# Digital Communities
# The Dell Technologies Strategy

## Rob Silverberg
**CTO Digital Communities**

# Digital Communities Technology Portfolio

**DELL**
Technologies

Award-winning customized solutions offering innovative devices and services designed for the way people work

**DELL**EMC

The foundation to transform your data center with industry-leading servers, storage and converged infrastructure

**Pivotal**™

Leading the intersection of Big Data, PaaS and agile development leveraging data on one cloud-independent platform

**Dell Boomi**

The leading EDI – API – MDM - IOT

Cloud enabled software suite

**RSA**®

The premier provider of security, risk and compliance solutions solving your most complex challenges

**vmware**®

The most trusted virtualization for desktop, data center and applications. Mobile device security. VDI. IOT

**virtustream**

The leading enterprise-class cloud software and solution provider

**SecureWorks**®

Elite and trusted intelligence that strengthens security and reduces risk in a dynamic landscape

**DELL**Technologies

Imagine a
**City of Tomorrow**

DELLTechnologies

# As a resident, my city is a city…

… that operates efficiently

… where I feel safe

… that provides services for my needs

… that provides quality education

… where I feel at home

… that provides affordable housing

… that is engaging and connected

**DELL**Technologies

# As a city leader, my city is a city…

…that needs to take our aging population into account

… where citizens' expectations are growing

…where trust in public services need to be stronger

..that is impacted by uncertain economic conditions

…where budgets are challenging, we need to do more with less!

.. that needs to comply with new regulations

…where city services must be more resilient

My city generates a lot of valuable data… but how can I leverage it to create value for the city and its citizens?

**D&LL**Technologies

# Accelerated urbanization amidst challenges

Aging infrastructure

Limited public budgets

Unprecedented urbanization

Environmental sustainability

**Cities** can change the world with **technology**

In the next decade, Cities will likely spend more on infrastructure build up than in the past 1000 years

**D∕ELL**Technologies

# Imagine a world where cities…

### Optimize traffic flows in real-time

The city of Bellevue installed adaptive traffic lights and saved drivers **$9 million** annually by reducing traffic times more than **36%** during peak traffic times.

### Reduce energy consumption

Eight Spanish cities reduced their electricity consumption by **64%** and saved over **4,300 tonnes** of $CO_2$ in 2014, thanks to efficient street lighting systems and technologies that both cut costs and benefit the environment.

### Use predictive policing

The Los Angeles Police Department used predictive policing to reduce crime rates and save more than **$9 million** a year.

### Improve city functions

New York city used predictive analytics to increase building inspector efficiency. Without analytics, only 13% of inspections found dire conditions; with analytics, more than **70%** of inspections identified issues.

### Detect a drop in air & water quality

Chicago's Array of Things is a city-wide sensor network that measures temperature, barometric pressure, carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, pedestrian and vehicle traffic, and surface temperature.

### Automate waste management

Seoul used smart trash cans with real-time monitoring to cut waste collection costs by **83%** and increased the recycling diversion rate to **46%.**

## Interwoven in the fabric of our lives, continuously adapting

**D∉LL**Technologies

# Drive economic, environmental and social benefits

Become an innovative digitally transformed community, business and individual

| EFFICIENT | SAFE | ENRICHING | FOR ALL |

Optimized use of resources:
- People
- Businesses
- Environment

Anticipate risks and protect people & information: Everyone must trust the system

Integrated daily life services: Blending many facets of work & life to improve quality of life

Enriched life & business experiences for every citizen:
- All must benefit
- No favorites

