Cross Stratum Optimization enabled Path Computation

draft-dhody-pce-cso-enabled-path-computation

Dhruv Dhody (dhruv.dhody@huawei.com)

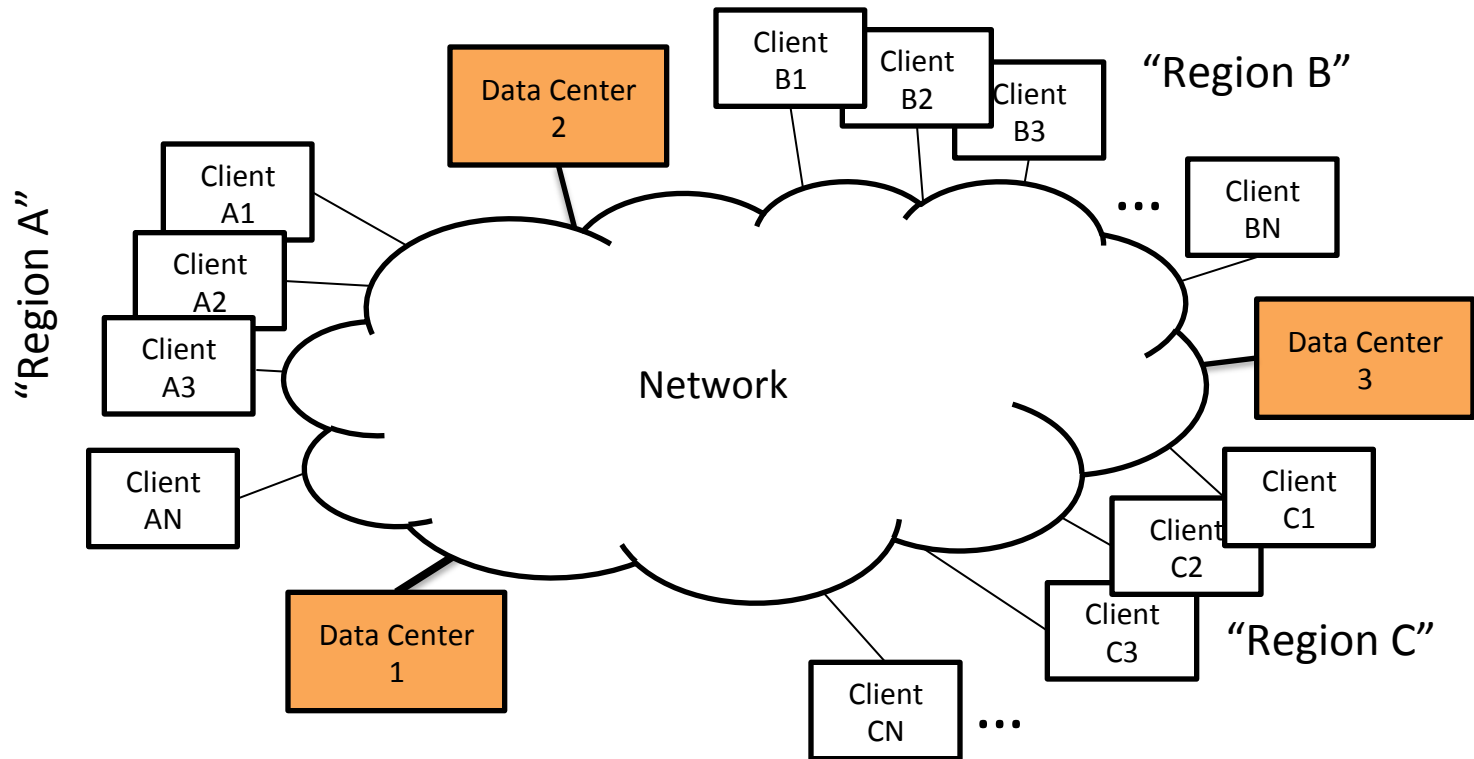Young Lee (leeyoung@huawei.com)

Nicola Ciulli (n.ciulli@nextworks.it)

Luis M. Contreras (lmcm@tid.es)

Oscar Gonzalez de Dios (ogondio@tid.es)

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Introduction

• Cloud based applications balanced among multiple data centers requires optimization of both application and network resources.

