Recursive Monitoring Language in Network Function Virtualization (NFV) Infrastructure

draft-cai-nfvrq-recursive-monitor-01

Xuejun Cai
Catalin Meirosu
Gregory Mirsky

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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

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