**DELL**Technologies

# 10 Points
## At a Glance

**10 long-term strategic actions** we will take to better serve and empower our agency customers and all New Yorkers:

---

PREPARE • Define and Realign

RUN • Operate and Maintain

GROW • Enhance and Expand

TRANSFORM • Innovate and Drive
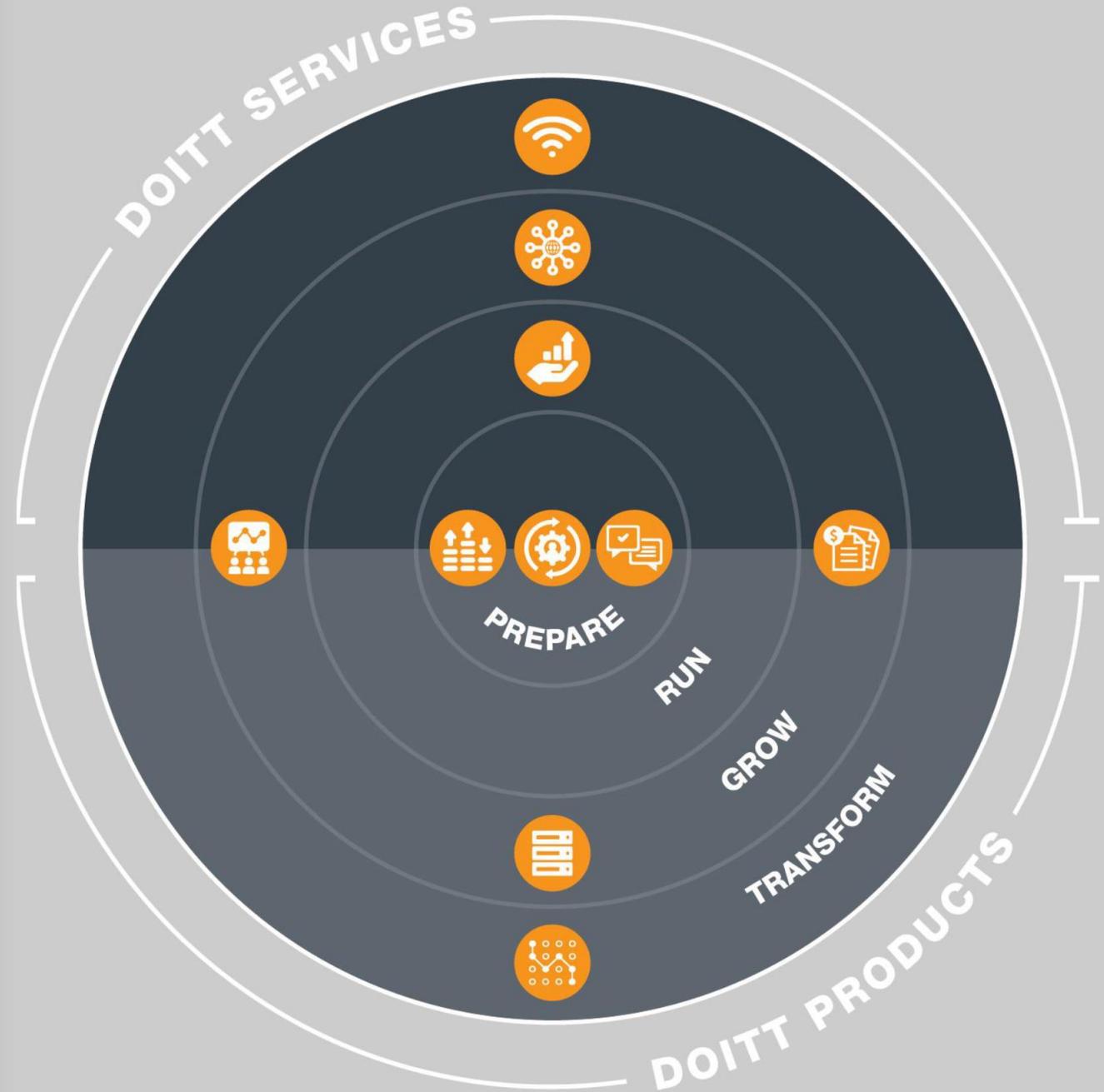
# We Will Empower Agencies to Better Share Data and Connect Apps Internally and Across Government

o Establish first-ever citywide data platform – enabling agencies to seamlessly ingest, store, analyze, share, and act on their data

o Establish first-ever citywide integration platform – enabling agencies to automate workflows both within and across agency clusters

# Realizing the
# **Digital City** Vision

# San Jose, CA - Open Data Community Architecture

Leveraging Components of Dell EMC Digital Cities Architecture

## PURPOSE:

- Provide a data sharing architecture that allows for data sets to be shared inside and outside the City

- Provide an architecture that supports IoT, big data and advanced analytics. Structured and Unstructured Data.

- Provide a data management and analytics architecture at IoT Scale

- Showcase the capability of Hyperconverged systems

## SOLUTION:

- Hortonworks Hadoop Stack - Data Lake

- Pivotal Components (Spring XD, HAWQ)

- CKAN for Open Data Portal and Data Sharing use cases

- Future expansion for scale out big data platform with native HDFS

- Data Platform for Data Driven use cases and IoT Data

## RESULTS:

- Implementation of ODCA Data Architecture

- Implementation of Hadoop, HIVE, Spark, CKAN, Pivotal Spring XD, Pivotal HAWQ

- Data Ingest from Open Data Sets
  - 4.5 Million Police Incidents (9 Years)
  - 2 Million Traffic Incidents (5 Years)
  - All data sets from Open Data Portal

