Towards recursive virtualization and programming for network and cloud resources

draft-unify-nfvrg-recursive-programming-00

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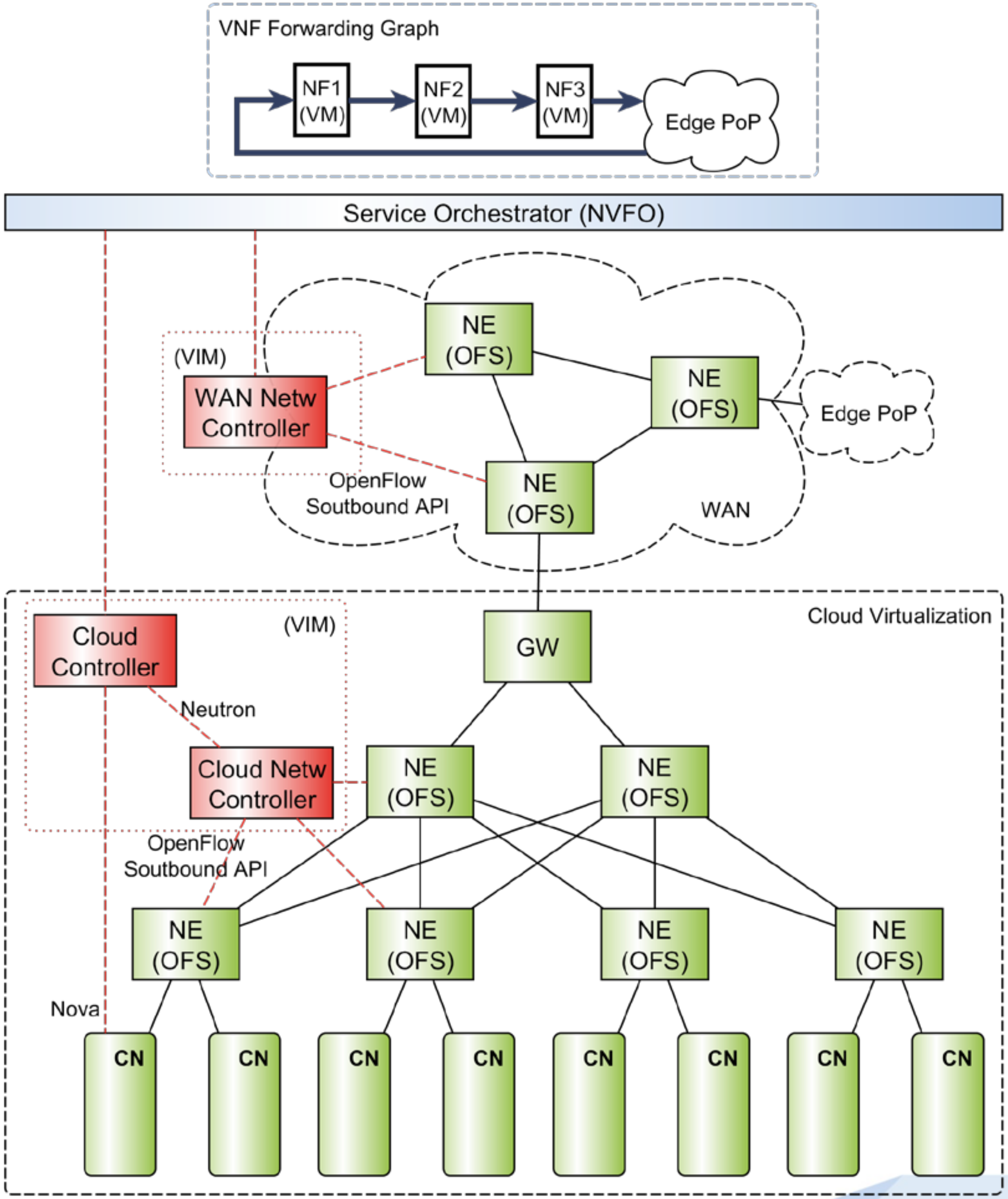
Agenda

- Motivations
- DC network function chaining examples use-cases
  - L2-in-L3
  - L2 white “box”
  - Recursive approach with joint compute and network virtualization and programming
- Summary

