Recursive Monitoring Language in Network Function Virtualization (NFV) Infrastructure

draft-cai-nfvrg-recursive-monitor-01

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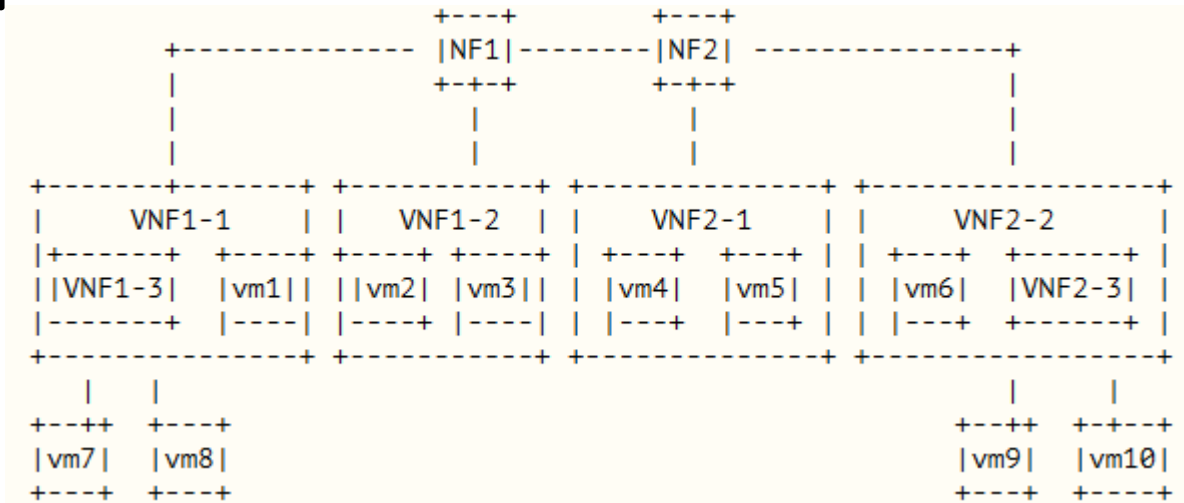
Gregory Mirsky

NFVRG meeting, IETF 95

Overview

- Motivation:
  - provides an automatic way to decompose/aggregate monitoring data in different infrastructure layers
  - provide a way for developers and operators to easily access monitoring data collected from resources in a software-defined telecom infrastructure that contains a hierarchy of abstraction levels
- Solution proposal:
  - Define a query language based on an extended Datalog syntax
  - Include pre-defined templates for initial metrics examples

Example

```
                         +---+          +---+
        +-------------- |NF1|--------|NF2| ---------------+
        |                +-+-+          +-+-+                |
        |                  |              |                  |
        |                  |              |                  |
        |                  |              |                  |
 +-------+-------+  +-----------+  +-------------+  +----------------+
 |   VNF1-1      |  |  VNF1-2   |  |   VNF2-1    |  |    VNF2-2       |
 |+------+  +---+|  |+---+ +---+|  | +---+  +---+|  | +---+  +------+ |
 ||VNF1-3|  |vm1||  ||vm2| |vm3||  | |vm4|  |vm5|| | | |vm6|  |VNF2-3| |
 |-------+  |----||  |---+ |----||  | |---+  |---+| | | |---+  +------+ |
 +---------------+  +-----------+  +-------------+  +----------------+
      |    |                                            |      |
   +--++  +---+                                      +--++  +-+--+
   |vm7|  |vm8|                                      |vm9|  |vm10|
   +---+  +---+                                      +---+  +----+
```

Ground facts	F1: sub(NF1, VNF1-3, vm1, vm2, vm3), sub(NF2, vm4, vm5, vm6, VNF2-3), sub(VNF1-3, vm7, vm8), sub(VNF2-3, vm9, vm10) F2: node(NF1, NF2, VNF1-3, vm1, vm2, vm3, vm4, vm5, vm6, VNF2-3, vm7, vm8, vm9, vm10) F3: link(NF1, NF2), link (VNF1-3, vm1), link(vm2, vm3), link(vm3, vm4), link(vm4,vm5), link(vm5,vm6), link(vm6, VNF2-3), link(vm7, vm8), link(vm9, vm10)
Recursion control	R1: child(X,Y) <= sub(X,Z), child(Z,Y) R2: child(X,Y) <= sub(X,Y) R3: leaf(X,Y) <= child(X,Y), ~sub(Y,Z)
Leaf select	R4: in_leaf(X, Y) <= leaf(X, Y) & ~link(M, Y) R5: out_leaf(X, Y) <= leaf(X, Y) & ~link(Y, M)
Function def	R6: e2e_delay(S,D,P) <= link(S,D), P == f_e2e_delay(in_leaf(S,Y), out_leaf(D,Z))
User request	query(e2e_delay, NF1, NF2)

Updates in –01

- Following comments received at the interim NFVRG meeting in December (from Ramki Krishnan and Diego Lopez)

- Added motivation to use Datalog (in beginning of Sec. 4).
- Further explanation for how the recursion is controlled (section 7.1)
- Adopted ETSI terminology (VNFFG)
- Fixed editing errors and spelling

Next steps

- Receive feedback from the community
- Provide additional templates
  - What functions should be covered?
- Enhance the VNFFG description to align with NFVRG drafts evolution