

Connecting a Smarter Future



Realizing IoT

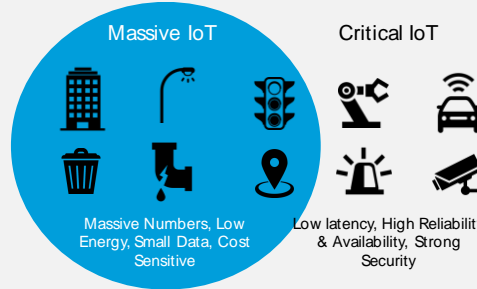
Spirent Communications

Ashish Kapur

IoT is driving changes in our Networks & challenges for our Developer communities



Accelerating NFV/SDN & 5G



The requirement to support Massive & Critical IoT



Power and Processing



New Developer Requirements



Security & Privacy Concerns



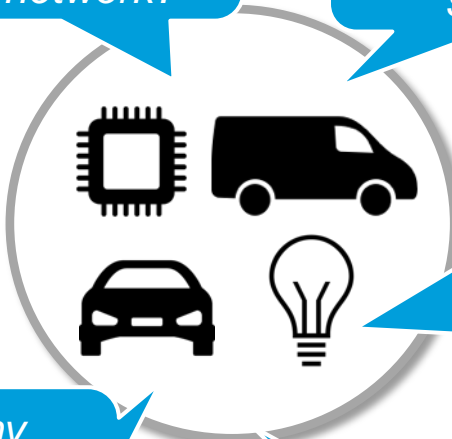
The need to manage QoS & SLA's

The IoT Anxiety Chasm

Developer

How can I quickly & cost effectively get on the network?

Will I connect in every country I ship to?



Will the network provide the QoS I require?

Will my connectivity work reliably?

Do I need to handle security?

Network Provider

What type of device is it?

What traffic pattern does it produce?



What QoS does it require?

Is it safe to go on my network?

How does it impact my traditional services?

Spirent IoT Lifecycle Assurance



Lab (Pre-Production)

On-Board

Production

Device Acceptance



Network Validation




Service Testing




Operational Assurance





 Network Emulation


 Safe for Launch Testing

 Battery life-time Validation


 Security Auditing

 Device Emulation

 Network & Nodal Emulation


 Network Validation (performance, quality, scaling)


 Security Auditing

 Security against any attacks

 Automated Nodal Turn-up Validation

 Active Testing

 Actionable Analytics


 SLA Assurance

 Proactive Network & Service Assurance

Cellular IoT Device Acceptance Testing

Safe for Launch Testing

- Spirent Elevate - Compact instrument for multiple radio access technology EMULATION & device TESTING
- Test Cases (Automated Tests) i.e.
 - Carrier Selection (with the correct carrier)
 - System Acquisition (RAN, Core, IMS)
 - Battery Performance
 - Audio/Video Quality
 - Data Throughput/Retry
 - Device Aggression (Behavior when/after)
 - SMS Service
 - Device Administration (OTA)
 - Inter-operability