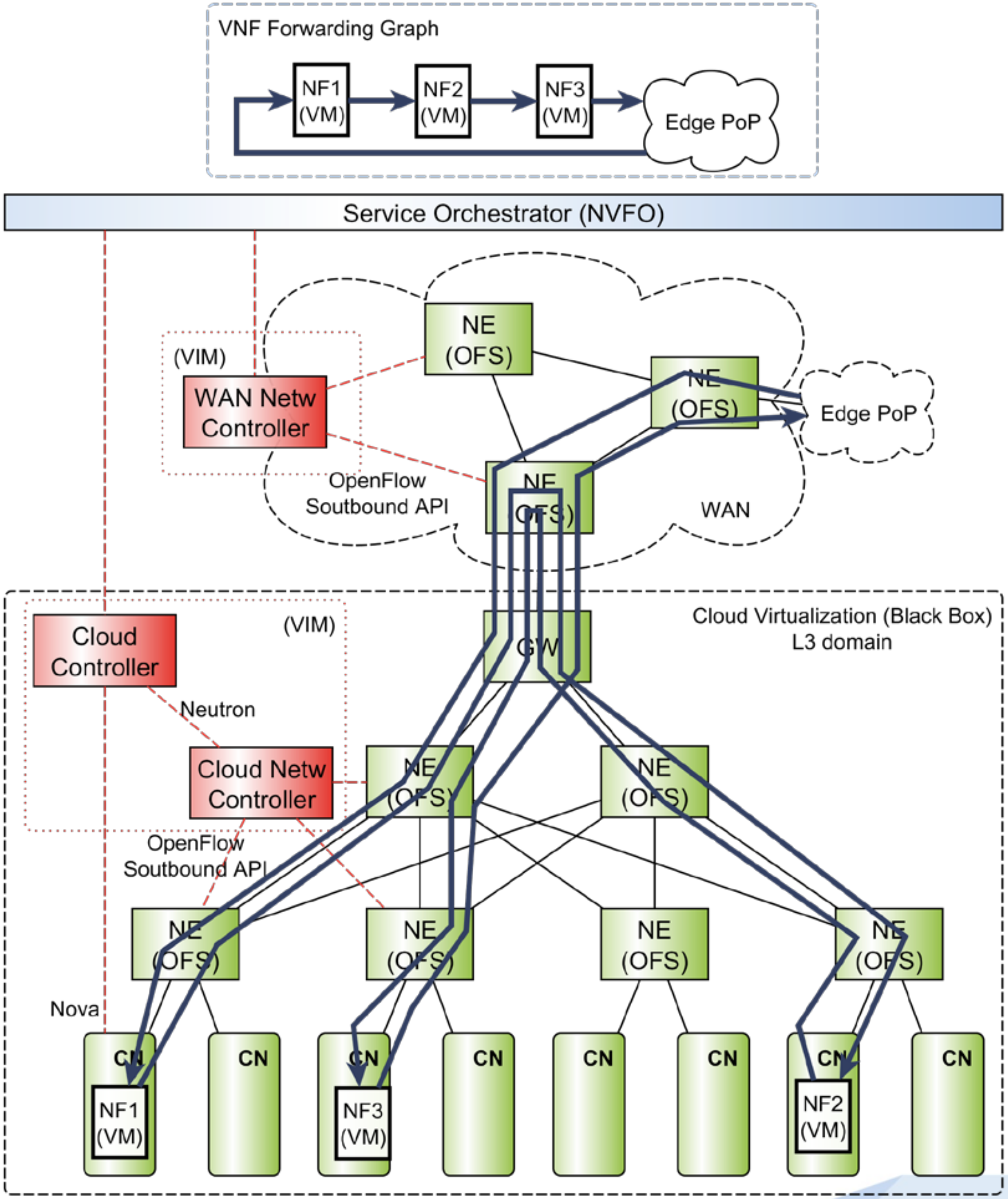
Motivations

- VNF FG request
    - NF chaining
        - Transparent NFs
- Domains
    - WAN (SDN)
    - Cloud (DC)
- How to orchestrate (program) the service?



