# M2M CHALLENGES IN A CLOUD ENVIRONMENT

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# MOBILE CLOUD
## THE NEXT BIG OPPORTUNITY

Mobility, Cloud and M2M are key drivers creating a major industry cycle evolution

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# MARKET TREND IMPACT ON BUSINESS DECISIONS

**Mobility Explosion Continues**

- Providers enhance cloud offers requiring expansion of network services and capabilities

**Enterprise Services**

- Become applications within and on the network

**Insatiable Traffic Growth**

- Video content requires enhanced network architectures to best optimize use of network resources to provide a quality user experience
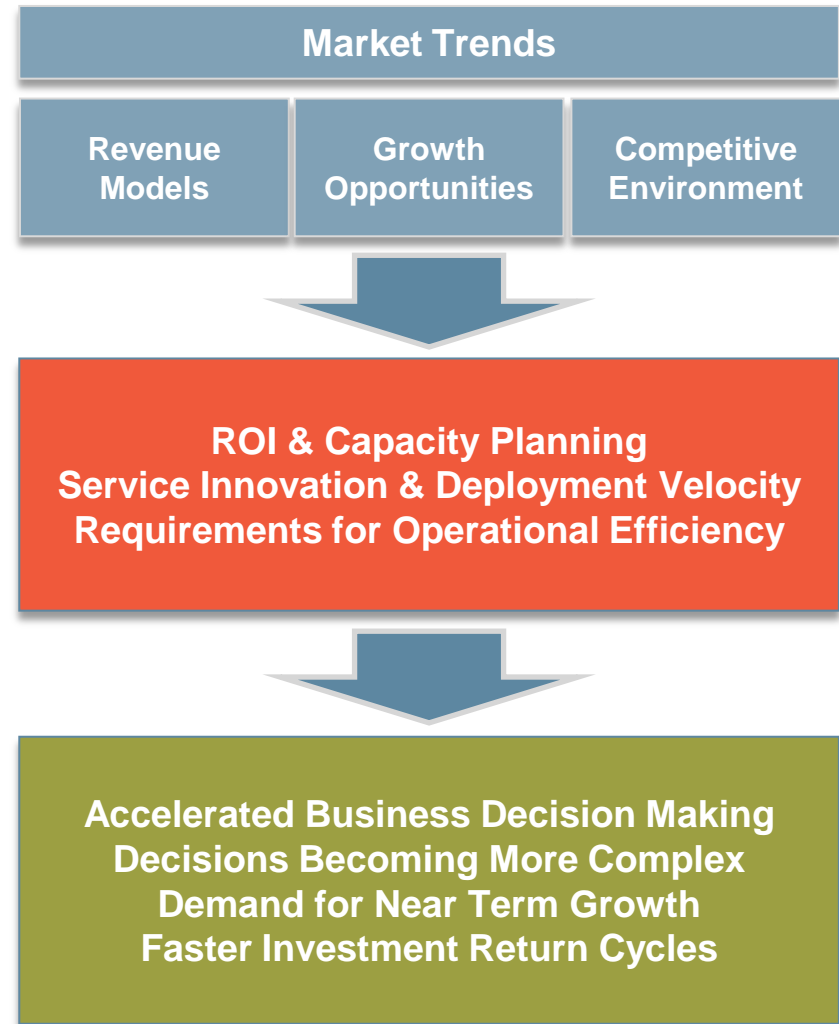
**Application Service Management**

- Application services running in cloud or on client device require new infrastructure to manage identity, presence, subscriber awareness and security
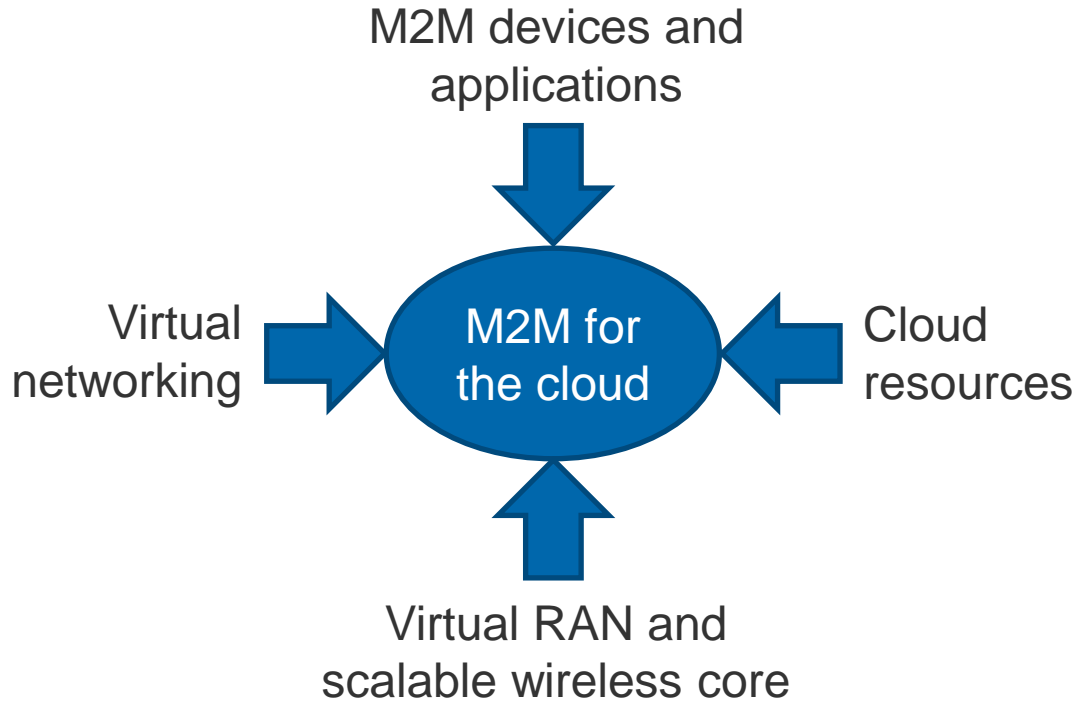
**Transaction Based Services**

