

Smart and Secured Infrastructure

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IoT Use Cases

Smart Cities



**Connected
Vehicles / V2X / ITS**



**Industrial Internet /
IIoT / Industry 4.0**



**Enterprise IoT /
Smart Buildings**





Technical Challenges

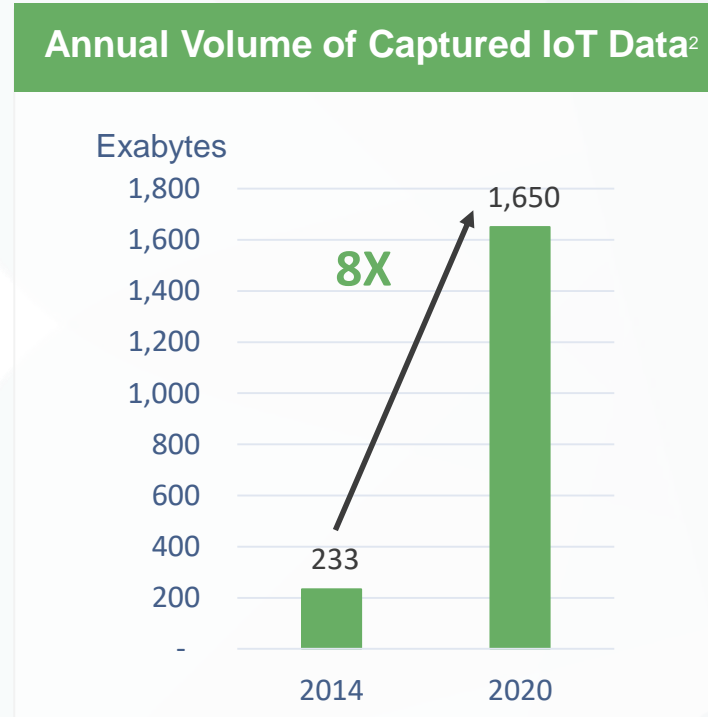
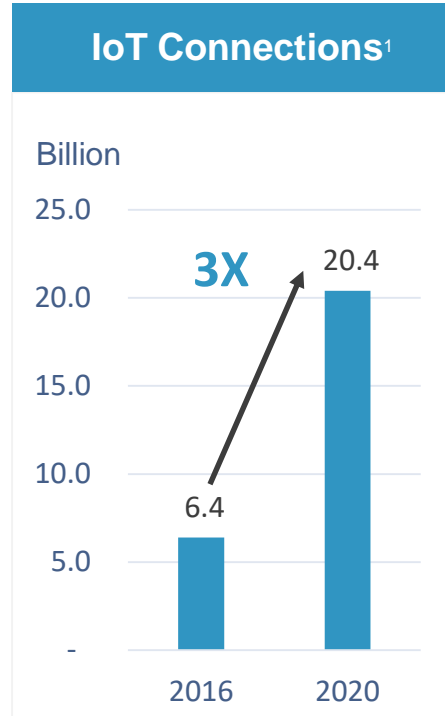
- What are the current and future technical challenges of implementing IoT?
- How to unlock the value of IoT and address the challenges?

Juniper Solution

- What can Juniper help as you aspire to capture more value from the IoT?
- What does our IoT solution framework look like? And technology building blocks?

Everything Related to IoT is Expected to Grow Exponentially

Number of Connections, Data Volume Generated

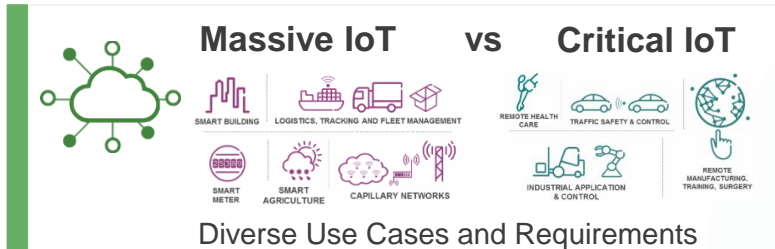


^{1,3} Forecast: Internet of Things — Endpoints and Associated Services, Worldwide, Gartner, December 2016

² IoT Analytics Today and in 2020, ABI Research

IoT Challenges – Infrastructure

Aspire to new models, is your current infrastructure agile and flexible



Require...



Meaning...

