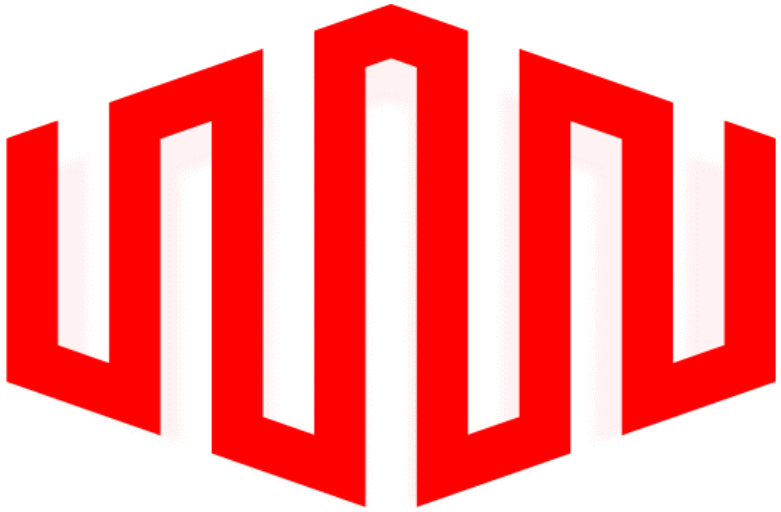

EQUINIX

SDN/NFV VNF Service Chaining

Critical Design Review

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Project Advisor: Dr. Levi Perigo, Mr. Brooke Mouland (Equinix)

TEAM 9:

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Sarang Ninale

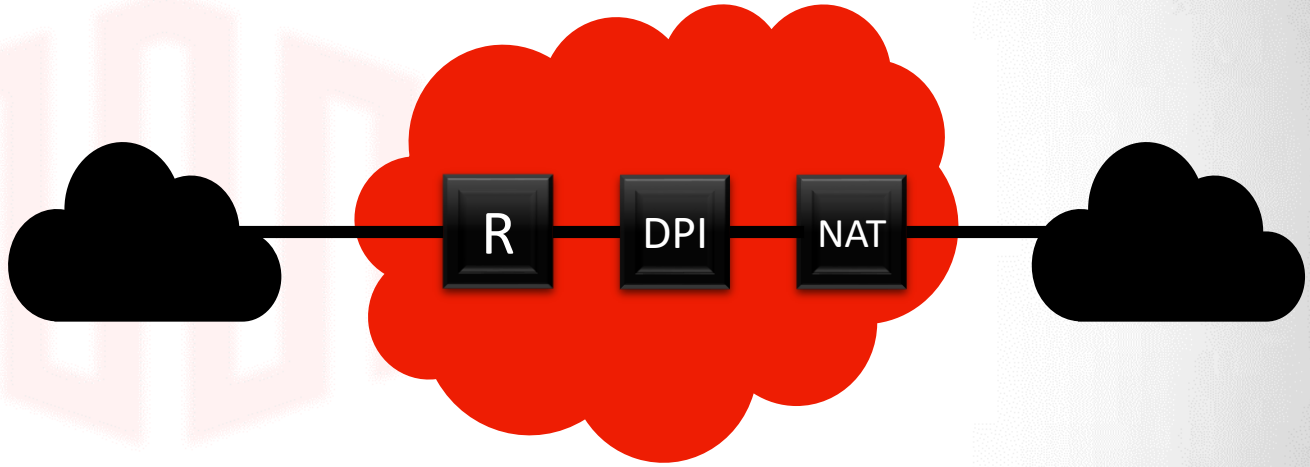
Agenda

Project Purpose and Objectives	Sarang
Design Solution	Sarang
Critical Project Elements	Hariharakumar
Design Requirements	Hariharakumar
Project Risks	Dashmeet
Verification and Validation	Rohit
Project Planning	Rohit

Project Purpose and Objectives

What is Service Chaining?