- Introduce requirements for more granular accounting and business models

**Rise of M2M**

- Low bit rates with high transaction rates will place an increased burden on networks

**Market Trends**

| Revenue Models | Growth Opportunities | Competitive Environment |
| --- | --- | --- |

**ROI & Capacity Planning
Service Innovation & Deployment Velocity
Requirements for Operational Efficiency**

**Accelerated Business Decision Making
Decisions Becoming More Complex
Demand for Near Term Growth
Faster Investment Return Cycles**

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# SETTING THE STAGE

M2M devices and
applications

Virtual
networking → **M2M for the cloud** ← Cloud
resources

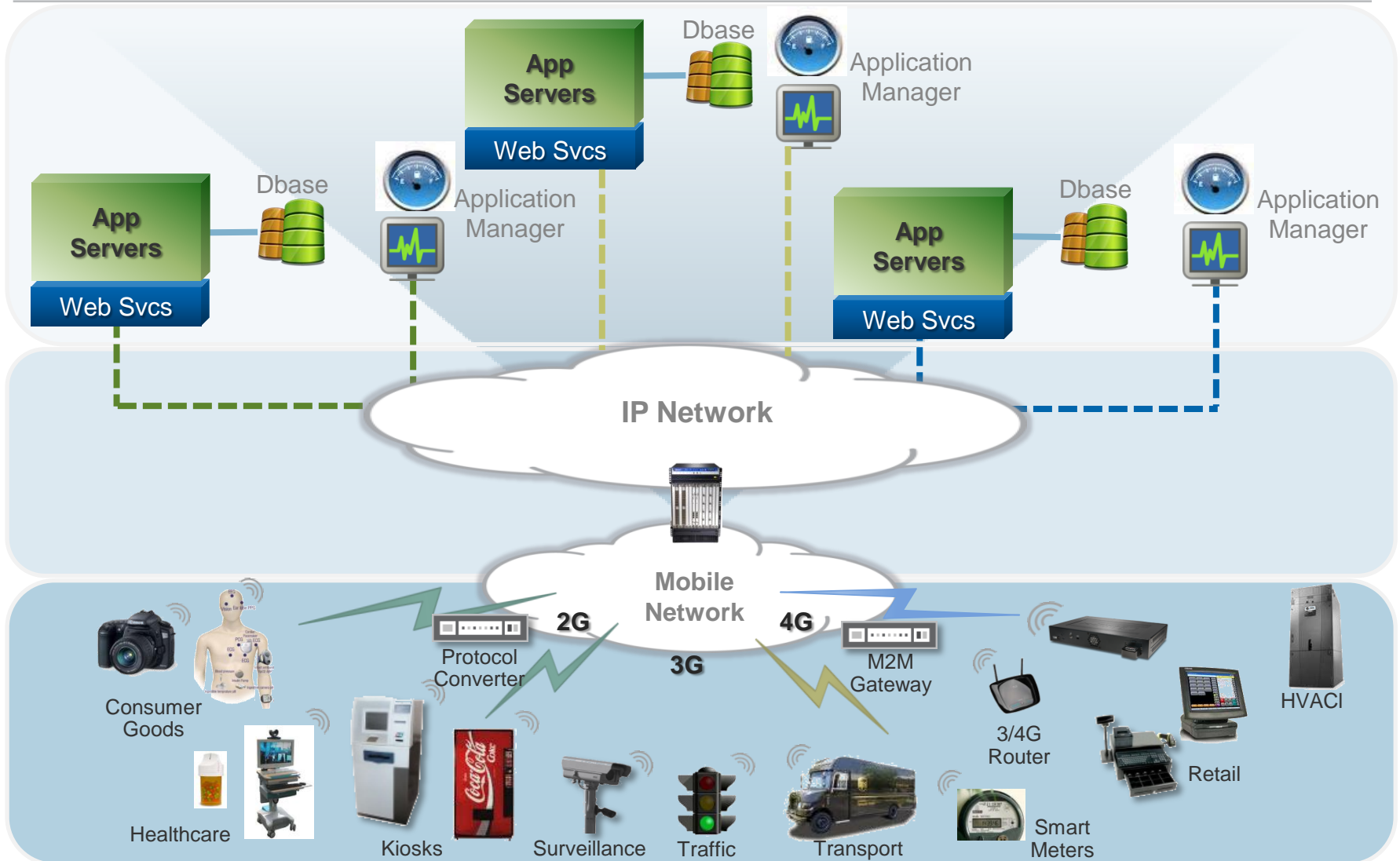Virtual RAN and
scalable wireless core

M2M domains are created by combining virtual slices of access, packet core and cloud resources

- Managed networks are in place connecting access, wireless core, data centers, apps and home
- Scalable wireless packet cores run in the cloud to address load variability
- All sub-components are managed jointly

