



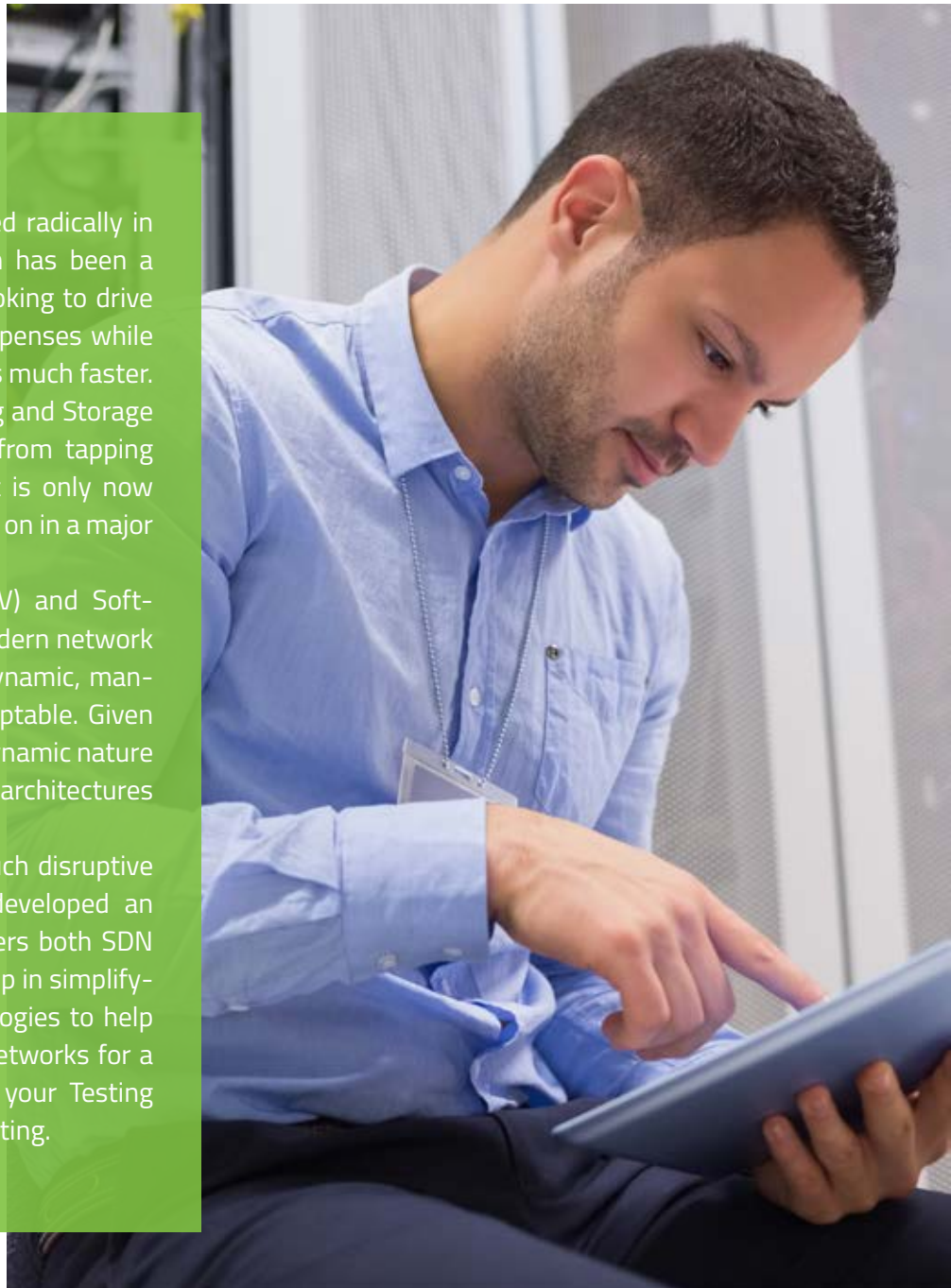
# ACHIEVE NETWORK TRANSFORMATION WITH **TEST ENGINEERING** THAT ENCOMPASSES **SDN-NFV VALIDATION AND AUTOMATION**

## Introduction

The technology landscape has evolved radically in the last few years and virtualization has been a Godsend to organizations that are looking to drive down their capital and operational expenses while being able to respond to market needs much faster. Interestingly though, while Computing and Storage have progressed leaps and bounds from tapping into the potential of Virtualization, it is only now that Networking seems to be catching on in a major way.