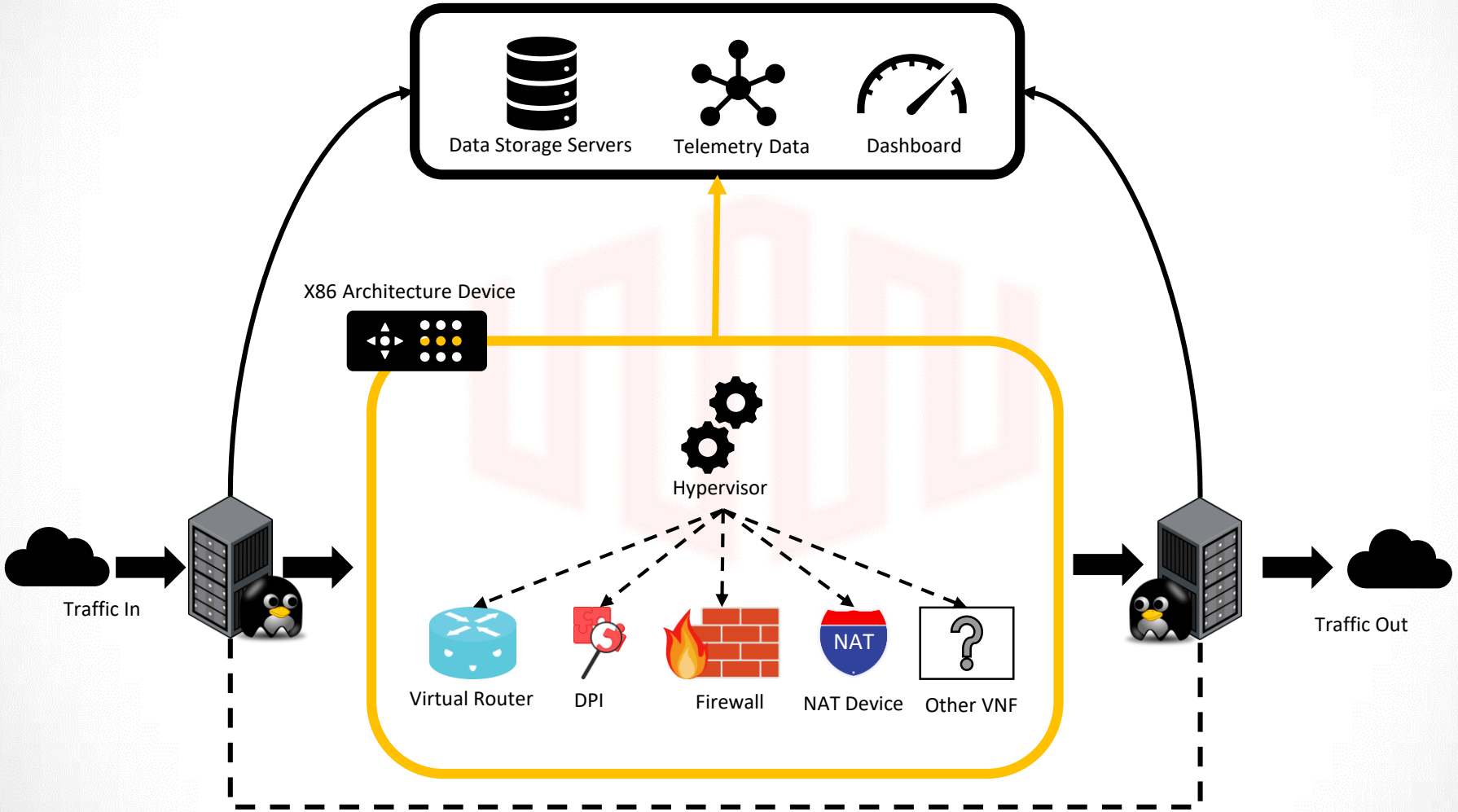
- Service chaining - set of network functions connected to support an application.
- SDN/NFV facilitates the ease of provisioning and reconfiguring the service chains.
- Building a service chain using SDN/NFV eliminates the need of acquiring network hardware.



Objectives

- Creation of various combinations of service chains – using VNFs from vendors and open source services.
- Creation of test cases to test throughput and performance of the service chains.
- Subject the chains to undergo varying types of traffic.
- Carry out testing in a consistent environment.
- Creation of an abstraction layer to plug-in and test.
- Creation of a dashboard for performance monitoring.
- Store the performance related data in a database.