M2M for cloud is about dynamically creating verticals with existing assets
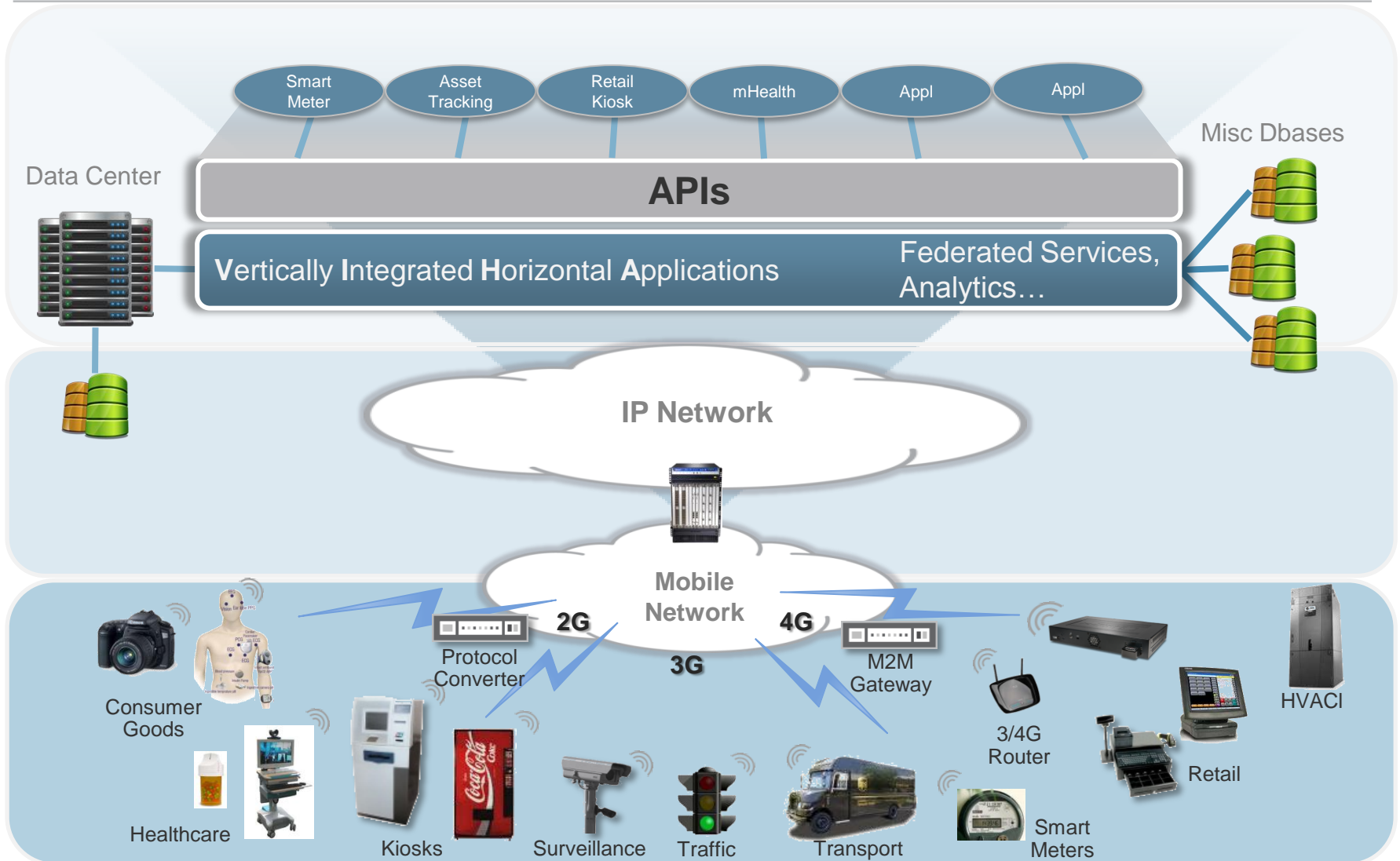
# TRADITIONAL M2M APPROACH