- Ability to launch quickly to capture the growth at the right timing
- Ability to spin up, spin down, and easily repurpose to pivot when needed



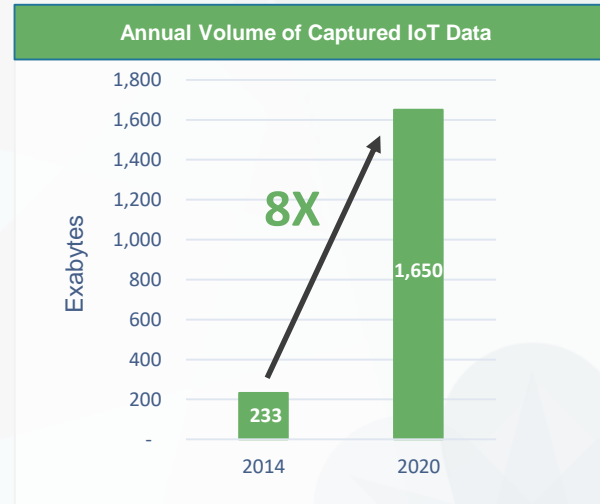
- Ability to serve various use cases with different requirements (latency, availability, security, cost, power consumption)
- Support centralized, distributed and hybrid deployment model


IoT Challenges – Infrastructure


Where will you place compute and storage resources? Centralized? Distributed? Or Hybrid?





Where will customer prefer processing these IoT data and running applications? All sending to the remote centralized cloud?



- 

The real business value of IoT is not about the “**Things**”, but about the **Data**
- 

It’s about deriving meaningful **insight** from the **data** and then take actions
- 

It’s about leveraging the insight to improve either **products** or **processes**
- 

Transform **business models**, new revenue, customer experience, **efficiency**, cost saving, safety, citizen’s **quality of life**

IoT Challenges – Connectivity

How will you differentiate your connectivity services for IoT use cases



Want to Have Better Experience: Anytime, Anywhere, On Their Own Terms



For Critical IoT Use Cases, such as Industrial, they Need Deterministic and Secure Connectivity



For Massive IoT Use Cases, such as Smart Cities, they Need Low Cost Low Power Connectivity

- How will you meet your customers expectations?
- How will you serve these diverse IoT use cases and requirements?
- How will you serve them cost efficiently? Different dedicated networks for each? Or? How will you accomplish?

To accomplish these goals, you need **SDN/NFV** for **Programmable APIs, Self-Service Portal, Virtualized Network Slicing and Traffic Optimization**

Rise of Edge Computing and Edge Analytics

Definition

Push data processing and analytics **closer to end devices** versus to centralized remote cloud.
Possible Locations: customer premise, cell site, central office, aggregation site, local / metro DC, etc.

Benefits



Real-time Analytics with **Lower Latency**



Reduced Cloud Data Storage **Costs**



Improved Availability of Applications and IT Assets



Conserve Network Bandwidth and Lower Transport Cost



Strengthen Security and Compliance



IDC predicted that **43% of the data** created by IoT devices worldwide will be stored, processed, analyzed, and acted on at the edge (instead of in the cloud or a remote data center) by 2019 (*Cloud 2.0: New Services, Challenges, and Opportunities, IDC, February 2017*)

Verticals



Manufacturing



Smart Cities



Energy



Agriculture



Utilities



Healthcare



Connected Vehicles



Retail

IoT Challenges - Security

What have happened and What will happen very soon

IoT Security Headlines



- About **100,000** Mirai IoT botnet launched DDoS attack with a throughput of **1.2 Tbps** to a major DNS service provider Dyn, causing **>2 hours** outage, especially for the East Coast, for many major web service providers such as Twitter, Spotify and Github
- Chrysler announced a recall for **1.4 million** vehicles after hackers demonstrated that they could remotely hijack a Jeep's digital systems over the Internet
- In the past 3 years, AT&T has seen a **3,198%** increase in attackers scanning for vulnerabilities in IoT devices

IoT Security Predictions



- Hackers will continue to exploit IoT device vulnerabilities to use them to launch more DDoS attacks. The Dyn case is **just the beginning** of long-term more massive nightmare.
- The IoT attack surface will transcend the Digital-Physical divide. IoT breaches will bring **physical damages** and even threaten people's **life safety**.
- Most IoT endpoint devices simply don't have enough footprint to run security functions. **The role of network will become increasingly critical** in mitigating IoT threat and protecting your infrastructure and your users.

IoT Challenges - Operations

With 10x~100x more connected, how will you address management complexity, ensure service assurance and operational efficiency?

Millions to billions of IoT devices will be added to your already complex network today



How much incremental budget will you have for adding new headcount for Ops?



How will you and your Ops team deal with all of these upcoming challenges?

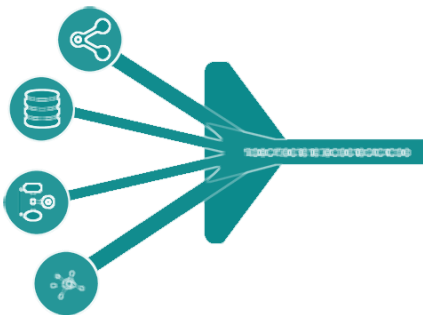


You need to **transform** the way you **operate** your infrastructure and services. **Automate whatever you can.** This is the only way to cope with the operations challenges.