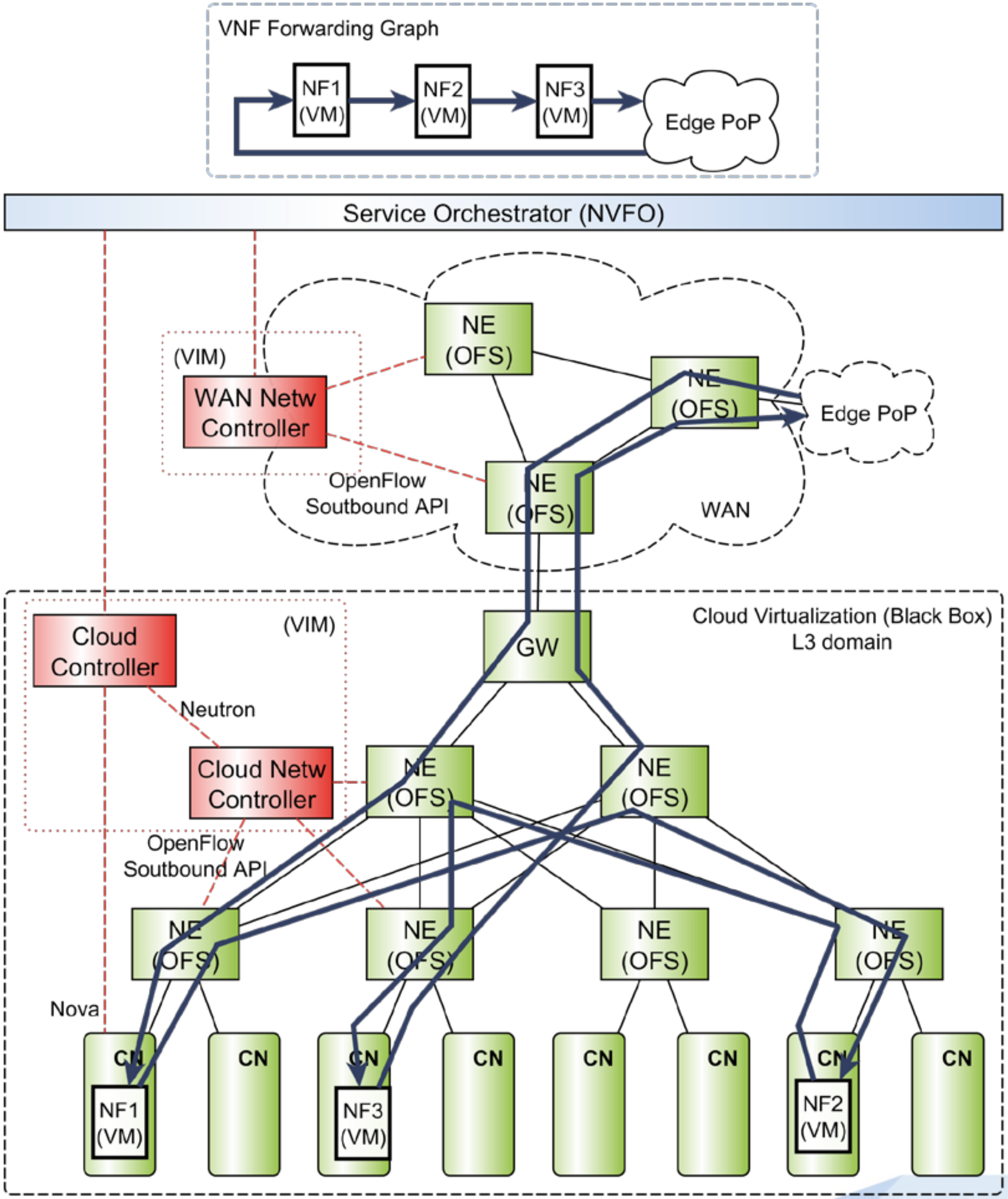
L2-in-L3 with External Steering

- Pros
  - Works out of the box
    - E.g. OpenStack
- Cons
  - Random VM placement
  - Back-forth traffic
  - L3 tunnel termination in the VMs
    - trust