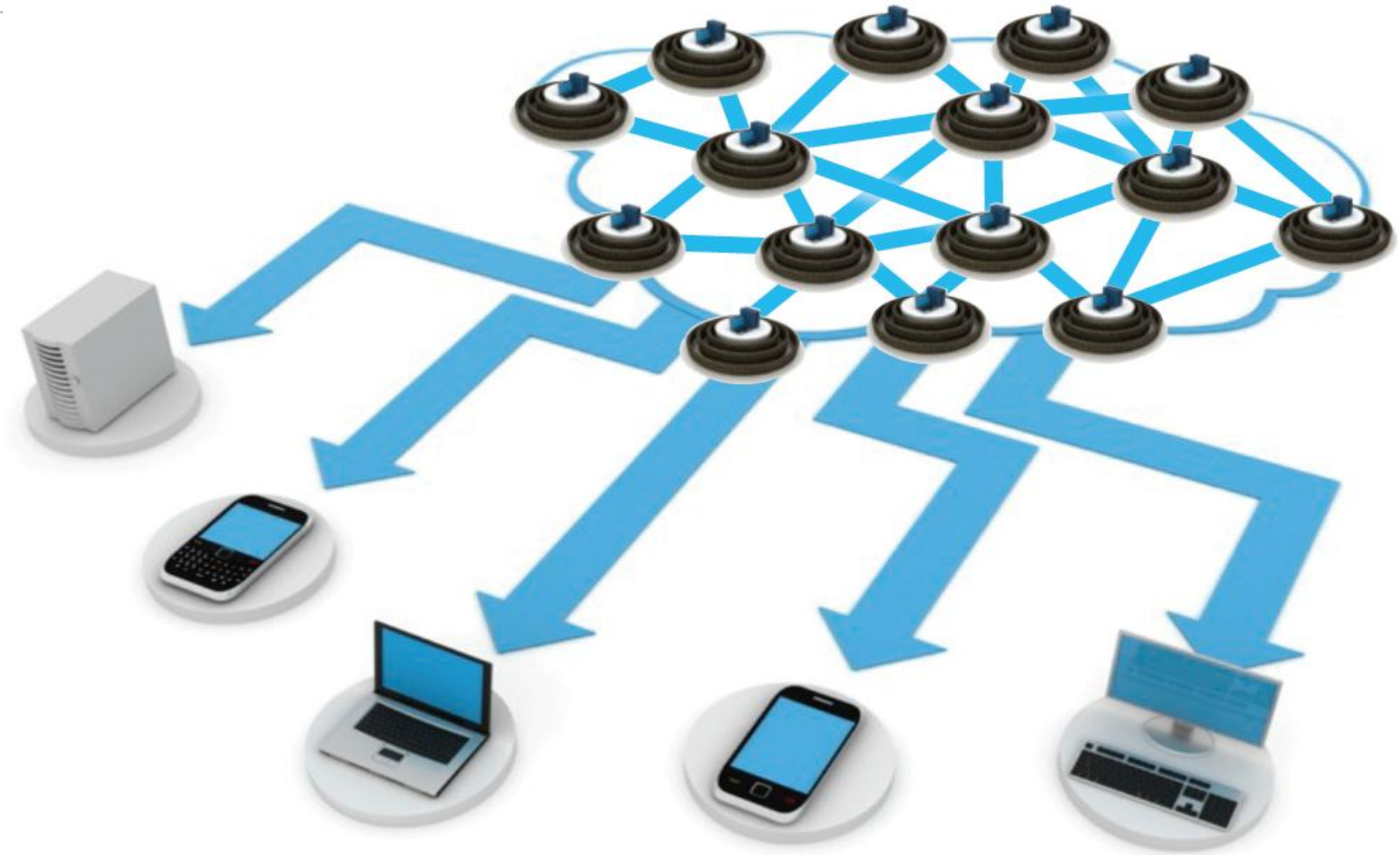## FRAGMENTED AND DIFFICULT TO SCALE
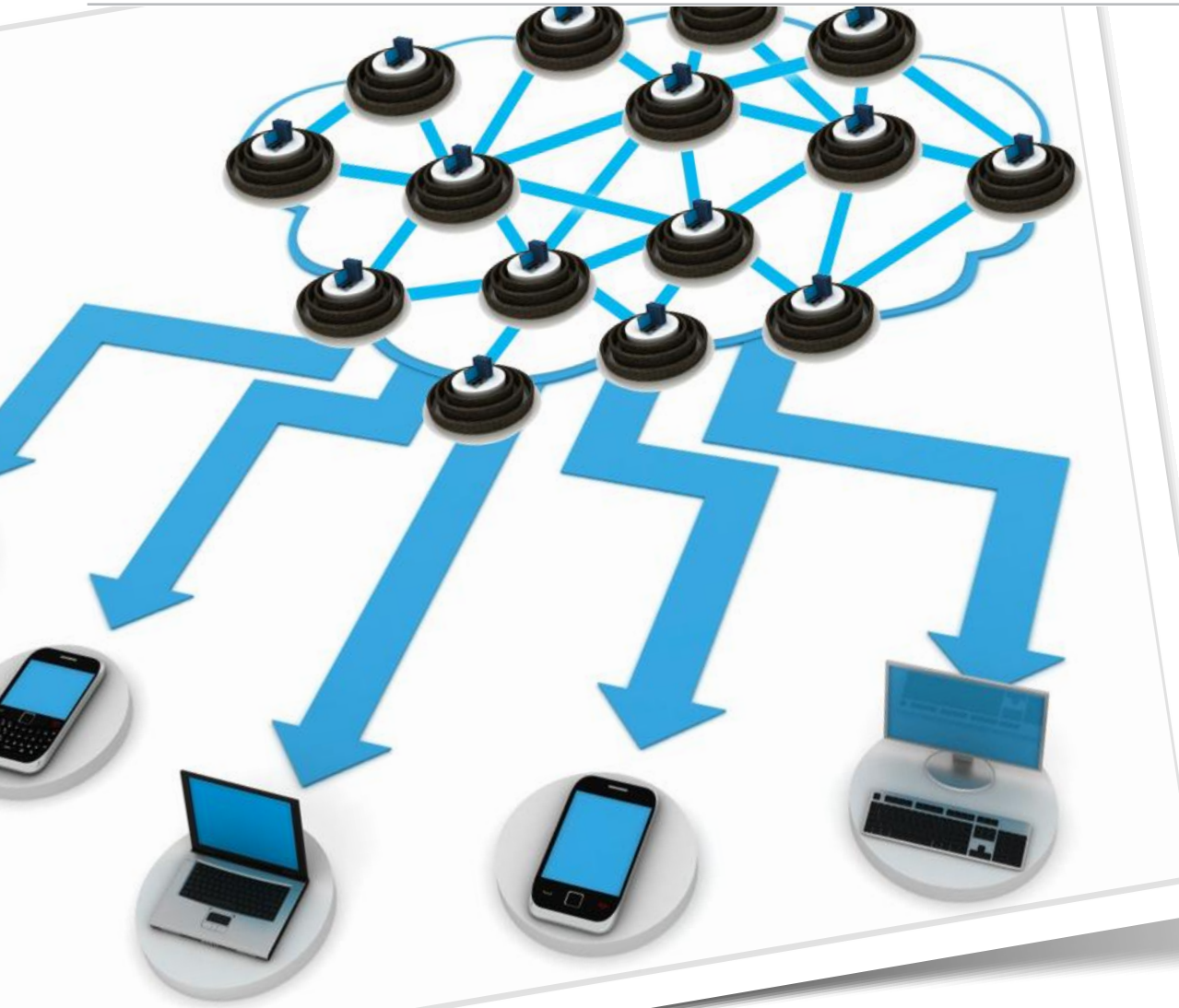
# A HORIZONTAL APPROACH TO VERTICAL M2M APPS
## MAXIMUM OPERATOR LEVERAGE