Introduction

- Network Stratum Query - 2 stages

(1) *Vertical Query: From Application in Data Center to Network and vice-versa*

(2) *Horizontal Query: Gathering network information.*

- **PCE can provide the network resource estimation in the 2nd stage of the NS Query.**
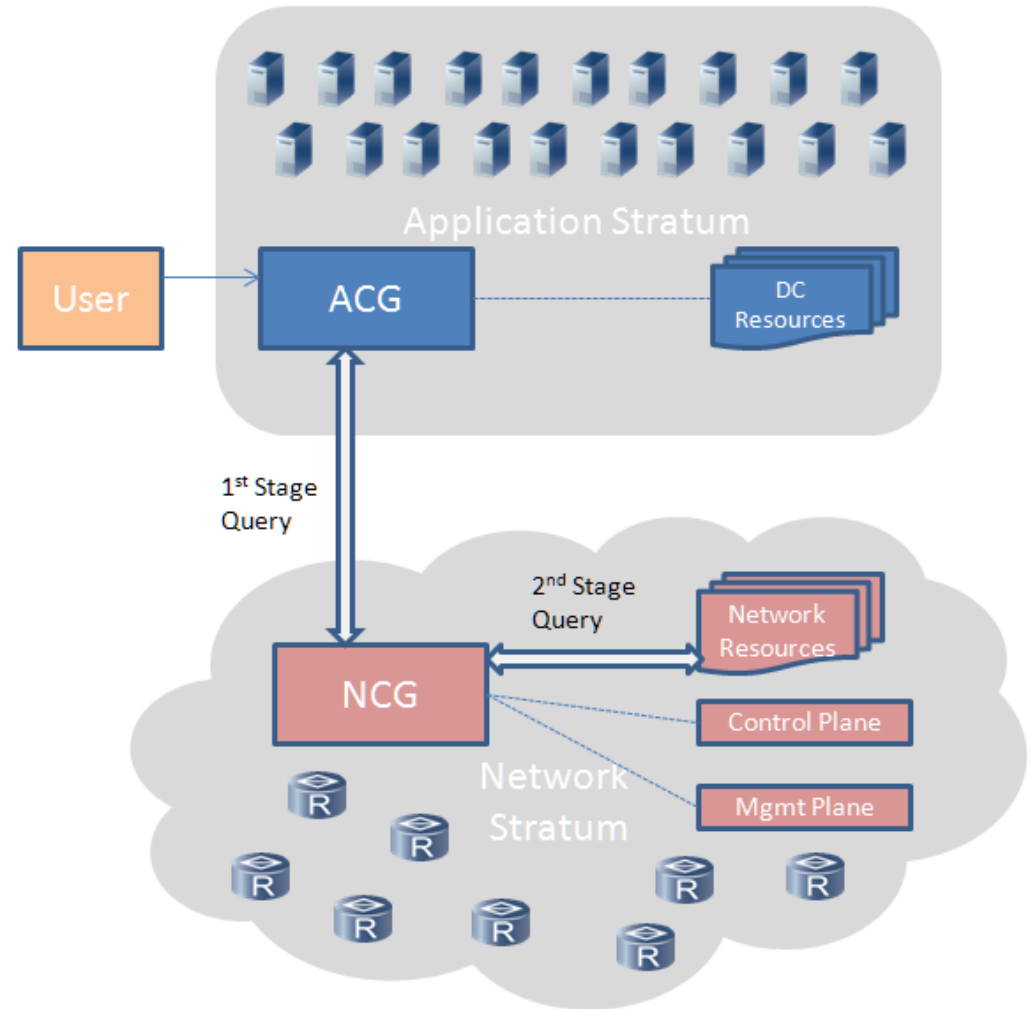
NCG(network control gateway) & PCE

- NCG can use the PCE to do path computation based on constraints.
  - NCG and PCE can be co-located
  - NCG uses external PCE, acts as PCC

- Statefull PCE can further help in maintaining the status of the final cross optimized path along with application binding.