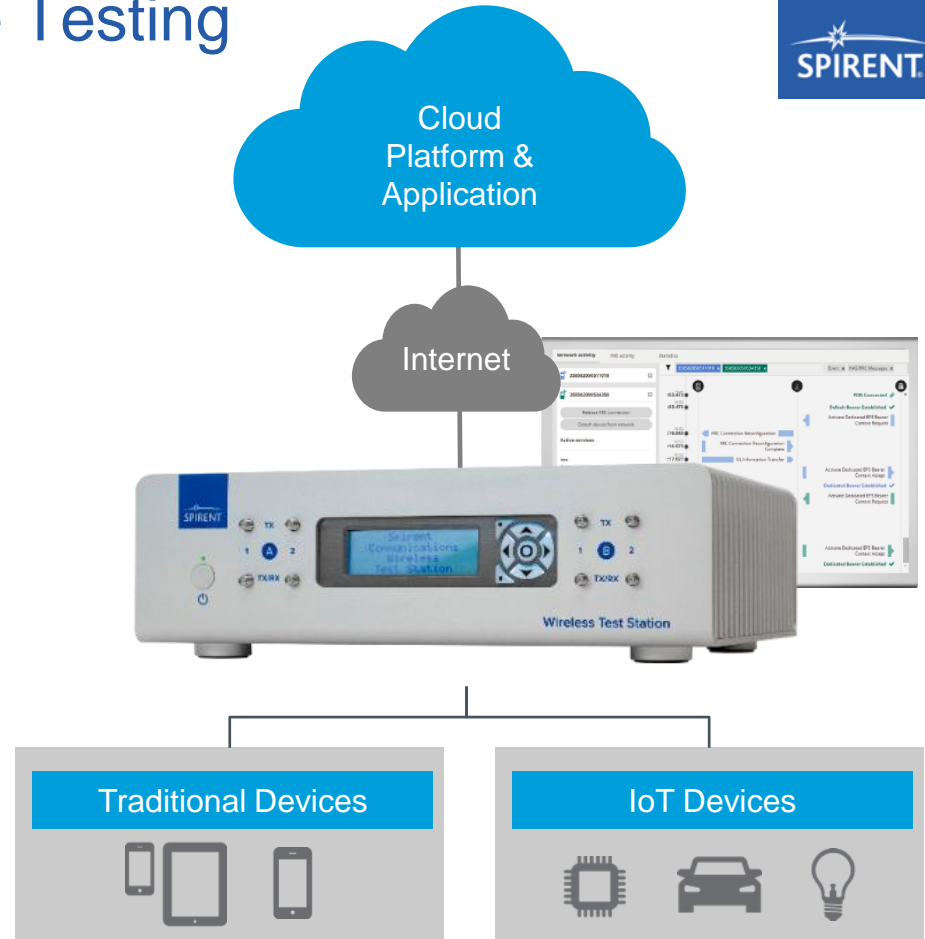
Making IoT Devices **SAFE FOR LAUNCH** –
focused test cases to get IoT devices efficiently
validated



Cellular IoT Device Acceptance Testing

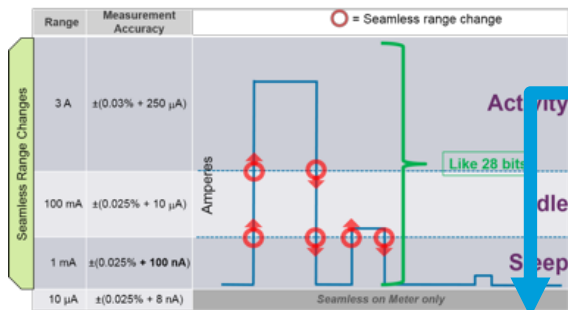
Spirent Elevate®

- Compact instrument for multiple radio access technology EMULATION & device TESTING
- 2 collocated individually configurable cells
- Network modes: LTE-FDD, LTE-TDD, UMTS (3G),NB-IoT
 - LTE frequency range: 400MHz - 6GHz
- Wi-Fi modes: 802.11a/b/g/n/ac
 - Wifi frequency bands: 2.4GHz, 5GHz
- Configurable Network emulation including IMS modeling
- Simulation of realistic network scenarios via built-in bi-directional IP network impairments



Cellular IoT Battery Efficiency Testing

Spirent Elevate®



Emulation & Execution

IoT Devices Under Test



Assessments in:



- Good Coverage
- Bad Coverage
- Marginal Coverage
- Intermittent Coverage

Profiles including:

- Deep sleep
- Active transmit
- Listening window
- Firmware updates
- Under Cybersecurity attack

Accurately determine expected battery life in real-world conditions using actual usage profiles

IoT Security Services

Spirent SecurityLabs®

- **Compliance Level Scans**

- i.e. OWASP top 10

- **Vulnerability Scans**

- i.e. Passwords

- **Penetration Testing**

- IoT Devices
- Applications
- Networks

- **Protocol Fuzzing**

- **Volume & Mutation testing**



Results:

- ✓ Identified vulnerabilities
- ✓ Risk prioritization
- ✓ Remediation recommendations