Smart Meter · Asset Tracking · Retail Kiosk · mHealth · Appl · Appl

Misc Dbases

Data Center

**APIs**

**Vertically Integrated Horizontal Applications**

**Federated Services, Analytics…**

**IP Network**

**Mobile Network**

**2G** · **4G**

**3G**

Protocol Converter

M2M Gateway

Consumer Goods

3/4G Router

HVACI

Healthcare

Kiosks · Surveillance · Traffic · Transport

Smart Meters

Retail

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# With Virt & Cloud We Have 1000's Of Micro-Perimeters

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# CHANGES IN APPS & NETWORKS - PROGRAMMABILITY



- Application architecture is changing dramatically

- Network architectures are also changing dramatically

- How we manage them are, too:
  - API's & SDKs
  - Software Defined Networking

- Leverage solutions that allow for extensible and programmatic capabilities

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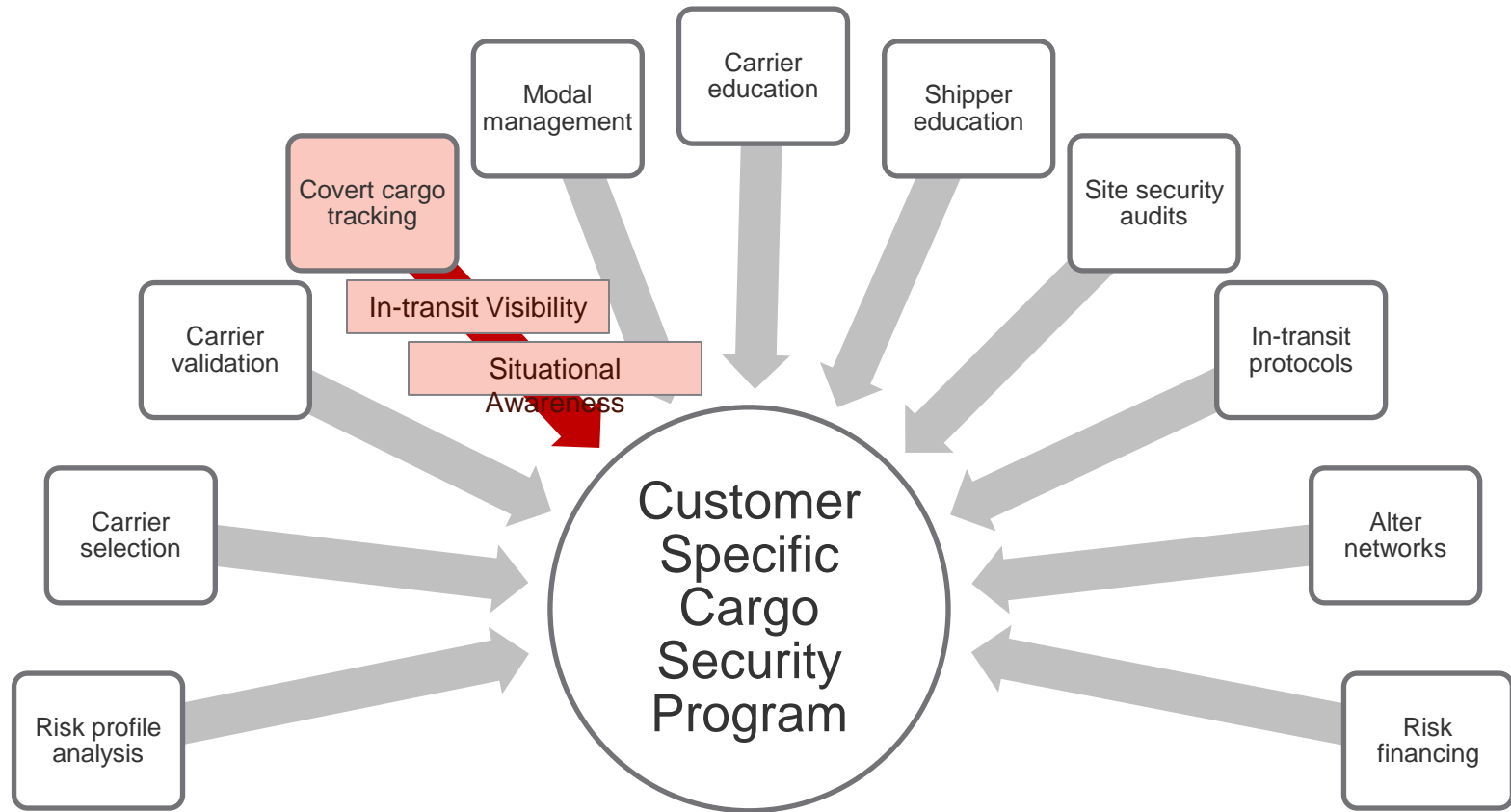The Perimeter Is Disappearing...

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But The Diameter Is DECREASING...

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# Before Applying a Solution: First, Understand the Problem

Common Themes in the Criminal Process
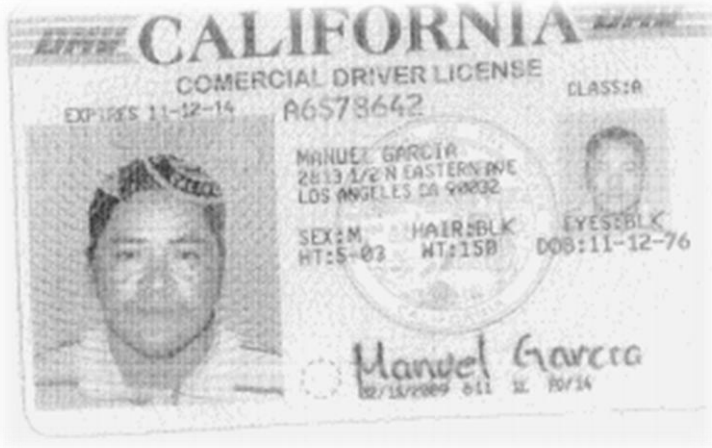
Falsification of credentials

Trailer Decoys

Trailer Theft

Off-route, unauthorized unloading of cargo



The bad guys are creative too!

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# Bad guy scenario: Falsification of Records

# SECURITY AND SUPPLY CHAIN: M2M SHOULD ENHANCE THE COMPLETE PROCESS

## Step 1: Security

- When did it leave?
- Where is it now?
- How long has it been there?
- What route is it on?
- Is it on the right route?
- When did it arrive?
- Was receiving ready for it?