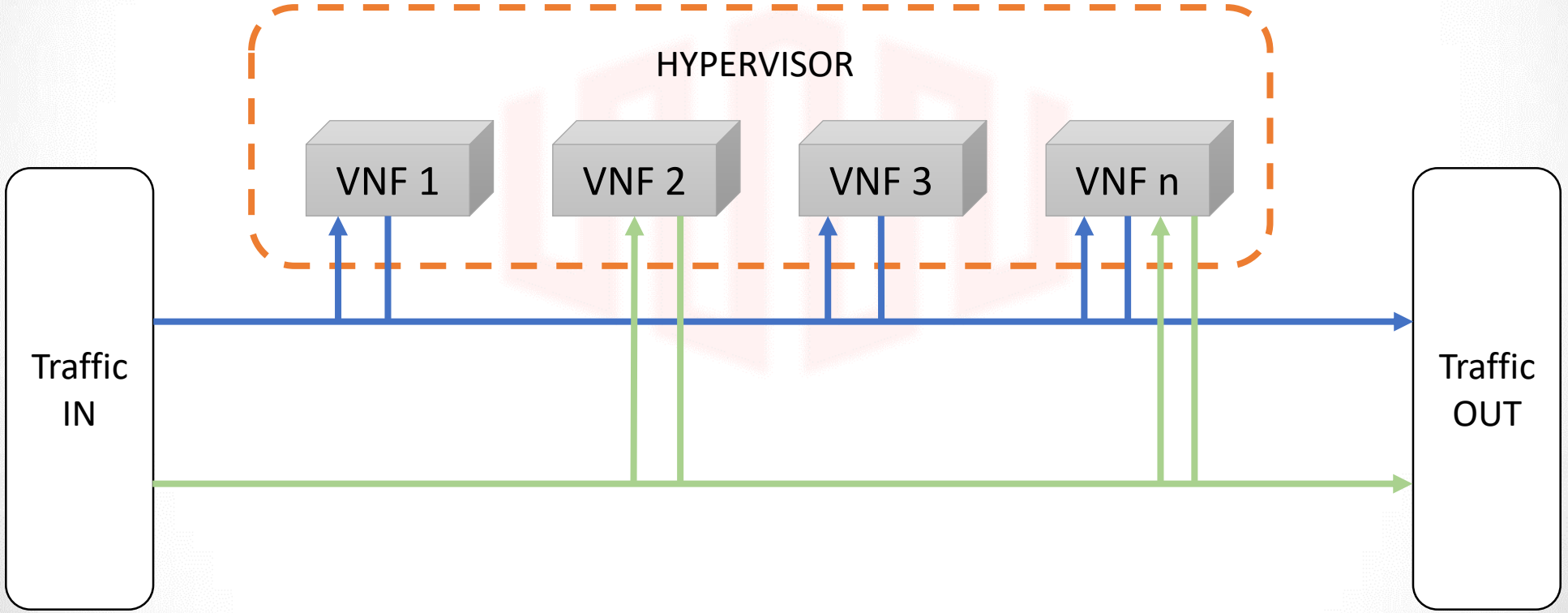
Concept of Operations



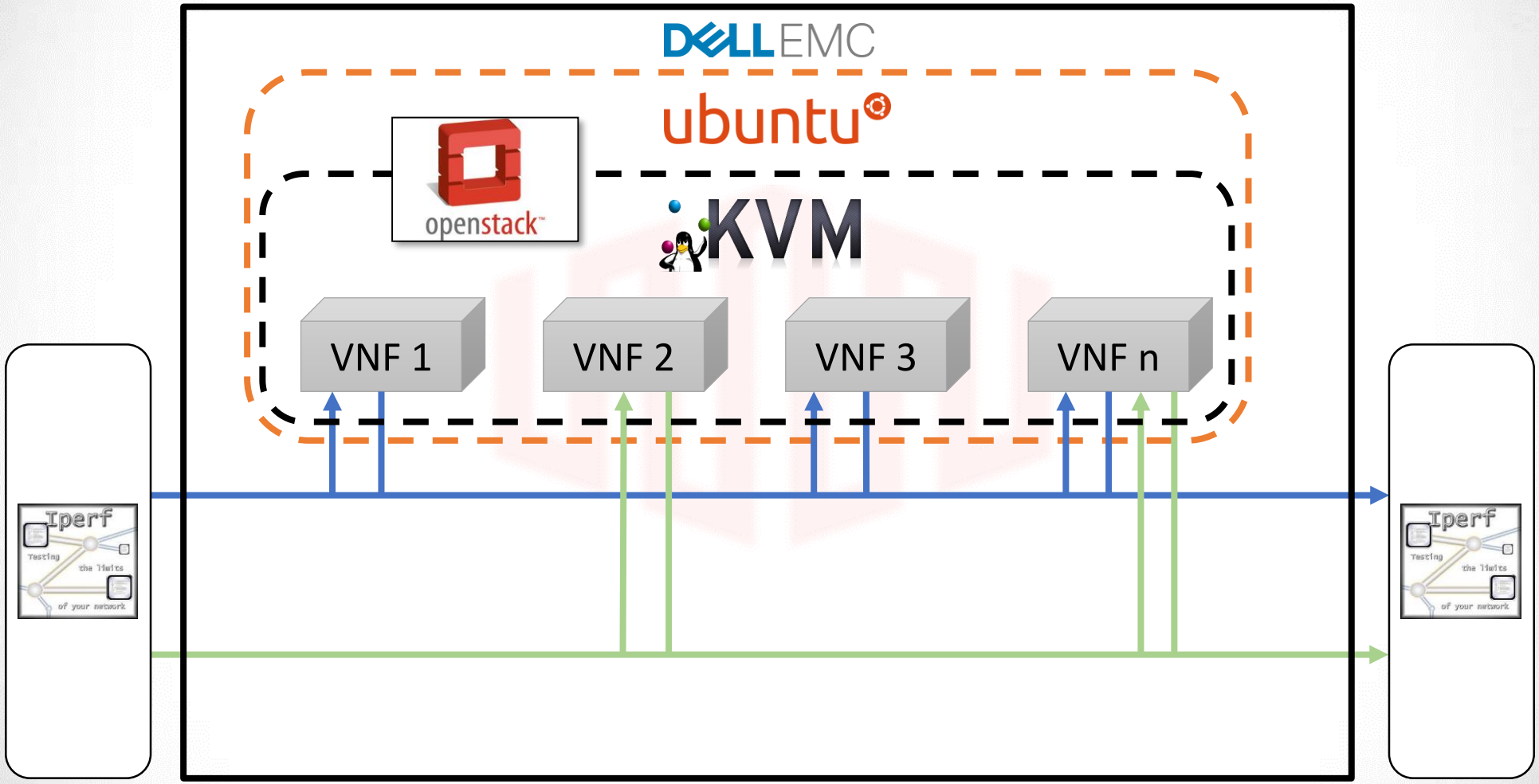
Design Solution

Functional Block Diagram

Overview of Service Chain implementation



Key Parameters



Critical Project Elements

Technical

- Service chain implementation using Virtual Network Functions (VNFs).
- Identify test cases and build a consistent test environment.
- Save test results in a database and analyze data for performance evaluation.

