Distributed NFV in Scattered Premises

draft-geng-nfvr-distributed-nfv-00

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Background

• New services emerge
  – Higher flexibility, greater security and reliable service quality guarantee
  – Customer end to service provider core

• How NFV helps
  – Software/Hardware de-coupling – Flexibility
  – Isolated instances on NFVI – Security
  – Dedicated computing/storage allocation – Performance Guarantee
NFV – Centralized or Distributed

• Centralized NFV
  – Well studied, commercialization seen in service provider
  – Strong computing and storage resources
  – Scalable and elastic
  – Conventionally centralized NFs in virtualized forms
  – Some virtualized CP under CP/DP separation concept
NFV – Centralized or Distributed

- Distributed NFV
  - Interests start to show
  - Fair computing and storage resources
  - ARM compatibility
  - Dedicated system resources for mission critical services
  - New business model - mini PaaS and User-end “network slicing”
NFV – Centralized or Distributed

• Centralize what you can
  – Conventionally centralized instances for flexibility and implement-as-you-grow

• Distribute what you must
  – We are seeing more and more “musts”
    – Extremely low latency in mission critical services
    – Efficient local processing (WAN acceleration, firewalls etc.)
    – End-to-end resource dedication – or network slicing
    – Customer data privacy
    – Resilience and high reliability (i.e. Industrial internet)
    – Multi-homing and multiple provisional domain – isolated system
    – Providing edge/scatter PaaS to maximize service flexibility – walled garden won’t work - do what you are good at
Examples of Distributed NFV-PoPs

• **Customer Premise Devices**
  – Per service provider or per application isolation
  – Dedicated resource allocation for service guarantee
  – Support local processing
  – Enabling extreme low latency services
  – Mini PaaS – new business model

• **Scattered transport network elements**
  – CP may be separated, centralized and virtualized, “CP clients” remain
  – Enabling isolated multiple provisioning domains
  – Enabling network slicing management/maintainence
Use cases of Distributed NFV

• VNFaaS and VNPaaS in Residential and Enterprise Network
• Mission Critical Services
• End-to-end Network Slicing Management
• Managed Multiple Provisioning for Network Elements
• Elastic VPN
Other Issues

• Rethinking VNFs in Distributed NFV
  • Application specific
  • High efficiency
  • Computing-hungry VNFs are not preferred
• Virtualization Technologies in Distributed NFV
  • ARM compatibility
  • Container vs VMs
  • Finer granularity
• Management and Orchestration of Distributed NFV
  • Scattered NFVIs
  • Mass number of managed NFVIs
  • Various CPU Arch, NFVI vendors
Discussions

• Draw interests of the community
  • Collaboration is welcome
• Is this an interesting topic for IRTF community?
• What can be taken by NFVRG for further investigation?
  • Architecture & Use cases?
  • MANO for widely distributed NFVIs?