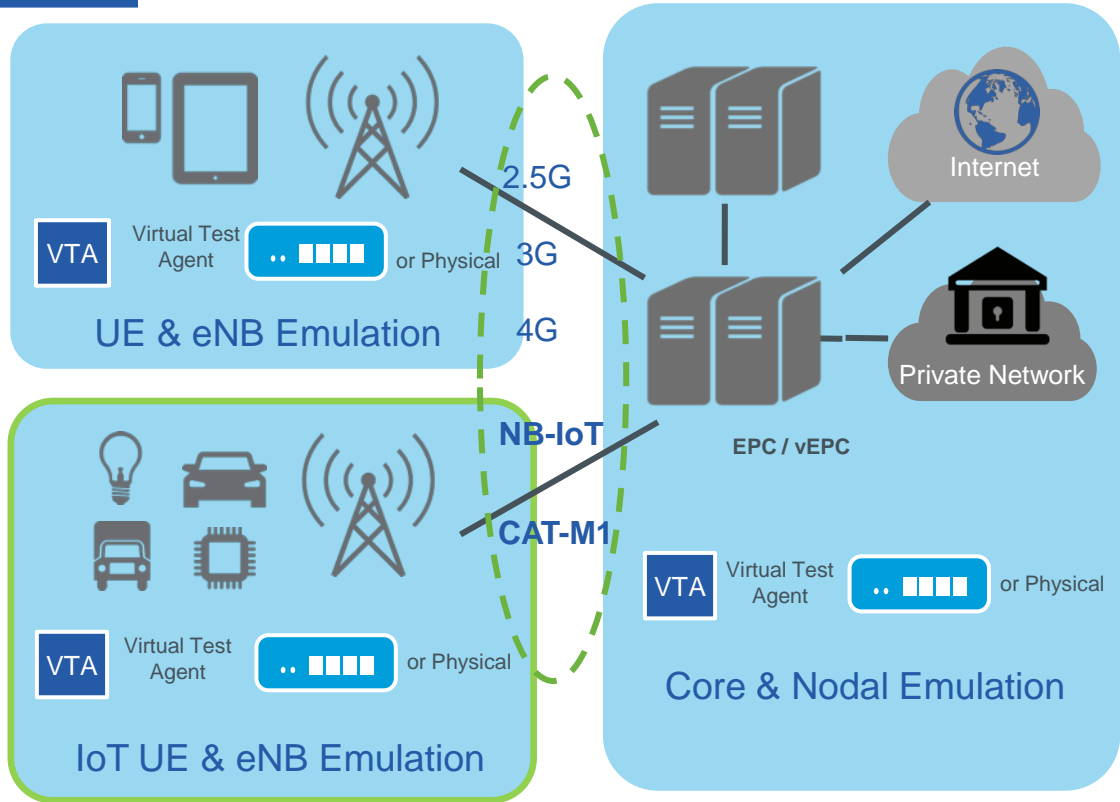


IoT Devices | Apps | Networks

Network Validation Testing

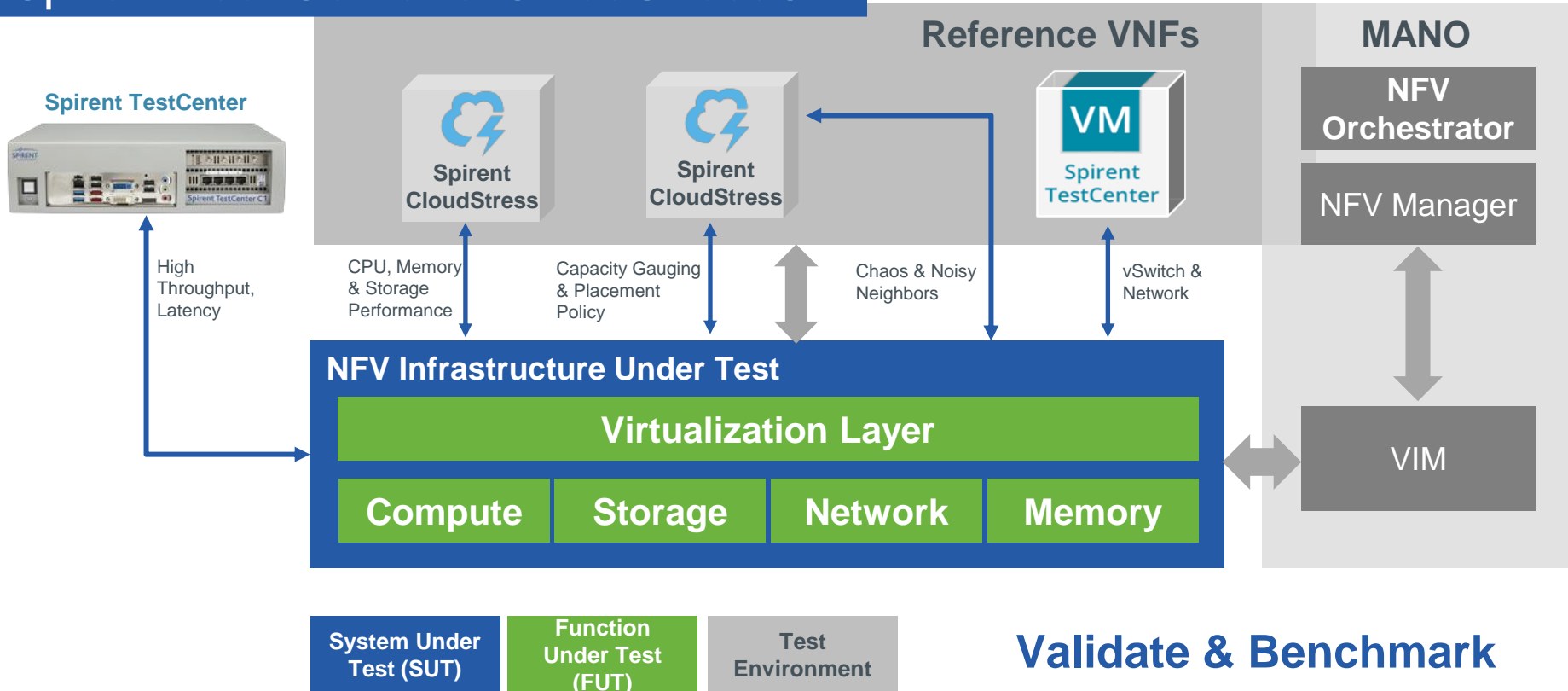
Spirent Landslide®

- Emulates 2G/3G/LTE/NB-IoT mobile core networks
 - Full network emulation or Nodal elements (i.e. eNB, MME, SGW, PGW, HSS, AAA, PCRF, IMS, OFS, OCS, CFG, EIR, PGW, DRA)
 - NB-IoT & CAT-M Support
- RAN & UE Emulation
 - Millions of emulated Traditional & IoT Devices & Traffic Mixes
- Systems Under Test:
 - Nodal validation, End to End Validation & Service Validation



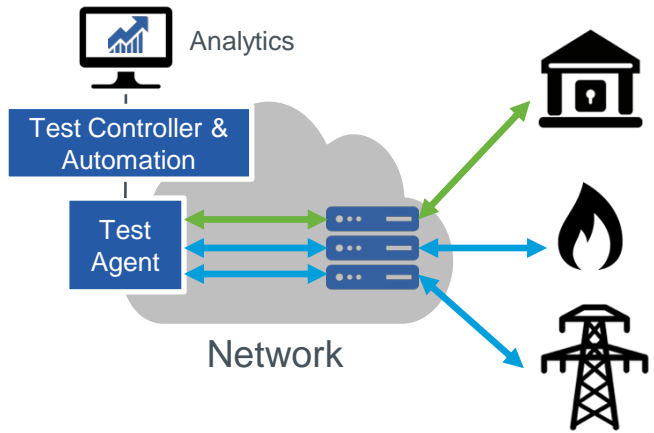
Cloud & NFV Infrastructure Validation Testing

Spirent Test Center & CloudStress®



Operational Assurance

Spirent Lifecycle Service Assurance



*Proactively assure service & SLAs through
Active Testing & Actionable Analytics*


Reduce SLA penalties & OPEX



Proactive approach using emulated traffic & analytics to continuously verify performance & quality



Troubleshoot problems before they impact your customers



Increase agility and reduce operational costs through extreme automation

Spirent Internet Of Things Solutions



- 1** **Simplifying** IoT adoption through simple & cost effective test & verification
- 2** **Assuring** IoT through proactive service assurance
- 3** **Securing** IoT through real world security testing & ethical hacking services

Your IoT Realized

Your IoT Realized