Release 1 Use Case

5G Core Observability

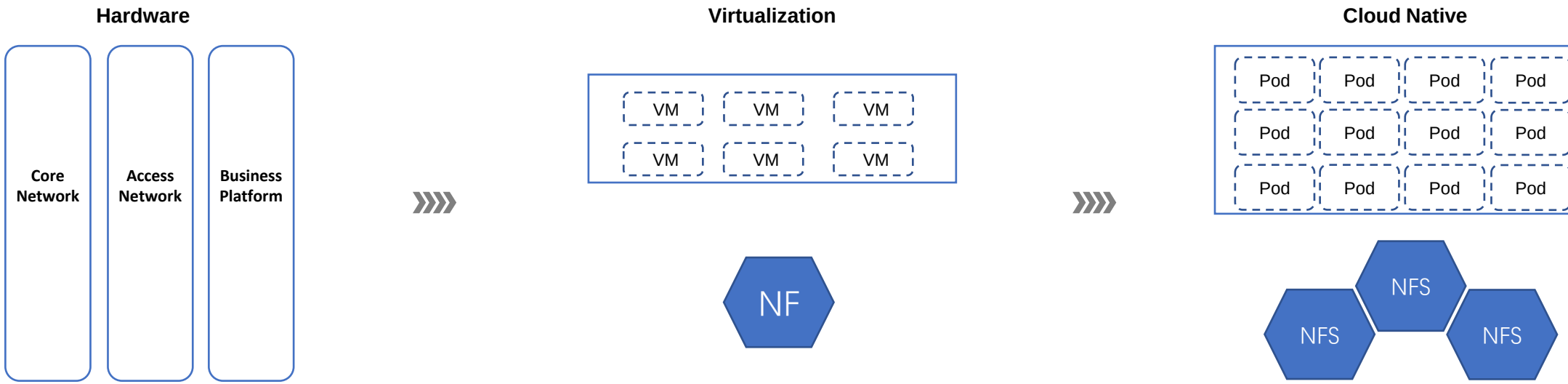
Use Case Description

【Pain Point】

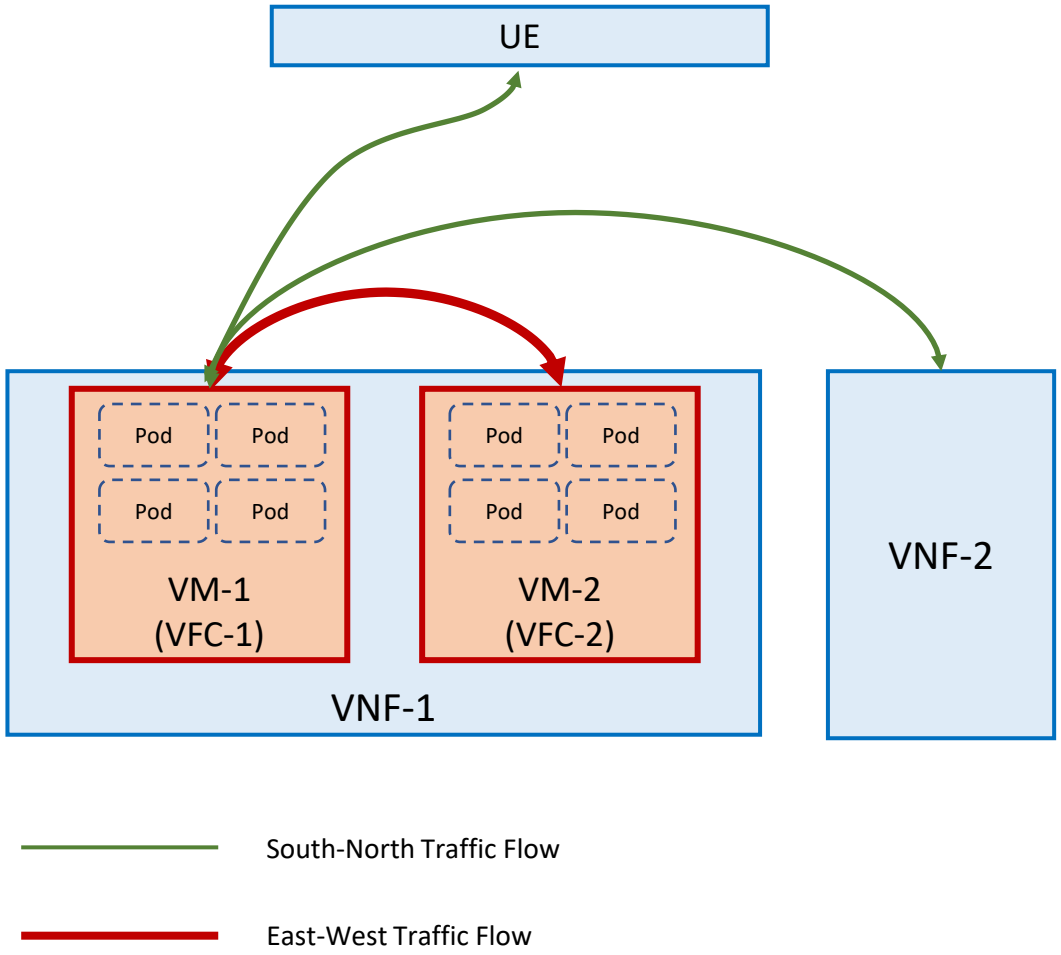
- As the cloudification of 5G core network and widely usage of container and microservice technology in 5G core implementation, 5G core network is becoming more and more complicated. The operation and maintenance object for operators is no longer a single and well-packaged PNF or VNF. It's a group of tens of thousands of pods which is related to hardware, virtualization layer, container layers.