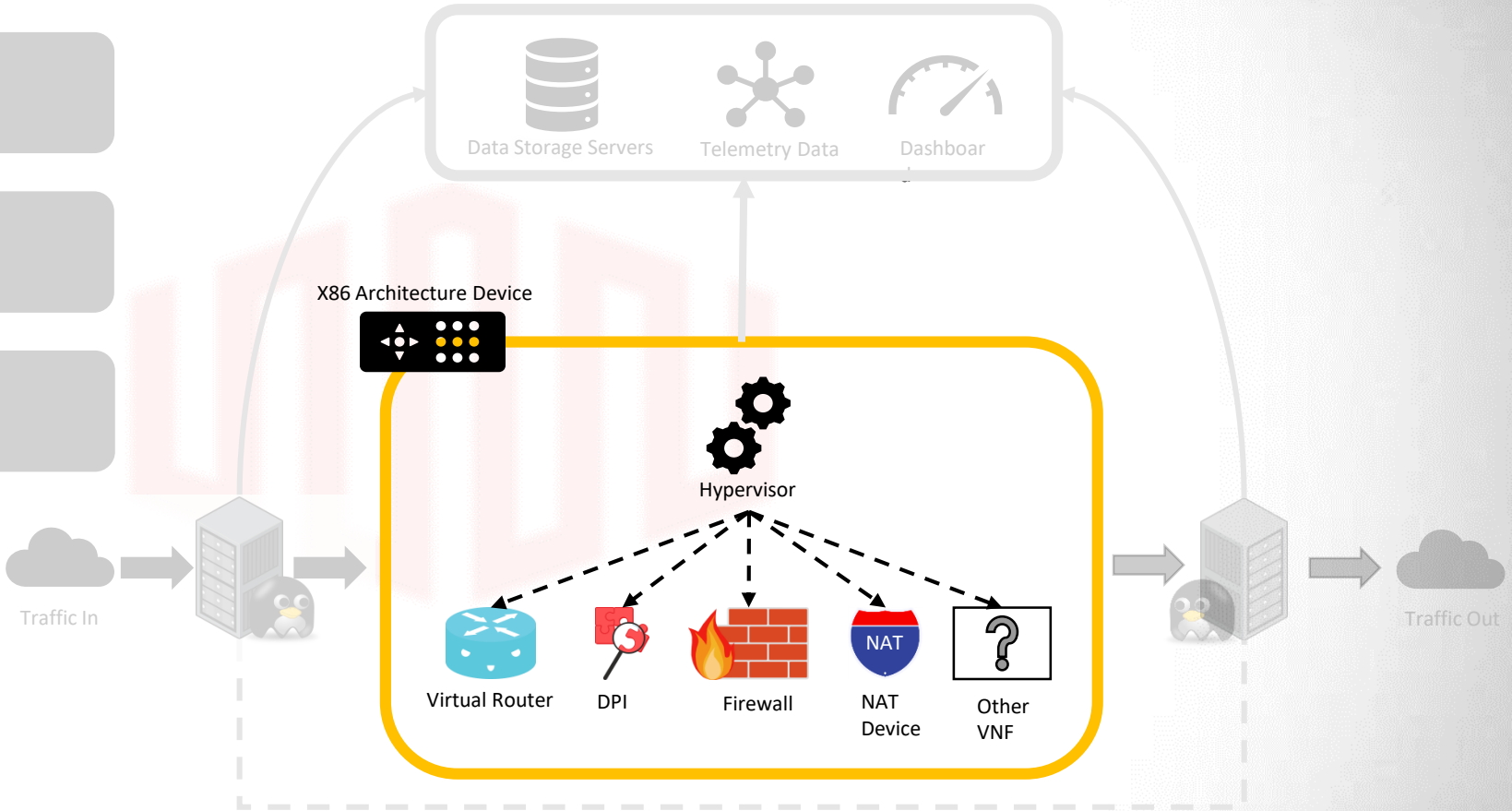
Logistical

- Acquiring VNF images, access to User Interface (UI) and APIs from Equinix
- Enhance knowledge of service chaining and familiarity with the testing tool

