Co-existence of different functional classes implemented as virtualized functions

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Network functions
Functional class partitioning

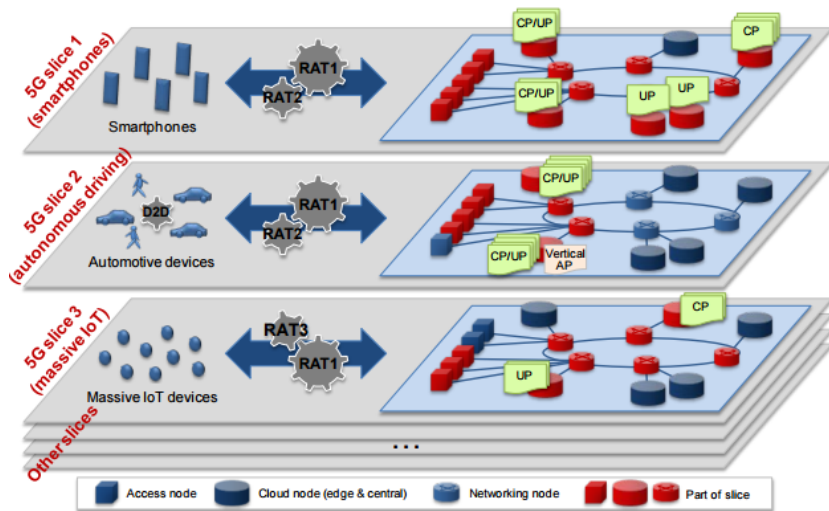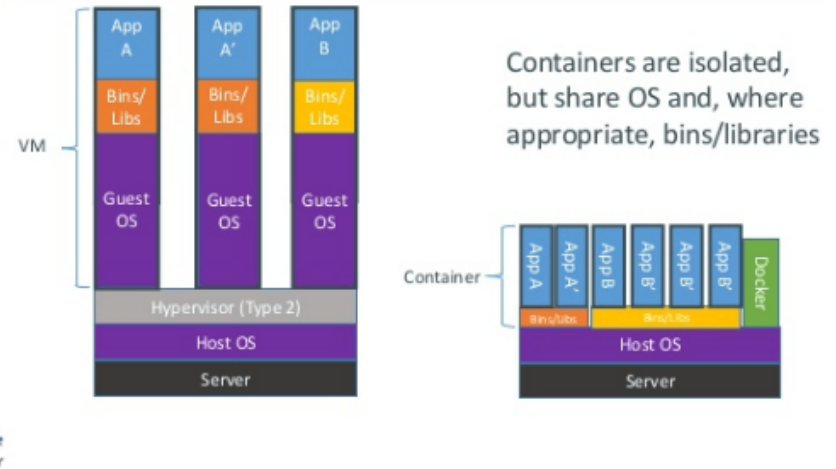| Forwarding Class	Processing Class	Network Control Class	Management and Orchestration Class	OAM Class
Router	TCP Proxy	BGP Routing Protocol	OpenStack Controller	Performance Monitoring Tools

Technology evolution impact

5G Network Slices
Diagram source: NGMN 5G White Paper

- Additional dimension to consider
- Is it really multiplicative?

Containers vs VMs
Diagram source: Docker Inc.

- Cannot assume only VMs
- Security re-thinking

NFVRG Ref: https://datatracker.ietf.org/doc/draft-natarajan-nfvrg-containers-for-nfv/

Need for class separation

Initial thoughts

- Side effects of isolation breaches
  - E.g. Data Overflow can have more serious side effects in management class

- Different nature of DoS attacks in each class
  - E.g. Few packets can bring havoc in the management class

- Different nature of the service verification requirements in each class (loops, trust links, etc.)
  - E.g. Periodic and/or event-driven loop verification is mandatory for forwarding/processing class

More on Isolation Breaches

- Data Overflow
  - E.g. Packet addressed to a processing function overwrites memory space of control function
  - E.g. OAM performance monitoring function overwrites memory space of processing function
- Data Leakage

Next steps

- Is there community interest in this effort?

- Love to hear your thoughts!