## Step 2: Situational Awareness

- Did it break?
- Is it the right temperature?
- Was there excessive humidity?
- Is it moving?
- Was it broken into?
- How fast was it going?

## Step 3: Continuous Improvement Business Intelligence

- Performance Analytics
- Customs Notifications
- Condition Reports
- Route Optimization
- Insurance Reductions
- Improved Claims Processing
- Invoice and Audit Savings
- Chain of Custody Management

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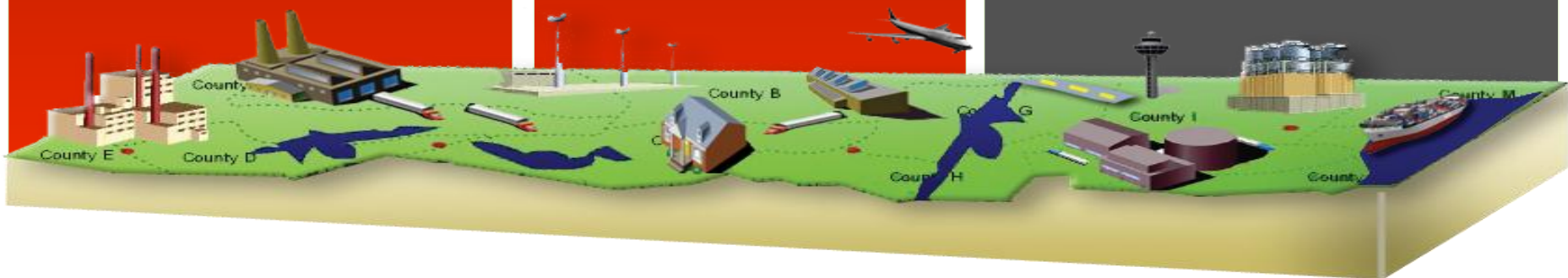
# vGW VIRTUAL GATEWAY
## EXTENDING ENFORCEMENT TO ANY FLOW IN THE DATA CENTER

**Juniper SRX**

**Juniper Switching**

**Security Design**

**Policies**

**VM 1** **VM 2** **VM 3** ■ ■ ■ **VM 20**

**vGW  Virtual Gateway**

VMware vSphere Hypervisor
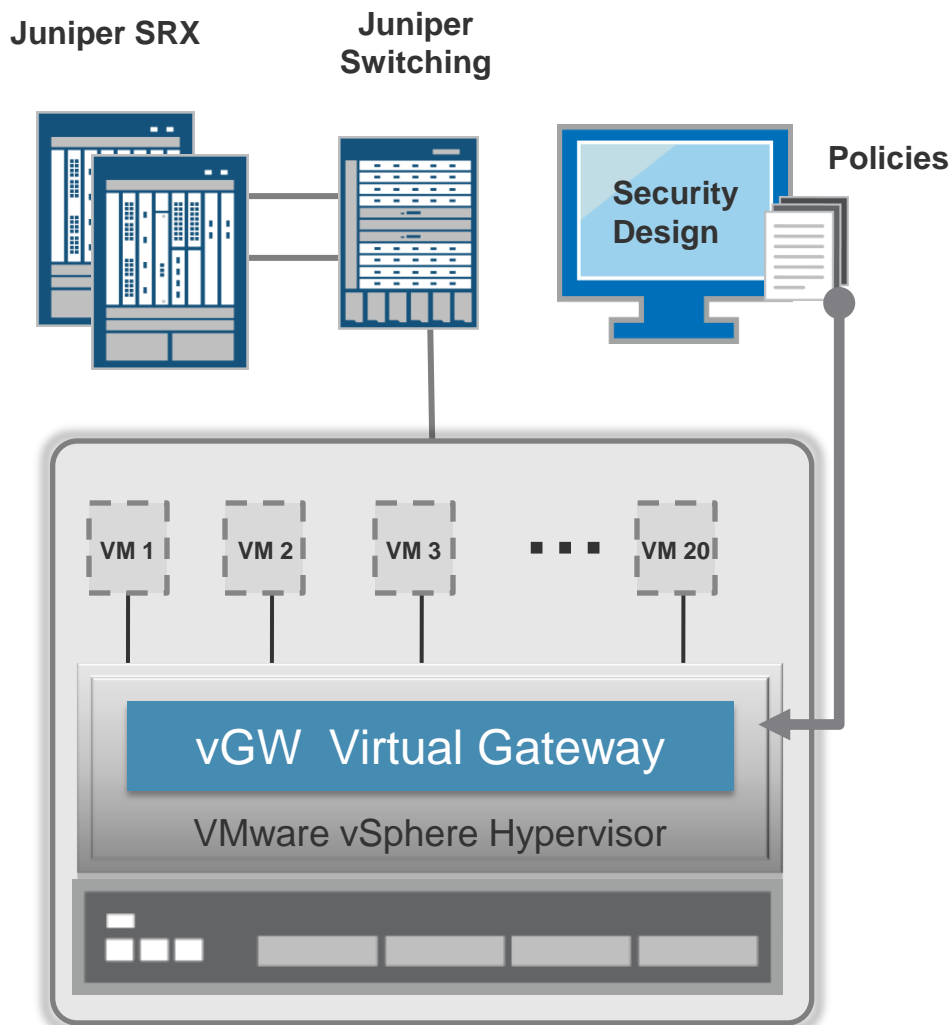
## vGW Solution Integration

1. SRX Zone Visibility extends to include VM awareness

2. Firewall Event Syslogs and Netflow for Inter-VM Traffic to STRM

3. VM Traffic Inspection and Enforcement  with selective mirroring to SRX for IPS

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# JUNOS PULSE – EXTENDING SECURITY TO THE MOBILE WORKFORCE



*Providing anyone a secure experience from any device from any location to any resource*