- New PCE capability includes:
  - New objective functions (e.g., Multi-destination path computation (ANI Cast))
  - Application-resource aware PCE
  - Maintain "Application ID" coupled with Tunnel ID

Application Stratum

ACG

NCG

PCE

Network Stratum

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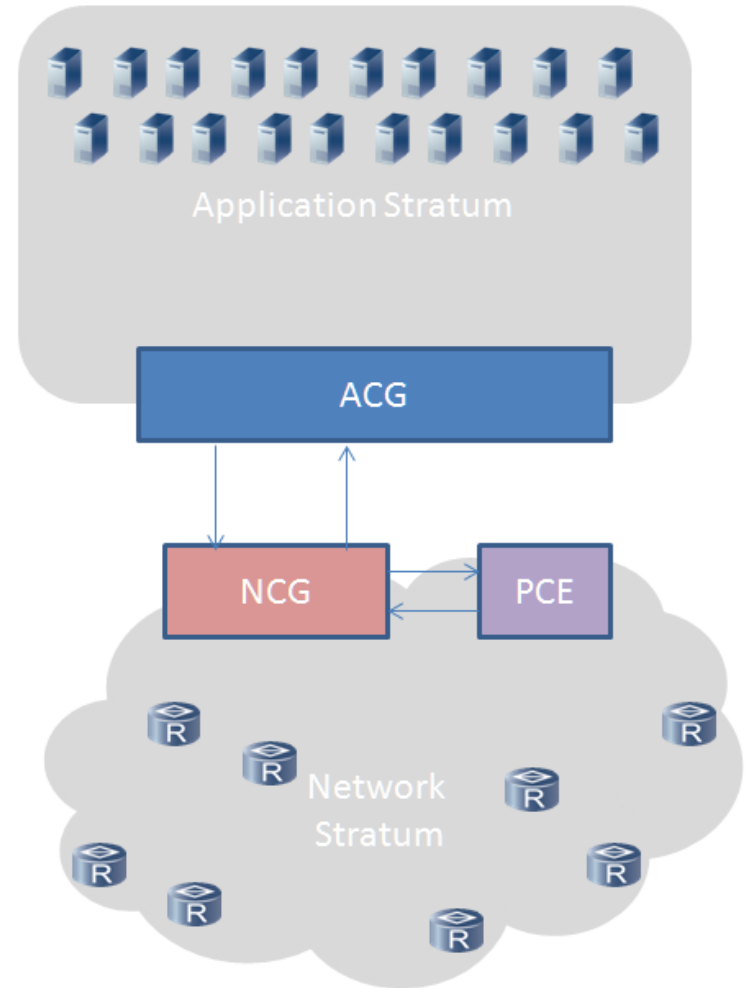
Path Computation

(1) User for application would contact the application gateway ACG with its requirements.

(2) ACG would further query the NCG to obtain the underlying network status.

(3) NCG would break the vertical request into suitable horizontal path computation request(s)