IoT Challenges – Intelligence

How will you collect data from your infrastructure, How will you analyze them and apply them for actions?

Data Collection



Analytics & Visualization




Machine Learning & AI



You'd need **telemetry** for data collection, **analytics engine** to effectively process data and **dashboard** for visualization, and **machine learning & AI** for continuous improvement

Juniper IoT Solution Architecture

LEARN  JUNOS Telemetry Interface AppFormix Self-Driving Networks

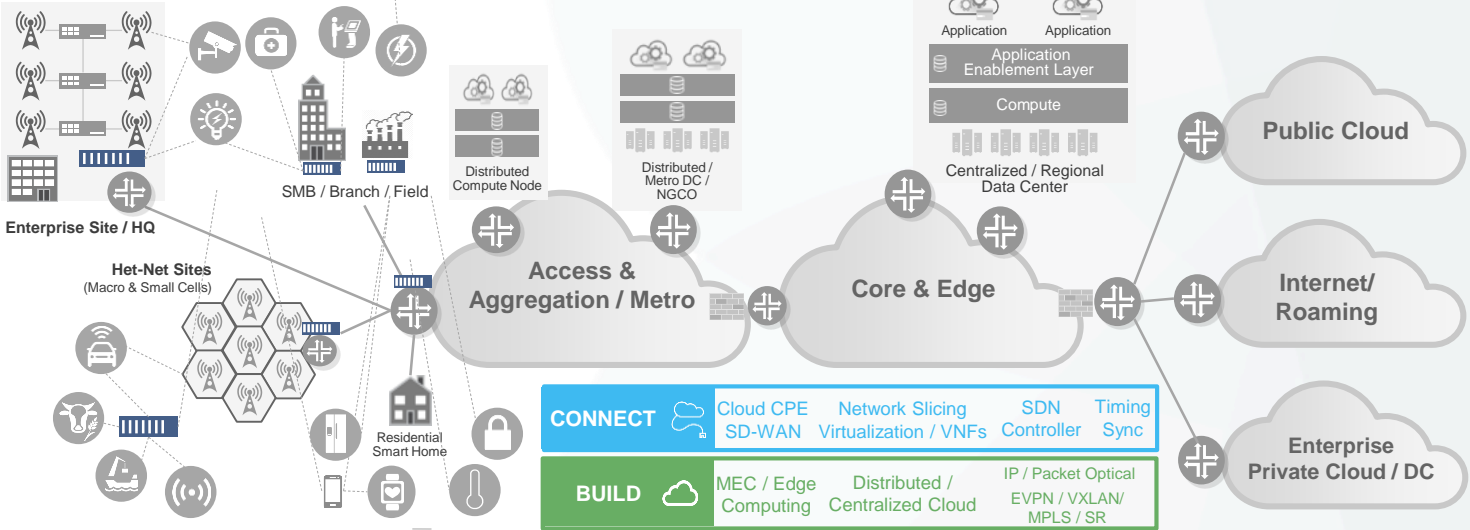
SECURE 


Cloud-based Security Services + SDSN


Detection:
Sky ATP + Spotlight Secure + 3rd Party Threat Intelligence

Policy:
Security Director + Policy Enforcer

Enforcement:
(v/c)SRX + (v)MX + EX + QFX + 3rd Party Elements



CONNECT  Cloud CPE SD-WAN Network Slicing Virtualization / VNFs SDN Controller Timing Sync

BUILD  MEC / Edge Computing Distributed / Centralized Cloud IP / Packet Optical EVPN / VXLAN/ MPLS / SR

AUTOMATE 

Infrastructure Automation + Programmability

JUNOS Automation Framework

Contrail Cloud Automation

Contrail Service Orchestration

Juniper's IoT Solutions Value Propositions

We help you **BUILD, CONNECT, SECURE, AUTOMATE, LEARN** with our products, services and partners ecosystems

BUILD



Building Flexible Cloud Infrastructure to Enable New Business Models

CONNECT



Connecting Things to the Cloud Securely, with Proven SDN/NFV and Timing & Sync, for dynamic, secure and deterministic customer experience

SECURE



Securing Things and Users with Intelligent Cloud-based Security Services and Protecting Your Own Assets with Software-Defined Secure Networks

AUTOMATE



Automating How You Operate Infrastructure to Improve Operational Efficiency, Transform Economics and Grow Profitability

LEARN



Learning Your Infrastructure, Your Processes, Your Customers and Turning into Actionable Intelligence for Better Customer Experience and Efficiency

Thank you