Network Function Virtualization (NFV) and Software-defined Networks (SDN) are modern network architectures that are meant to be dynamic, manageable, agile, cost effective and adaptable. Given the bandwidth-intensive, flexible and dynamic nature of today's applications these modern architectures are the need of the hour.

To tap into the benefits offered by such disruptive technologies, Happiest Minds has developed an integrated testing approach that covers both SDN and NFV. This is where our experts help in simplifying the complexities of these technologies to help you test & validate your virtualized networks for a successful rollout. Our aim – to be your Testing Partner of choice for SDN and NFV testing.





# WHAT WE DO

Happiest Minds Technologies has been working on creating test, validation and test automation frameworks and accelerators covering both SDN and NFV. We provide the complete Test cycle services from Test requirements to deployment and support. We offer services around the following Test areas:

NFV - verification and validation of the 3 main layers - NFVI, VNF& VNF-VNFM and NFVO/MANO and of the ETSI NFV reference Stack. The testing phases cover Test planning, Test Labs and scenario setup, Test Execution and Test Reports. The Test types covered are Dev-Test, Functional Test, System Test, Performance and customer use cases validation apart from First Office Application (FoA) support. SDN – verification & validation on both North Bound API /South Bound API Testing, SDN Controller functional test, SD WAN Testing, SDN to NFV integration through OpenStack, Orchestration functionality testing, Yang Model, NetConf via Rest API Testing



## Happiest Minds – An overview of Network Test Offerings

### Technology Areas

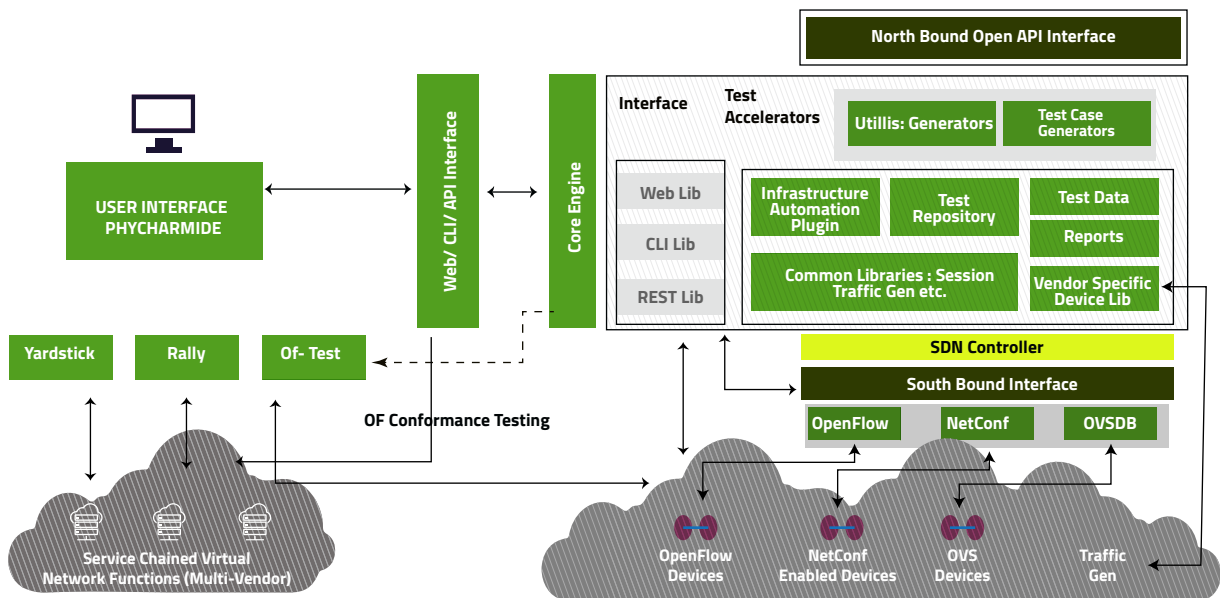
- Access
- Edge & Core Devices
- Enterprise/Switch
- Network Application
- SDN/ NFV