(4) PCE would provide the result to NCG

(5) NCG would abstract the computation result and provide to ACG

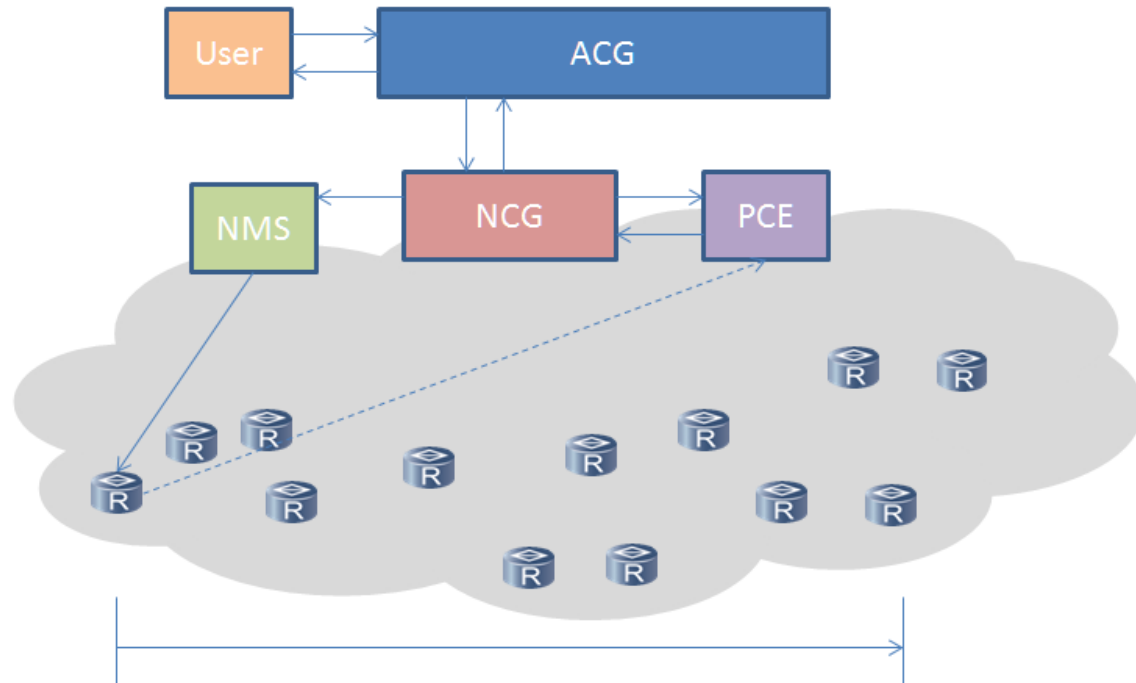(6) NCG and ACG would cooperate to finalize the path that needs to be setup.