Design Requirements

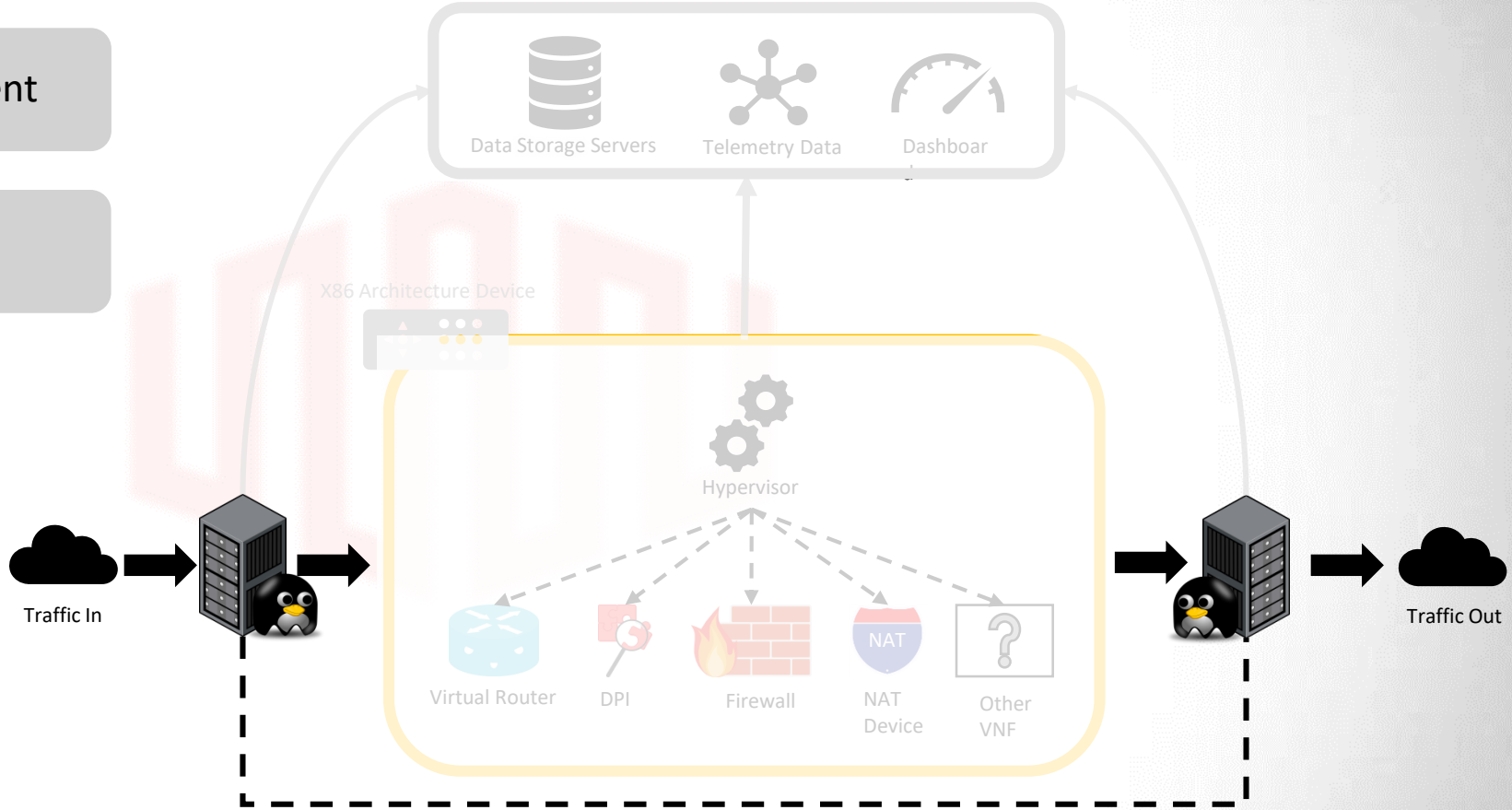
Service chain implementation

DES.1.1	• VNF Deployment
DES.1.2	• Use of OpenStack and KVM Hypervisor
DES.1.3	• x86 Architecture Device



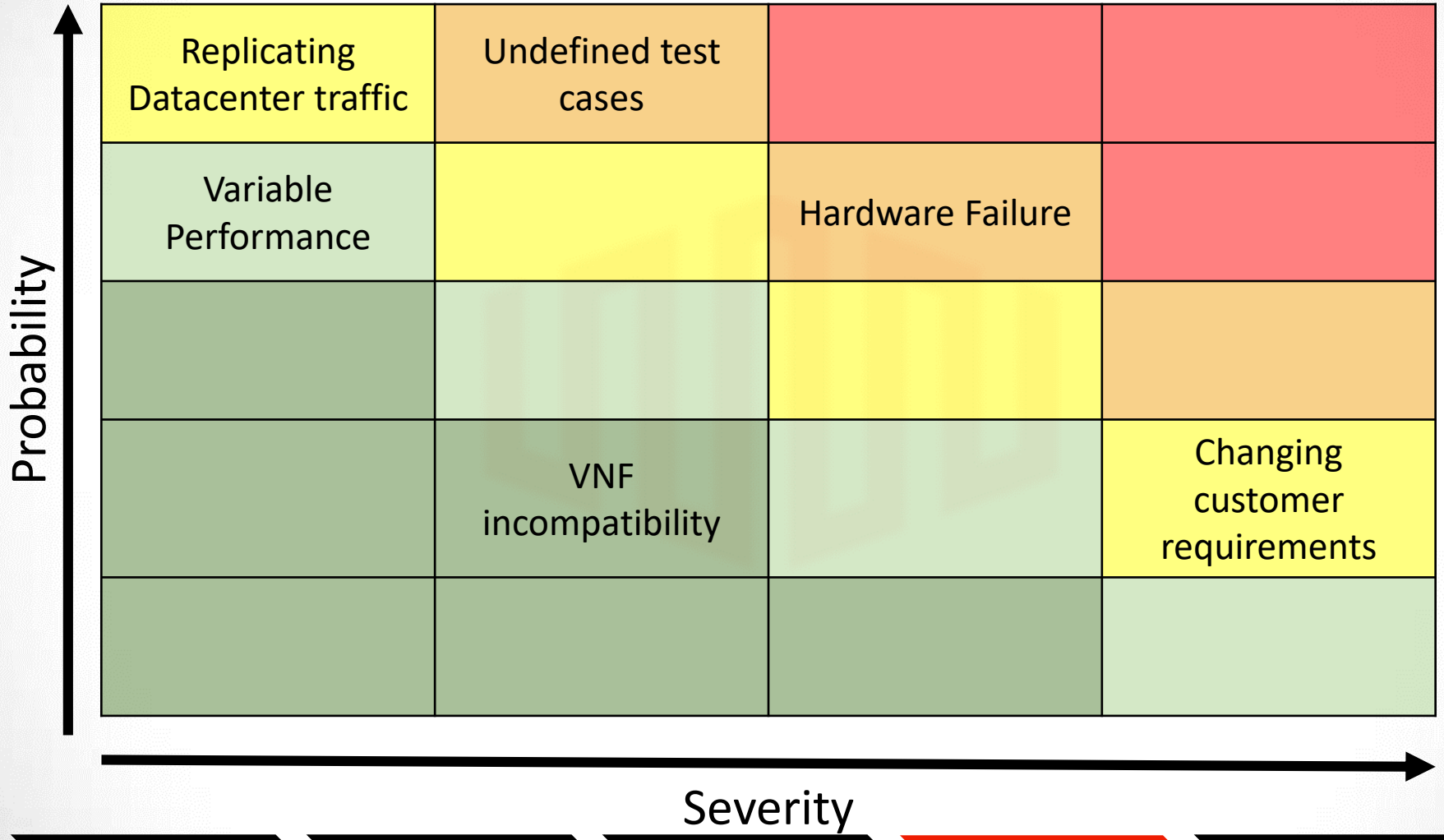
Service chain performance

DES.2.1	• Consistent test environment
DES.2.2	• Testing using traffic generator



Project Risks

Project Risks



Mitigation: Hardware Failure

Solution Purposed

- Backup server

Progress

- Acquired two identically provisioned servers
- OpenStack installed on both server on 32-bit Ubuntu 16.04.5 server OS