### Services

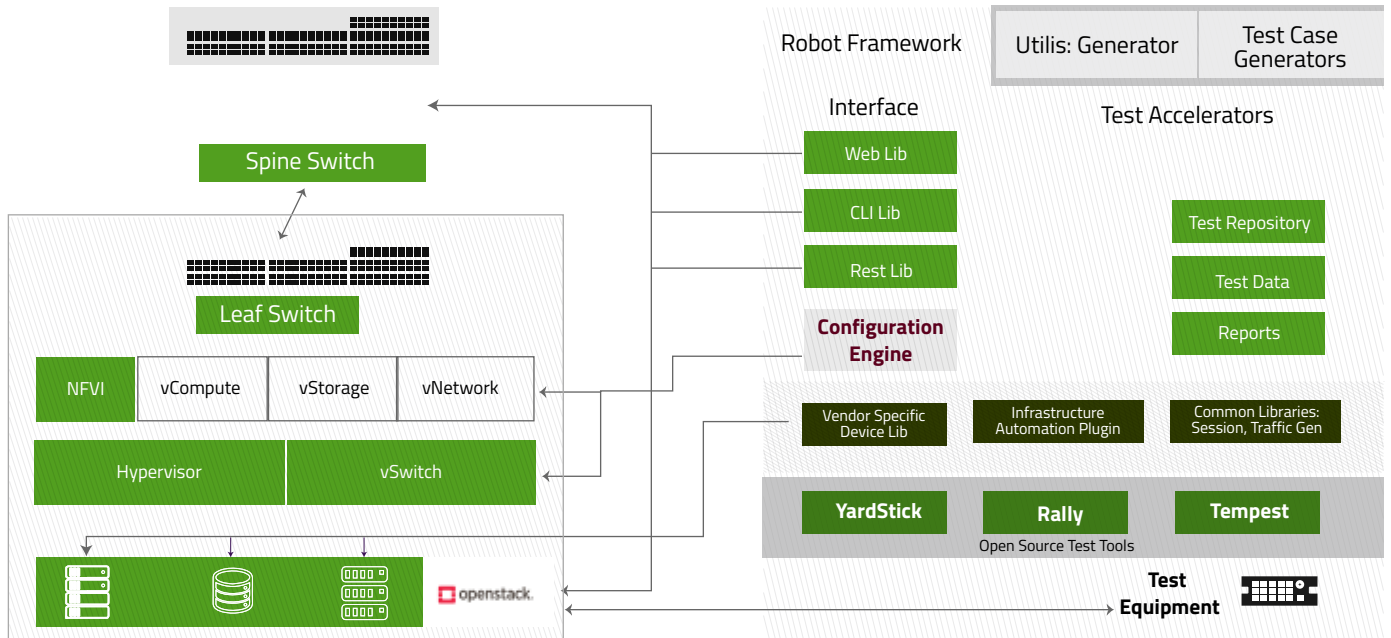
- Protocol/Interface**
  - Conformance & functional testing
- Systems**
  - SIT, Functional, Regression, Performance, Stability, Endurance, Load
- Network Element & Devices**
  - Load bring up, Sanity, Functional/ Non Functional, Testing using simulators, T&M equipment
- Test Automation**
  - Framework development, Test Scripting, Maintenance Bug fixing
- Test Lab Setup**
  - Test scenarios creation, Pre-certification, Type Approval
- Interoperability, Field & E2E**
  - Multi- vendor, Benchmarking Design use-cases, MOP's FOA Support, Operator tests