# APPLICATION MAPPING PRINCIPLES

Cross Layer information



Application
- application benchmark
- data input
- number of resources

Workflow
- data dependency
- computing time
- modules serialization

Description Language
- graph of resources
- network configuration

Allocation
- resources location
- infrastructure configuration

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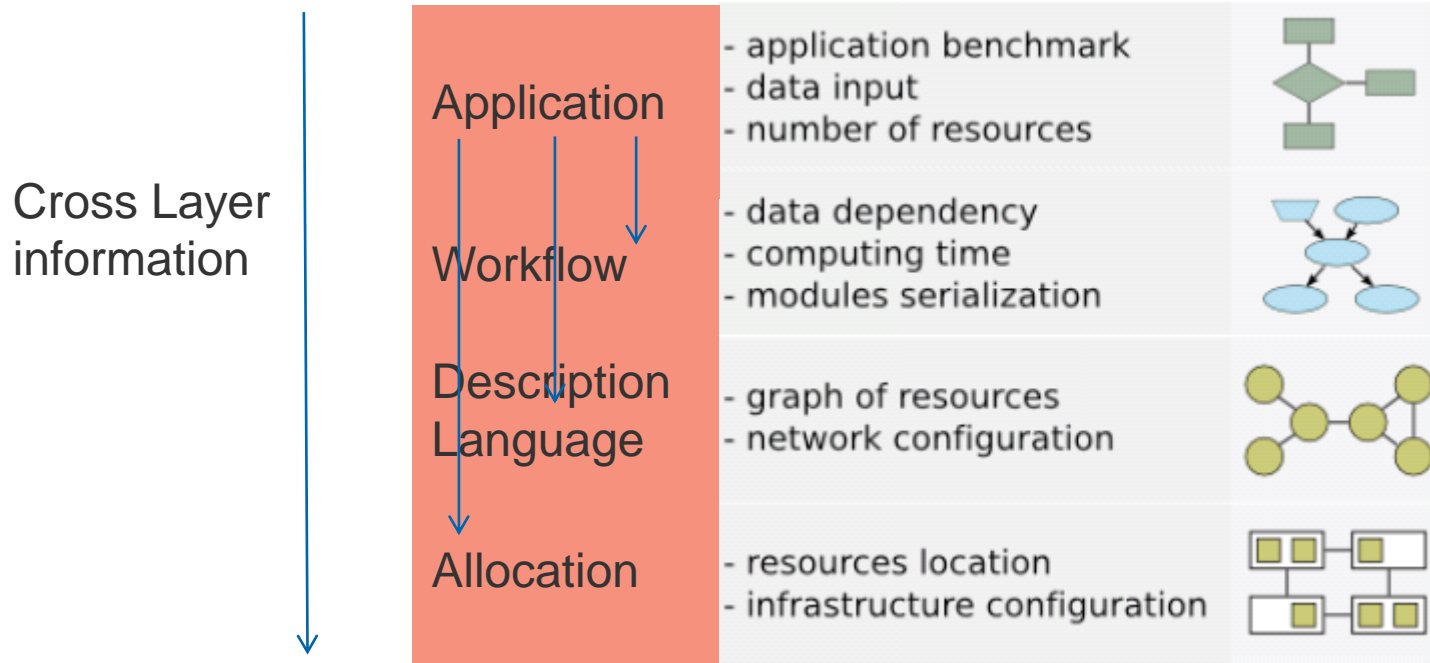
# APPLICATION / INFRASTRUCTURE MIGRATION

**Existing investments are critical to business function**. Moving to a cloud requires **translation of existing infrastructure**, bridging the management gap and extending global business policies into the cloud.

Moving from a **static**, **pre-provisioned environment** to a resilient cloud capable of **dynamic capacity**, **security** and **performance adaptation** requires **automation, abstraction, orchestration and transparency**.

Requires a single environment with multiple views providing a abstracted and aggregated  data aligned to cloud decisions
- Where is my application?
- Is it secure?
- Are my end-users experiencing difficulties?
- Can I prove that I am meeting SLAs?
- How fast can I add new applications?
- What can I charge customers for?

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# REQUIREMENTS FOR "SECURE" CLOUDS

- Infection-free endpoints and applications
- Controlled access of approved users to approved services
- Assured isolation of user transport and application resources
- Security for M2M/mobile and fixed user modes
- Attack-free environment
- Protection of virtual and physical resources in data center and network
- Per-user and per-tenant policy controls
- Comprehensive visibility to policy configurations, events and severity of anomalies or breaches
- Reliable audit and compliance policies enforcement and reporting

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# SECURITY ACROSS DEVICE, NETWORK, APPLICATION



**Device**

Mobile Clients

**Security In the Cloud**

**Applications**

Data Centers

Security Services across the device, the cloud and in the infrastructure

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# LEGACY SITUATION AND CLOUD CHALLENGES

Legacy situation :

We are use to deploying virtual networks that are pre-provisioned/ deployed in advance.

Main focus was on virtualization of server and storage resources with limited attention paid to the WAN or DC network.

Cloud situation :

In a Cloud Services environment, the challenge is

- to identify the appropriate paths between the source and destination which was not addressed before.
- Cloud Networking enables dynamic provisioning of virtualized links to interconnect virtualized server components.