  - Number of node and pod increases rapidly
  - Number of IP used increases rapidly
  - East-west traffic increases rapidly but not observable
  - Stronger cross domain collaboration (HW, SDN, VM, Container, NF)
  - Boundaries between resource & application, different types of resources are not clear

- However, in many network clouds, 5G core as well as other virtualized/cloud-native network functions are still black-box. The internal topology, network relationship, relationship of applications & resources are not clear. The implicit structure increase difficulty in O&M.



Use Case Description



Points lacking observability:

- Internal resource relationship is invisible, especially network resources, which may cause:
  - Inaccurate resource requirements at NF design and deployment stage
  - Potential conflict at running stage (such as IP conflict)
  - Slow fault location
- East-West traffic flow lacks monitoring/tracing
  - Processing huge amount of east-west traffic, which will occur after virtualization and cloud-native transformation, may influence cloud platform performance

Use Case Description

【Current Observability Status】

- NFVO, OSS only manages resource related FCAPS
- DPI monitors south-north traffic flow
- No interactions between NF O&M and resource O&M

【Requirement】

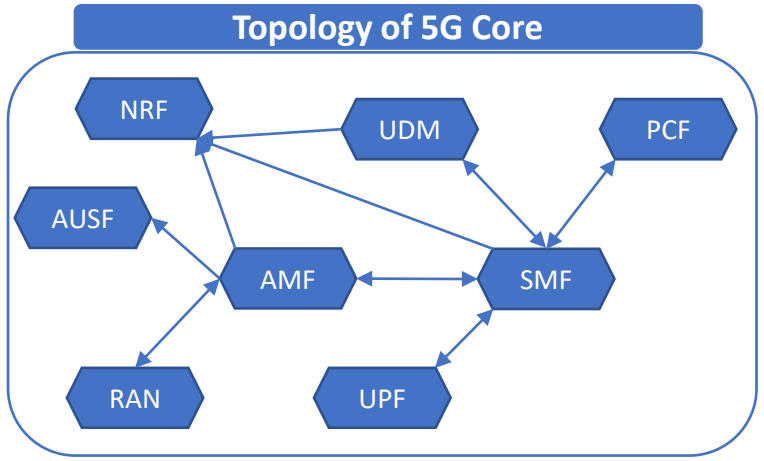
- A cross-layer O&M tool for management systems as well as network functions/applications is needed, which can be used to support O&M
- This O&M tool can collect, display and make connections of real-time NF/application and resource O&M data
- This O&M tool can provide unified view for different management systems