## Test Accelerators and reference frameworks

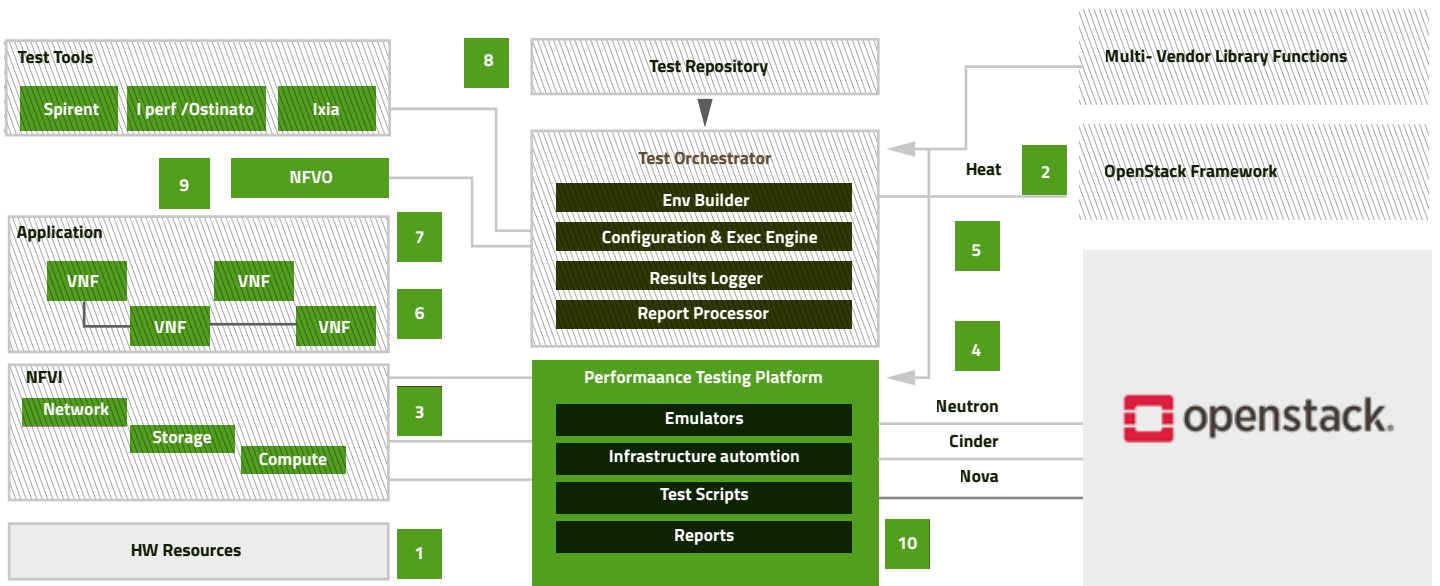
### SDN Test Framework



# NFVI Platform Testing



## E2E VNF Pre-certification





## Success Stories

We have helped several Tier 1/Tier 2 Technology vendors, Service Providers, Web Scale & Enterprise Companies. Some of our recent projects include:

- Product validation, Testing and Test Automation on RHOSP and carrier grade VNF for a global networking equipment provider.
- OpenFlow and SDN test case & script development and automation framework maintenance for a global network equipment provider.
- Test Automation framework enhancement for SDN Controller (ODL) functionality integrated with OpenStack via a Neutron API for a networking vendor.
- Validation & verification for a SD-WAN product for a North American Service provider.
- Test Automation framework development of a CEM application for a network equipment provider.
- Testing, Validation and Test Automation for a Networking Big Data Platform for a Network Equipment Provider based in North America.
- Testing and automation for an NFVI platform covering server, compute and storage using a testing BDD python framework.
- NFVI Functional Testing and VNF pre-certification covering vFirewall and vLoad Balancer for a hi-tech OEM compliant with ETSI NFV ISG standards.
- Test Automation Framework development of an NMS application for a Packet Analyzer product.
- Testing for a Cloud Based UTM device for home and SMBs

## Leveraging Disruptive Technologies

Intent Based Networking	Network automation and Orchestration based on User Intent and policies
Orchestration	Network and Mobile Service orchestration and automation
Block chain	Network Services orchestration using Blockchain ledgers and transaction id
Multi Access Edge computing (MEC)	Cloud based compute and storage resources at the edge of the Network

## About Happiest Minds Technologies

Happiest Minds enables digital transformation for enterprises and technology providers by delivering seamless customer experience, business efficiency and actionable insights through an integrated set of disruptive technologies: big data analytics, internet of things, mobility, cloud, security, unified communications, SDN-NFV, etc. Happiest Minds offers domain-centric solutions applying skills, IPs and functional expertise in IT services, product engineering, infrastructure management and security. These services have applicability across industry sectors such as retail, consumer packaged goods, e-commerce, banking, insurance, hi-tech, engineering R&D, manufacturing, automotive and travel/transportation/hospitality. Headquartered in Bangalore, India; Happiest Minds has operations in the US, UK, The Netherlands, Australia and Middle East.

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