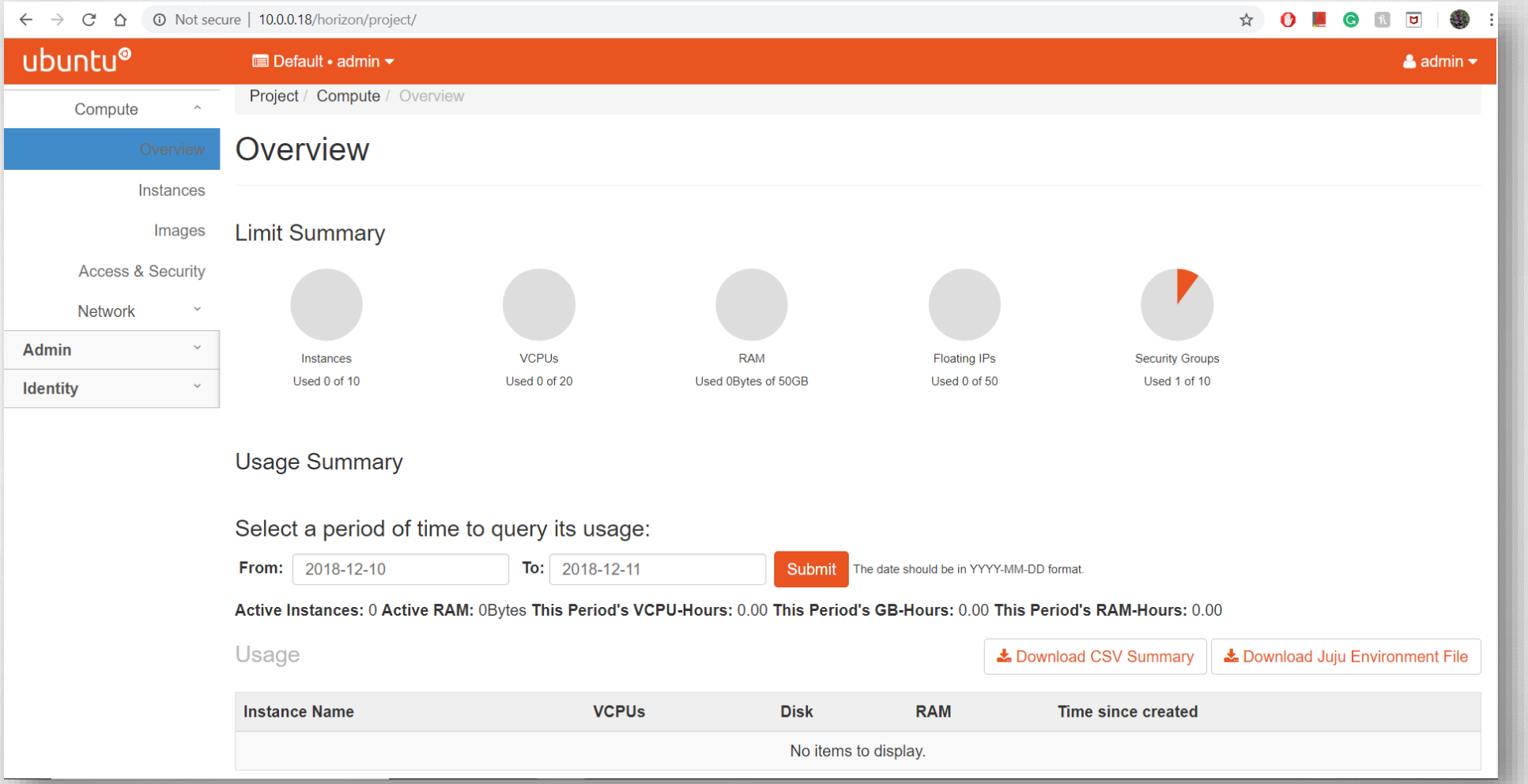
Future Work

- Run OpenStack on both servers in distributed fashion

POWEREDGE R430 DELL EMC

Feature	Specifications
Processor	Intel® Xeon® processor E5-2600 v4 product family
Memory	64GB
Storage	500GB SATA
Networking	4x1Gb Ethernet NIC's

OpenStack Dashboard



Mitigation: VNF Incompatibility

Solution Purposed

- Test Each VM individually before deployment.

Progress

- License key for the virtual images.
- Compatibility matches as per vendors specification and deployed systems.

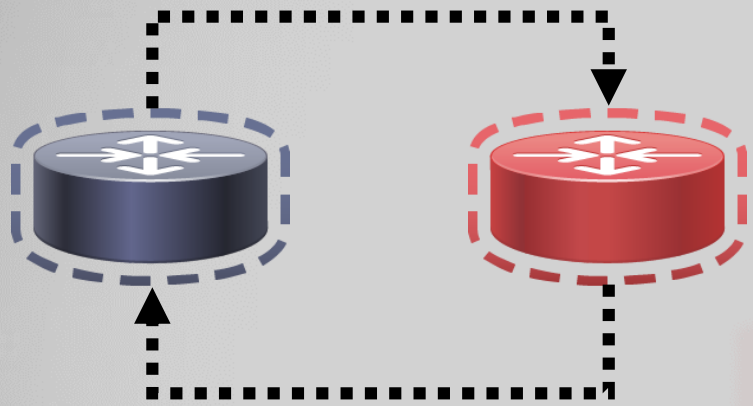
Future Work

- Need to deploy and check the virtual images.