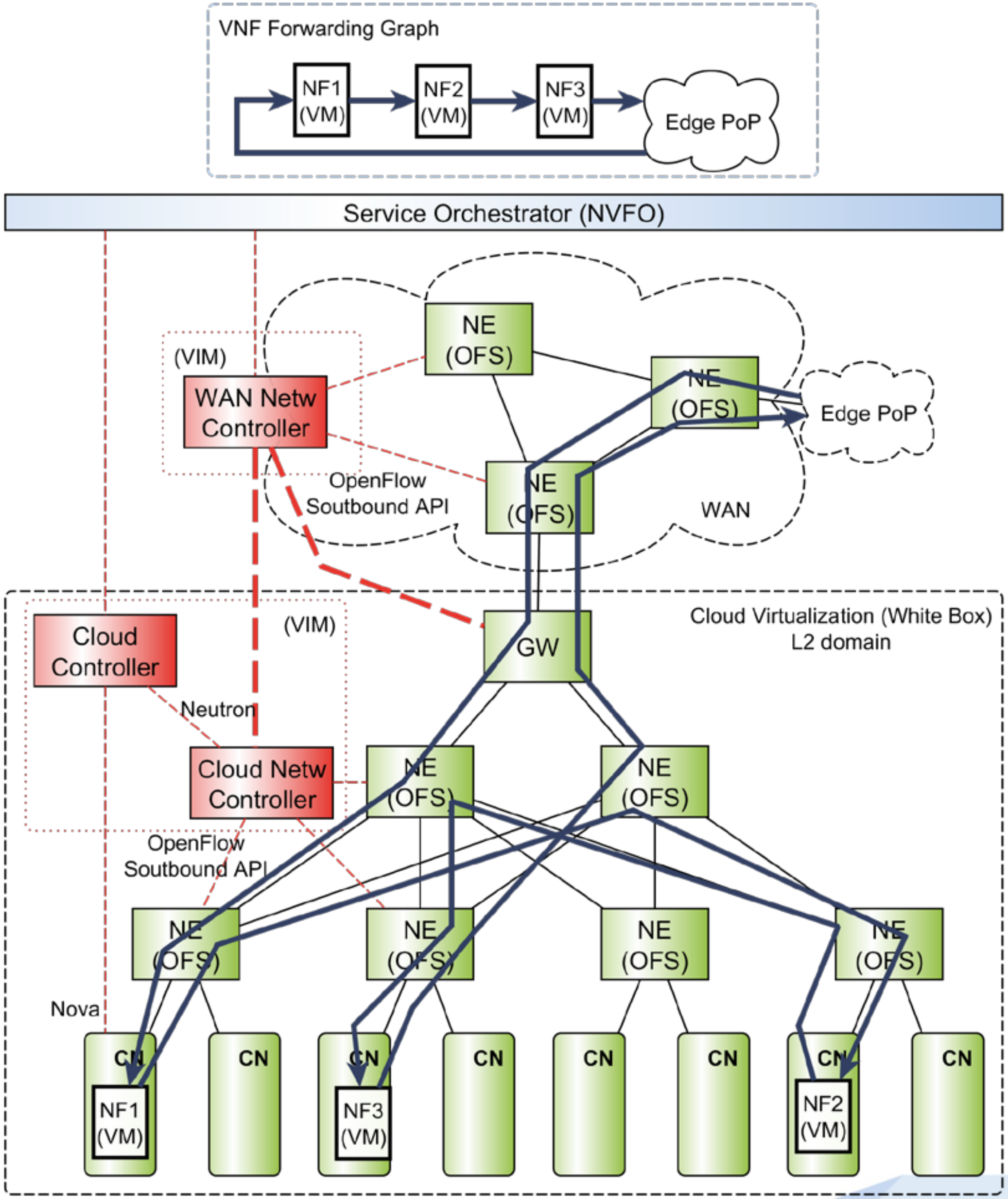
L2-in-L3 with VNF (VM)-based

- Pros
  - Works out of the box
    - E.g. OpenStack
  - Traffic stays within the DC
- Cons
  - Random VM placement
  - L3 tunnel termination in the VMs
    - trust