The combination of Cloud Computing and Cloud Networking allows for the creation of entirely virtualized Environments

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# BENEFITS

This approach enables :

- Solutions to the complex problem of mapping users' requirements onto physical constructs
- Formulation of  new requirements that are related to resources allocation like
  - elasticity aspect of virtual resources/reservation time
  - user's expectations in terms of application efficiency and quality of experience
  - on-demand provisioning including pay-as-you-go model.
  - Provisioning lifecycle (allocation, deployment, release)
  - Cost function (time, cost, capacity)
  - guaranteeing the quality of service (QoS)
  - allocation of virtual networks – mapping networking resources to virtual environments requirements
  - capacity profiles – resources capacity variation during reservation time

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# APPLICATIONS & NETWORKING – WORKING TOGETHER

**APPLICATION** ← **NETWORK**

## Applications made better by <u>information</u> from network

- Understanding of end-device capabilities
- Real location / topology
- Adjust behavior to real-time usage
- Billing granularity

**Flexibility of service placement**
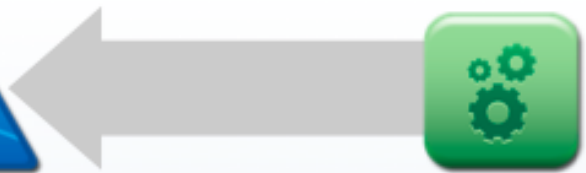
**NETWORK** ← **APPLICATION**

## Networks made better by <u>information</u> from application

- Bandwidth and resource optimization
- New service topologies
- Security identification
- Service-specific packet treatment

**Control of resources from applications**

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# WHAT BRINGS THE TWO WORLD TOGETHER?



**THE APPLICATION WORLD**

Inform network of desired behavior

Inform application of data intrinsically in the network

Network Programmability

**THE NETWORK WORLD**

User service profile

Enterprise edge

Hypervisor stack

**Programmable Touch points**

CDN

Billing profile

Business edge service profile

VPN/mobile/security gateways
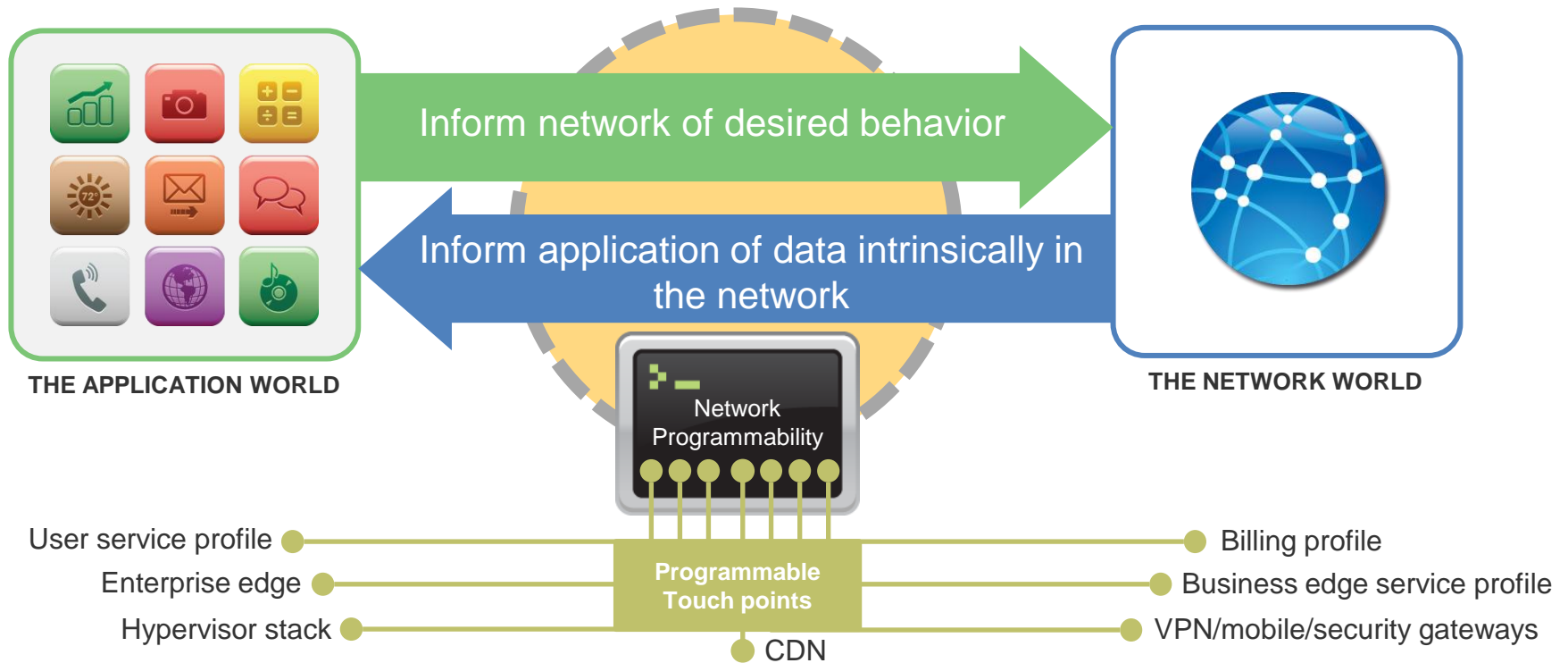
Touchpoints to extract information or influence behavior.
Platforms use touch points. Developers use platforms.

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# AUTOMATION & OPERATIONAL REALIGNMENT

1. Design for Scale & Re-define Deployment scenarios

2. Traffic steering/Service insertion/context - Physical and Virtual

3. Standardize On Common Telemetry & Consistent Policy Across Platforms

4. More intelligence shared between infrastructure & applications

5. Leverage guest-based footprint (IaaS)

6. Leverage Hypervisor, platform and application APIs (IaaS/PaaS/SaaS)

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# DELIVERING A NEW NETWORK THAT IS:

**Dynamic**
- Dynamically move resources to where they are most profitably deployed
- Real time and policy driven allocation
- Centralized policy engine

**Resilient**
- Never stop routing
- Never stop forwarding
- Never interrupt services for upgrades

**Secure**
- Protection at services and network layer
- Policy driven and dynamic

## The New Network

**Programmable**
- **Simplified provisioning**
- Interfaces based on common standards
- APIs to transport and policy layers

**Scalable**
- **Unified scalable transport & control plane**
- Subscribers/end points: scalable subscriber density with QoE
- Services: enabling multi-service, access and device agnostic QoE

**Efficient**
- **Common platform**
- Reduce watts per bit
- Better facility utilization

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