Vendor	Product
Juniper	vSRX 1G
Juniper	vSRX 500M
Cisco	CSR

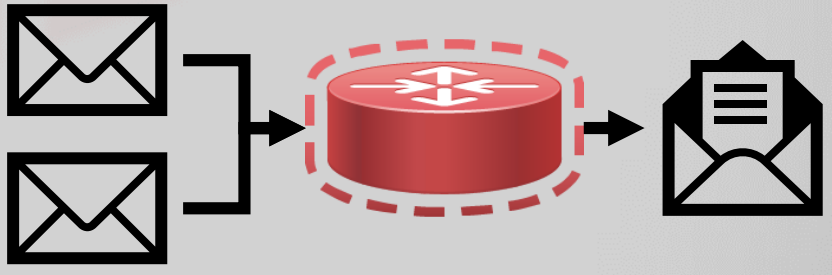
Verification and Validation

Service Chain

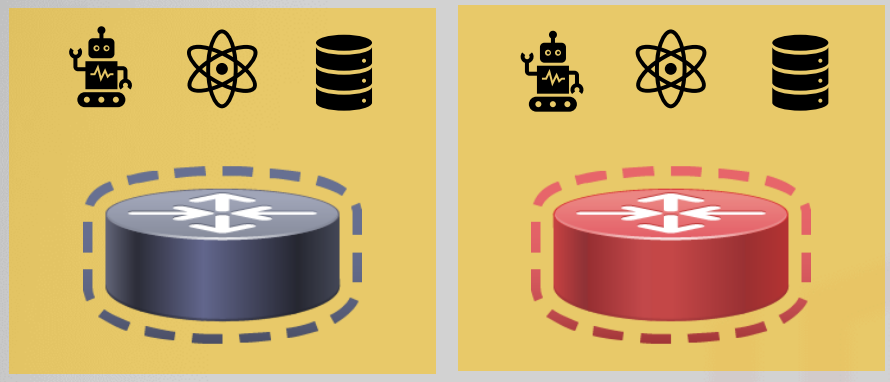


Check VNF’s are communicating with each other

Stress testing: to detect point of chain failure and threshold

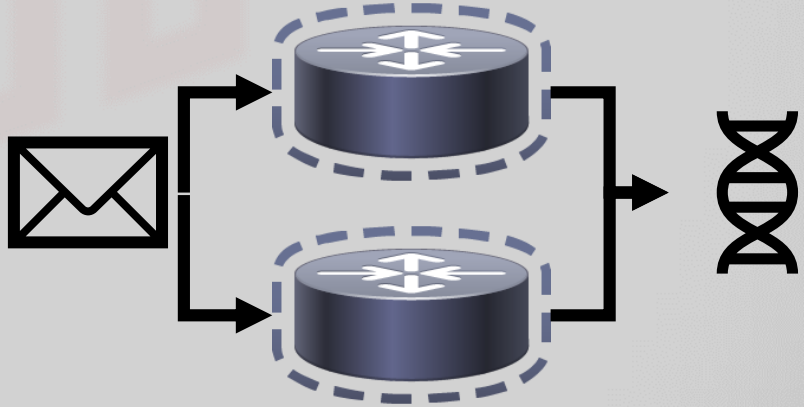


Testing



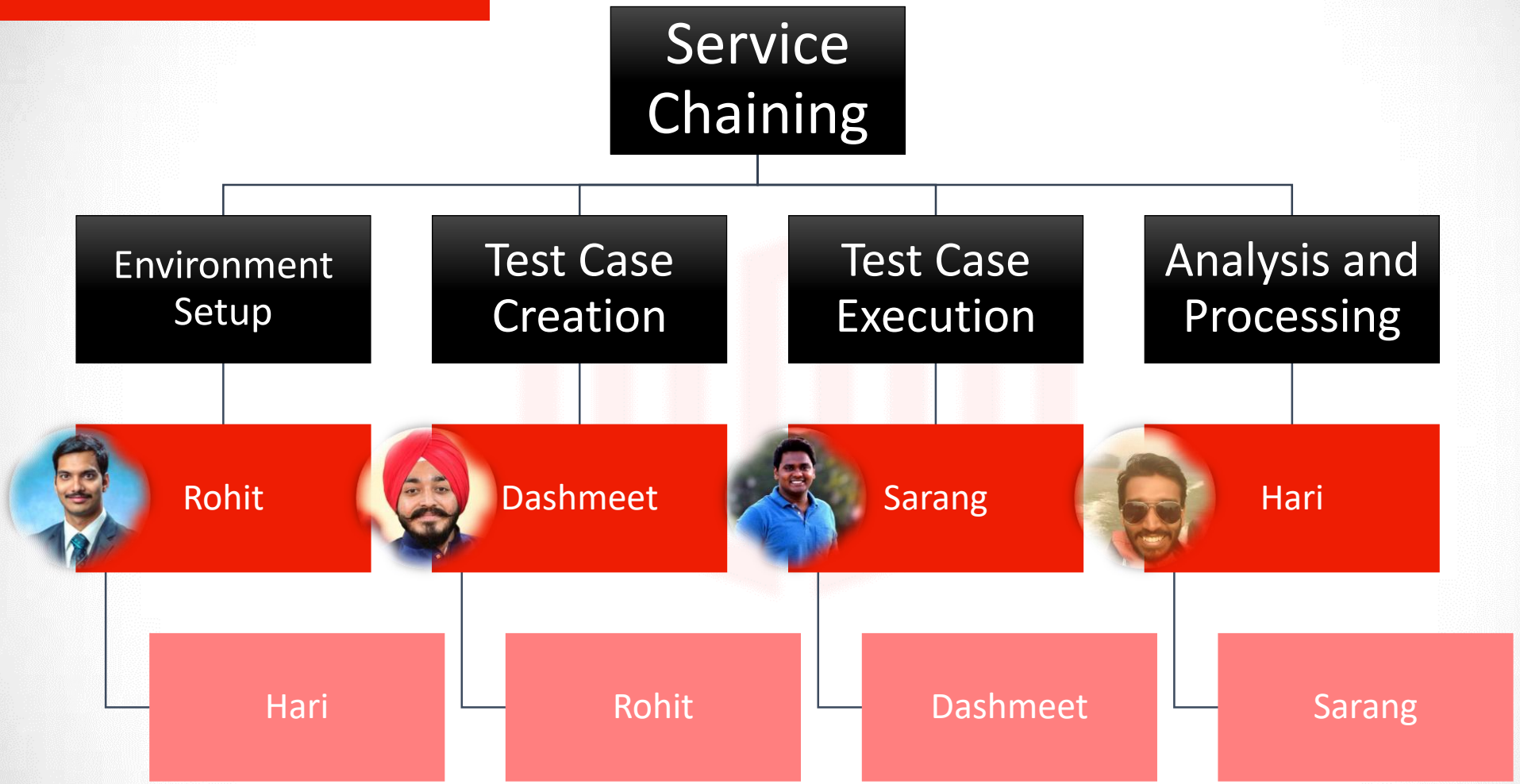
Verify consistent environment across test cases

