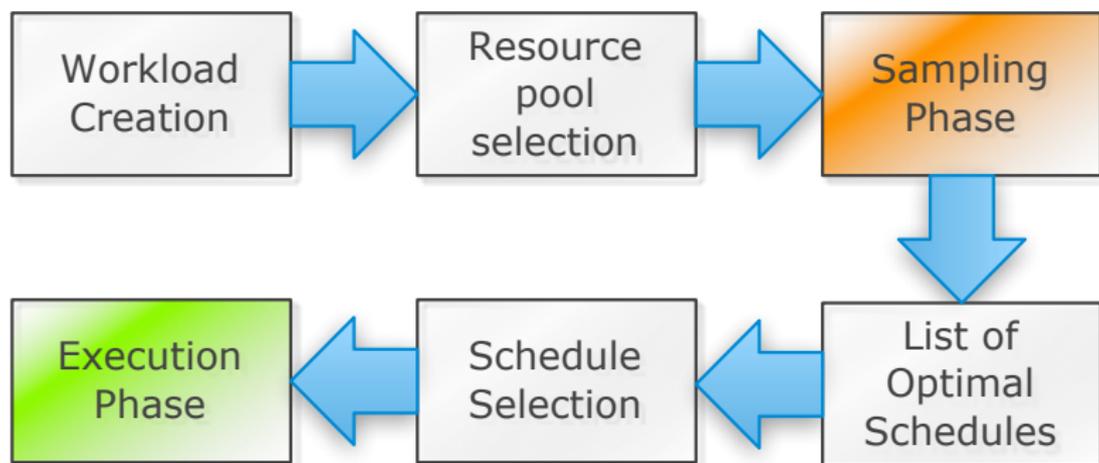


User perspective

- ▶ Many choices
 - ▶ Cloud Service Providers
 - ▶ Computing resource types
 - ▶ ...and now the network
- ▶ Making choices is tough - matters if you have to pay for it or deadlines are approaching

User Centric Scheduling the Vampires approach

- ▶ Vampires: a user-centric scheduler for bags-of-tasks
- ▶ Support for multiple cloud providers
- ▶ Profile the application and network
- ▶ Network and compute performance models
- ▶ Estimate performance on available types of resources
- ▶ Demo application: High resolution image transcoding/manipulation

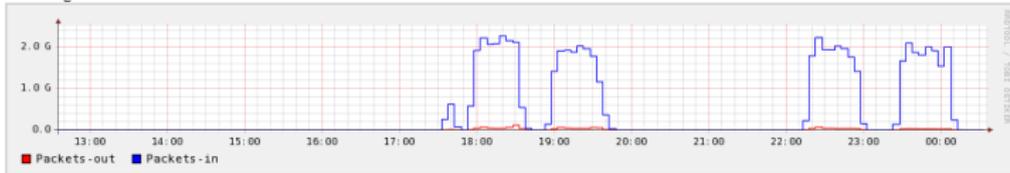


SC14 Demonstration

University of Amsterdam



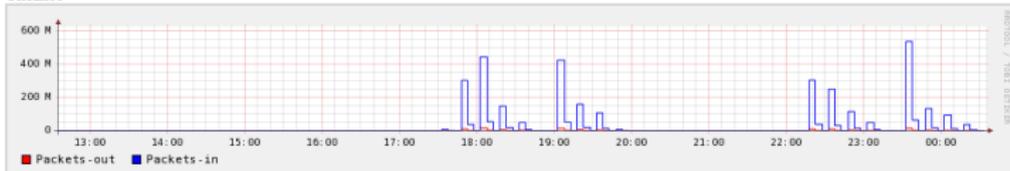
Cloud Sigma



Kentis



Okeanos



Lessons learned

- ▶ APIs everywhere - different, unreliable
- ▶ Billing - how much will it cost?
- ▶ Resource descriptions - cores vs compute units vs GHz, disks vs images, networks vs vlans
- ▶ Manual network provisioning is still the norm
 - ▶ Vlan remapping still done manually
 - ▶ BoD services greatly simplify provisioning

Conclusion and SC14 Demonstration Stats

- ▶ OCX: Connectivity-as-a-Service for cloud computing end-users
- ▶ A lot of open challenges in implementing end-to-end services.
- ▶ Users/applications need help in making the most of the heterogenous offer