Final decision can be made either in ACG or NCG depending on the mode of operation.
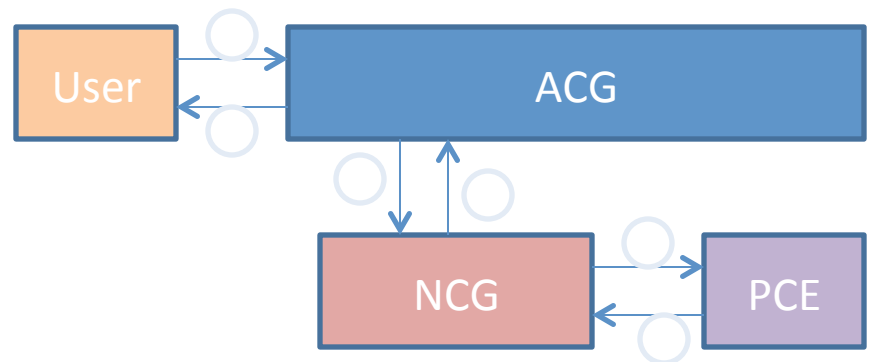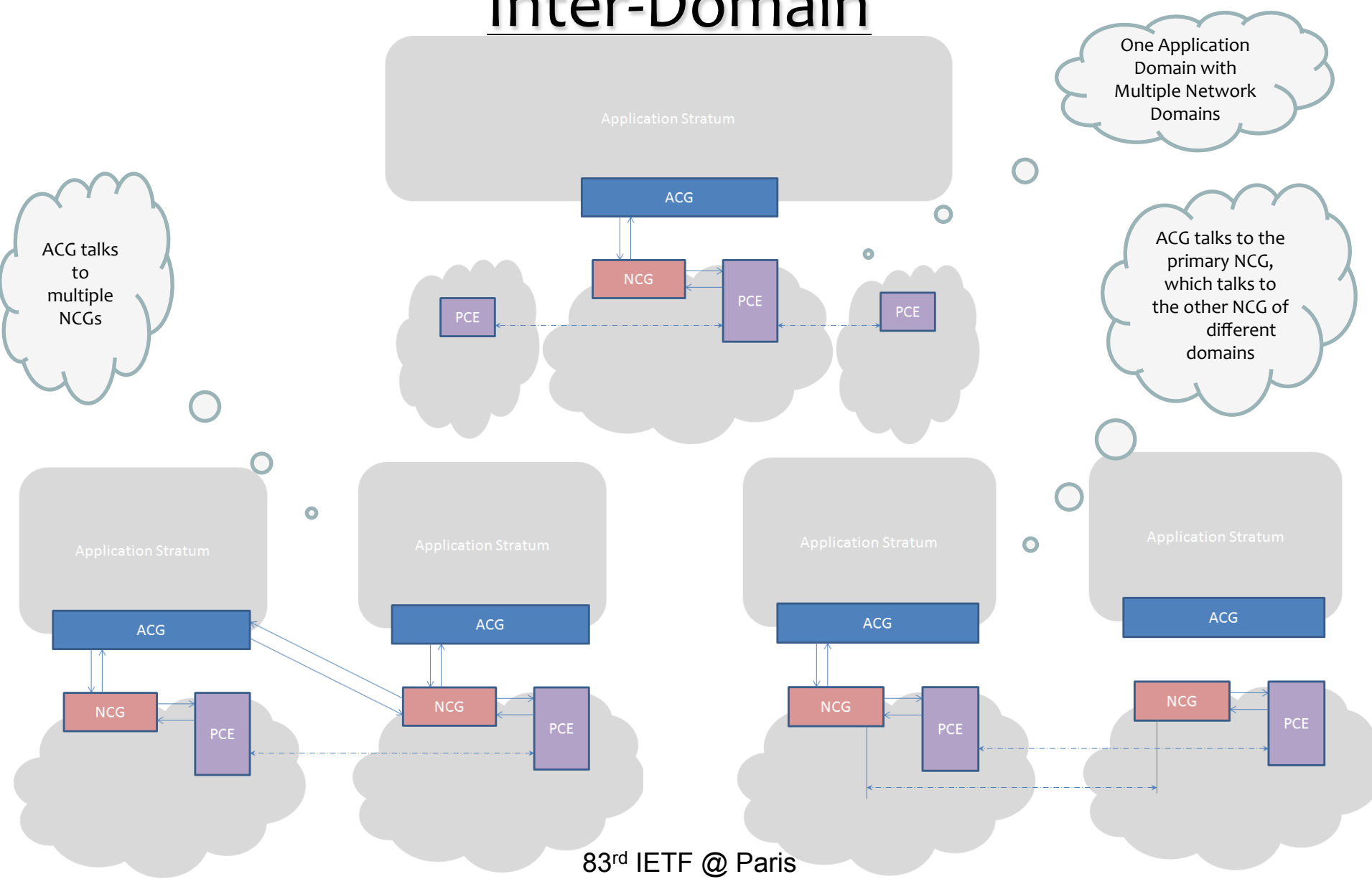
Path Setup

Path setup via NMS

- NCG can send a request to NMS asking it relay the message to the head end LSR to setup the pre-computed path.

- PCC should relay the status of the signaled LSP to the Statefull PCE.

Inter-Domain

One Application Domain with Multiple Network Domains

ACG talks to multiple NCGs

ACG talks to the primary NCG, which talks to the other NCG of different domains

Application Stratum

ACG

NCG

PCE

PCE

PCE

Application Stratum

ACG

NCG

PCE

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Application Stratum

ACG

NCG

PCE

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Summary & Next Steps

o PCE can be a tool for enabling CSO/SDN objective in the data centers/cloud networking environment.
  - o Application-awareness
  - o Statefull PCE
  - o More objective functions and constraints
o WG should evaluate the need of enhancing PCE for network and cloud providers where a need to optimize both application and network resources.

Questions & Comments?

Thanks!