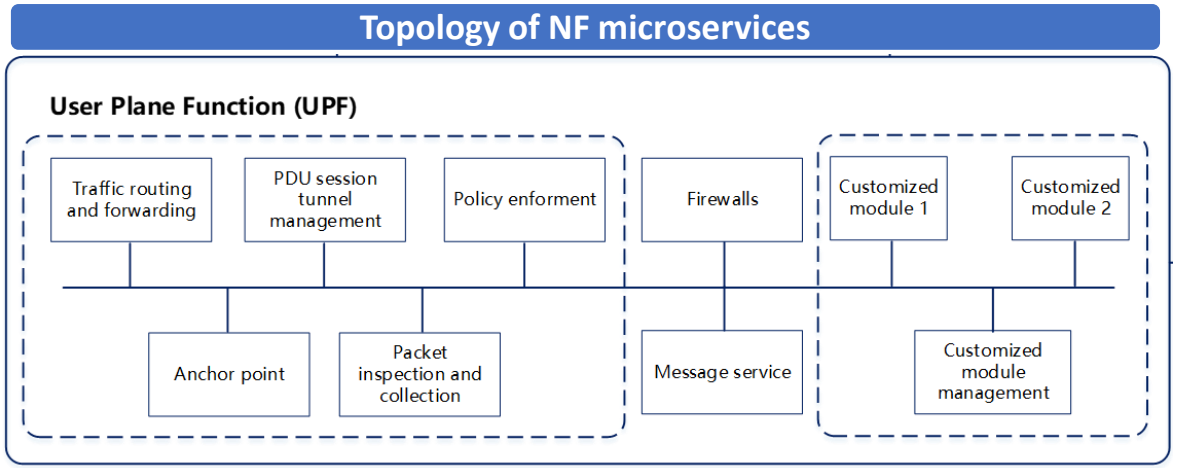
Requirements

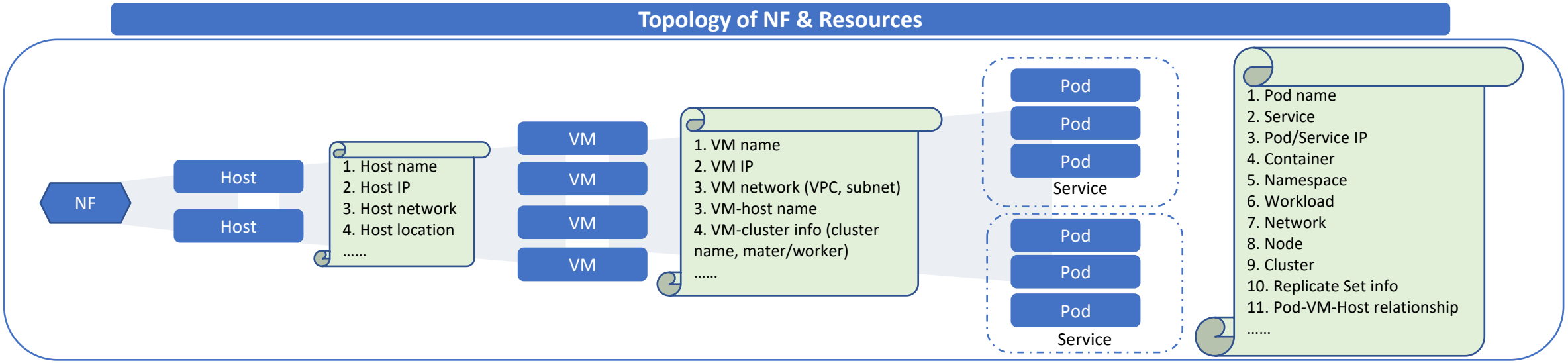
https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-3?filter=allopenissues
https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-4?filter=allopenissues

【# 1: Functionality -- Topology】

- Build multi-dimensional view for DC, hardware, virtual machine, container and 5G core network function
- Provide unified, observable, user-friendly topology