Check if test cases are reproduceable with stable output

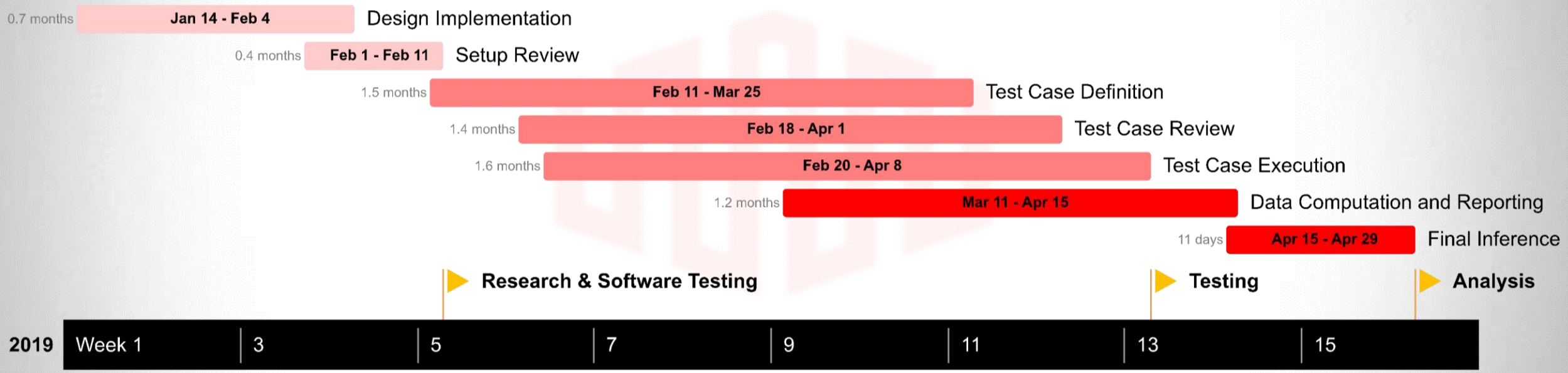


Project Planning

Organizational chart



Work Plan


0.7 months
Jan 14 - Feb 4
Design Implementation
0.4 months
Feb 1 - Feb 11
Setup Review
1.5 months
Feb 11 - Mar 25
Test Case Definition
1.4 months
Feb 18 - Apr 1
Test Case Review
1.6 months
Feb 20 - Apr 8
Test Case Execution
1.2 months
Mar 11 - Apr 15
Data Computation and Reporting
11 days
Apr 15 - Apr 29
Final Inference
Research & Software Testing
Testing
Analysis
2019
Week 1
3
5
7
9
11
13
15

FIN/ACK?

Baseline

Hypervisor

Open vs Commercial

Cost

Support

Compatibility

Performance

Industrial Application

Baseline

Hypervisor

Parameter	Weights	VMWare ESXi	KVM	XEN	Hyper-V
Open source	0.1	1	5	3	1
Cost	0.2	3	5	5	2
Industrial applications	0.15	4	4	2	3
Support	0.1	5	4	3	5
Compatibility with Operating Systems	0.2	5	3	3	3
Performance	0.25	5	5	3	4
Total	1	4.05	4.35	3.25	3.05

Baseline

Traffic Generator

Open vs Commercial

Cost

Support

Ease of Use

Performance

Industrial Application

Baseline

Traffic Generator

Parameter	Weights	Netperf	iPerf	Ixia	Spirent
Open source	0.1	5	5	1	1
Cost	0.2	5	5	1	1
Industrial applications	0.15	2	3	4	4
Support	0.1	5	5	4	4
Ease of use	0.2	4	4	2	3
Performance	0.25	3	4	5	5
Total	1	3.85	4.25	2.95	3.15

Baseline