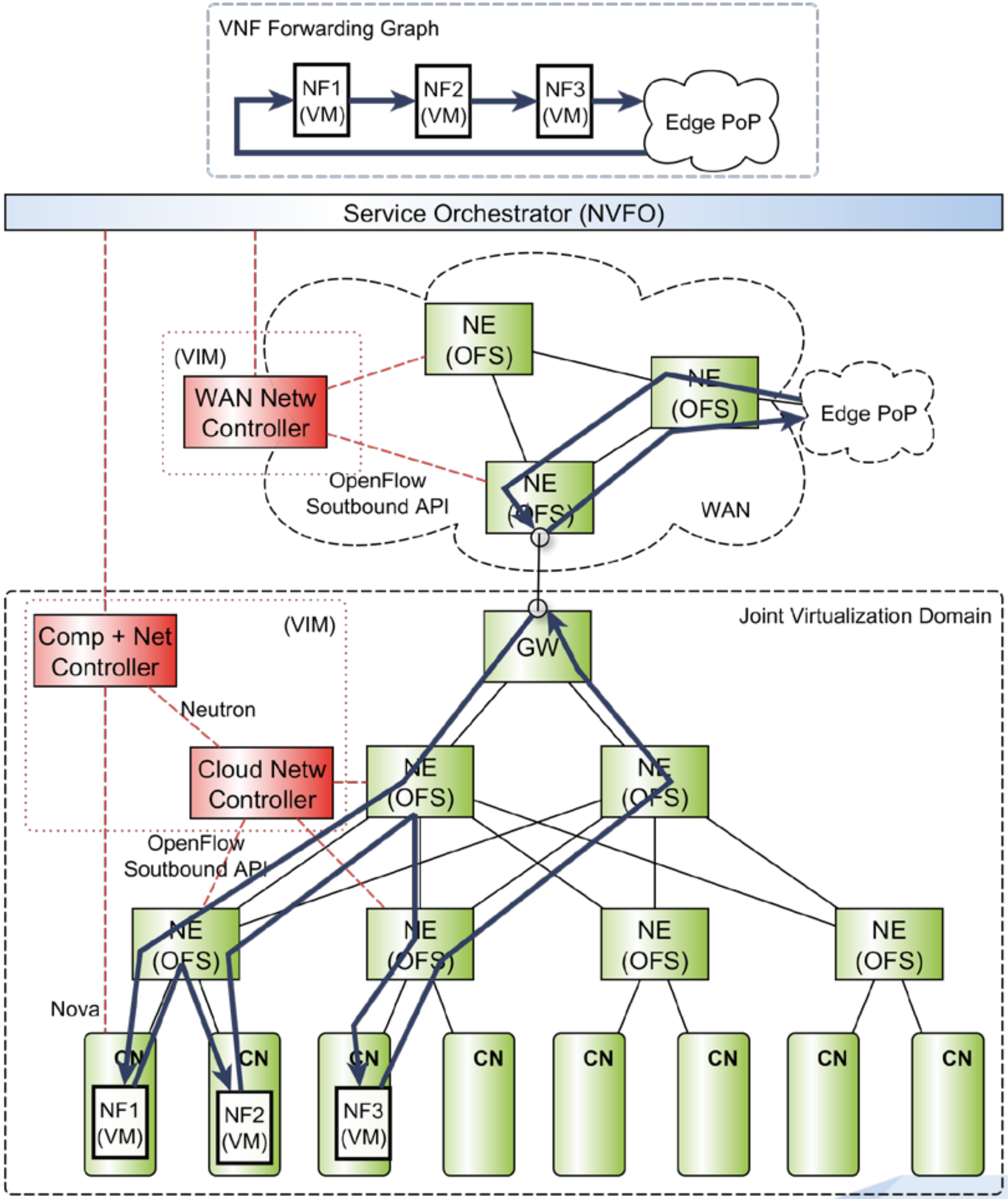
L2 White "Box"

- Pros
  - Traffic stays within the DC
  - L2 steering
  - No VM tunnel configuration
- Cons
  - Random VM placement
  - Control goes across domain boundaries



Joint Virt & Prog Recursion

- Pros
  - Traffic stays within the DC
  - L2 steering
  - No VM tunnel configuration
  - Optimized VM placement
  - Control split according to domains
- Cons



Summary

- Joint compute and network
  - Virtualization
  - Programming API

for domains

- **Recursive programming at the VNF FG level**

```
+--------------------------------------+
|                    DC Domain         |
|              +---------------------+ |
|              |  +-+    +-+    +-+  | |
|              |  |V|    |V|    |V|  | |
|              |  |N|    |N|    |N|  | |
| SDN Domain   |  |F|    |F|    |F|  | |
| +---------+  |  |1|    |2|    |3|  | |
| |         |  |  +-+    +-+    +-+  | |
| |  +---+--+--+>-+ |    | |    | |  | |
| |  |SW1|  |  |    +-->-+ +-->-+ |  | |
| |  +---+--+<-+------------------+  | |
| +---------+  +---------------------+ |
|                                      |
|<<=========>><<=====================>>|
|   VNF FG1            VNF FG2         |
+--------------------------------------+

 <<==================================>>
      VNF Forwarding Graph overall
```

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