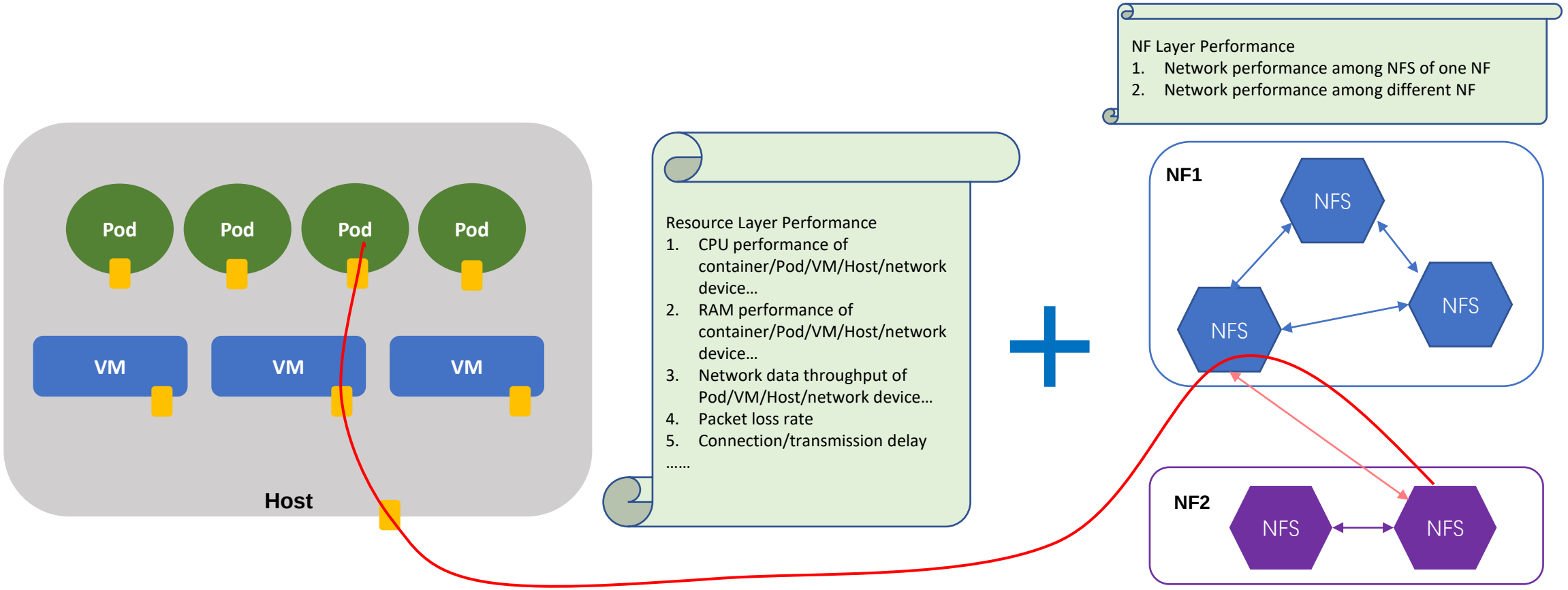


Requirements

https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-5?filter=allopenissues
https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-6?filter=allopenissues

【# 2: Functionality -- Monitoring】

- Provide real-time monitoring on any resource change event (VM migration, Replicate update, container reconstruct …)
- Provide real-time monitoring on resource performance and map performance data with resource topology
- Provide real-time monitoring on network performance and map performance data with NF/resource topology
- Monitoring data observable and displayed in user-friendly UI



Requirements

https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-8?filter=allopenissues
https://jira.lfnetworking.org/projects/XGVELA/issues/XGVELA-9?filter=allopenissues

【# 3: LCM】

- Dedicated:
  - Support pre-defined deployment:
    - Images and description/configuration files of this cross-layer O&M tool are prepared in advance on cloud platform (PaaS)
    - Reliance/usage/configuration of this tool are pre-defined in the NF design file before NF is instantiated
  - Support post-added deployment:
    - Images and description/configuration files of this cross-layer O&M tool are prepared in advance on cloud platform (PaaS)
    - NF has been instantiated and running of the cloud
    - Create tool for NF without influencing running and service status of NF
- Shared:
  - Tool instance is running on cloud with public API
  - NF pre-define tool in design files before instantiation
  - NF adds tool through changing design files at running status

Requirements

【# 4: Service delivery form】

- TBD: Define how to provide service to NF/management system (API? Data model?)

Actions for Release 1

【Suggested Scope】

- Choose containerized 5G core as NF, container environment with K8S as CaaS layer
- Create cross-layer O&M tool and focus to implement multi-dimensional topology with resource monitoring with UI
- Choose one type of LCM method and let NF/Orchestrator successfully use this tool
- Create manual for tool functionality and usage
- Reorganize architecture doc and add statement of workflow/relationship of PaaS/PaaS capability/management systems

【Dependency】

- #1: A containerized 5G core NF (cloud-natively designed is better, e.g. NF as micro-services)
- #2: A PaaS platform with container environment and K8S orchestration (e.g. OpenShift, open-source version K8S & Docker)
- #3: An orchestrator which can orchestrate and deploy CNF designed in Dependency # 1

Comments & Suggestions