- Data Visualizations using Microsoft Power BI and Tableau – Ready for AI/ML

- Co-developed ODCA Whitepaper

Rob Lloyd, CIO, City of San Jose

**DELL**Technologies

# LAS VEGAS SOLUTION ACCELERATING SMART

# NTT's Smart Safety Use Cases

**NTT** 👁

Crowd Counting & Sounds Detection

Detect Wrong Direction Vehicle Movement

Detect Persons of Interest and Vehicles of Interest

Vehicle Count for Traffic Congestion & Patterns

**DELL**Technologies

# Actionable Dashboard

## Goals

- Prioritize quality for license plate and crowd control data

- Focus on telling good data stories

- Capitalize on areas covered by existing network and infrastructure
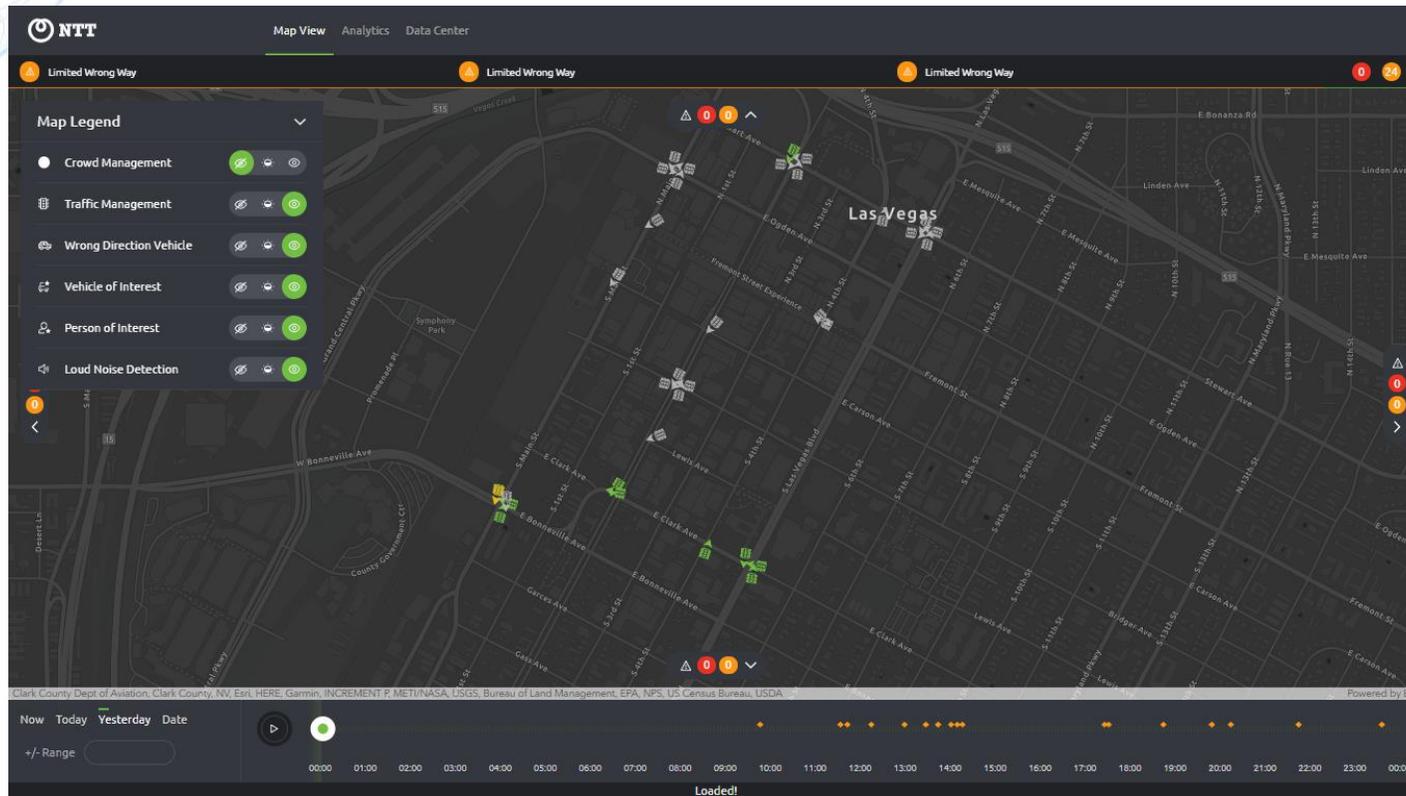


## Sensors / Analytics

- 32 total cameras

- 25 License Plate Recognition

- 7 Crowd Counting Cameras

- 5 Gunshot Audio Analytics in Crowded Areas

- 5 Glass Breaking Audio Analytics in Traffic and Parked Car Areas
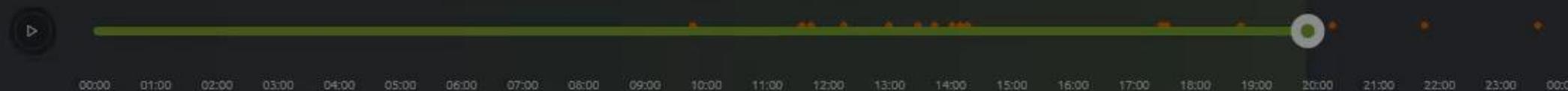
# Impact on Las Vegas

## City has reacted

One way signage
One way arrows

## Alerts have been reduced

Incidents have reduced over the first 4 weeks of changes

# Vehicle Recognition

- Count
- Classify
- Monitor
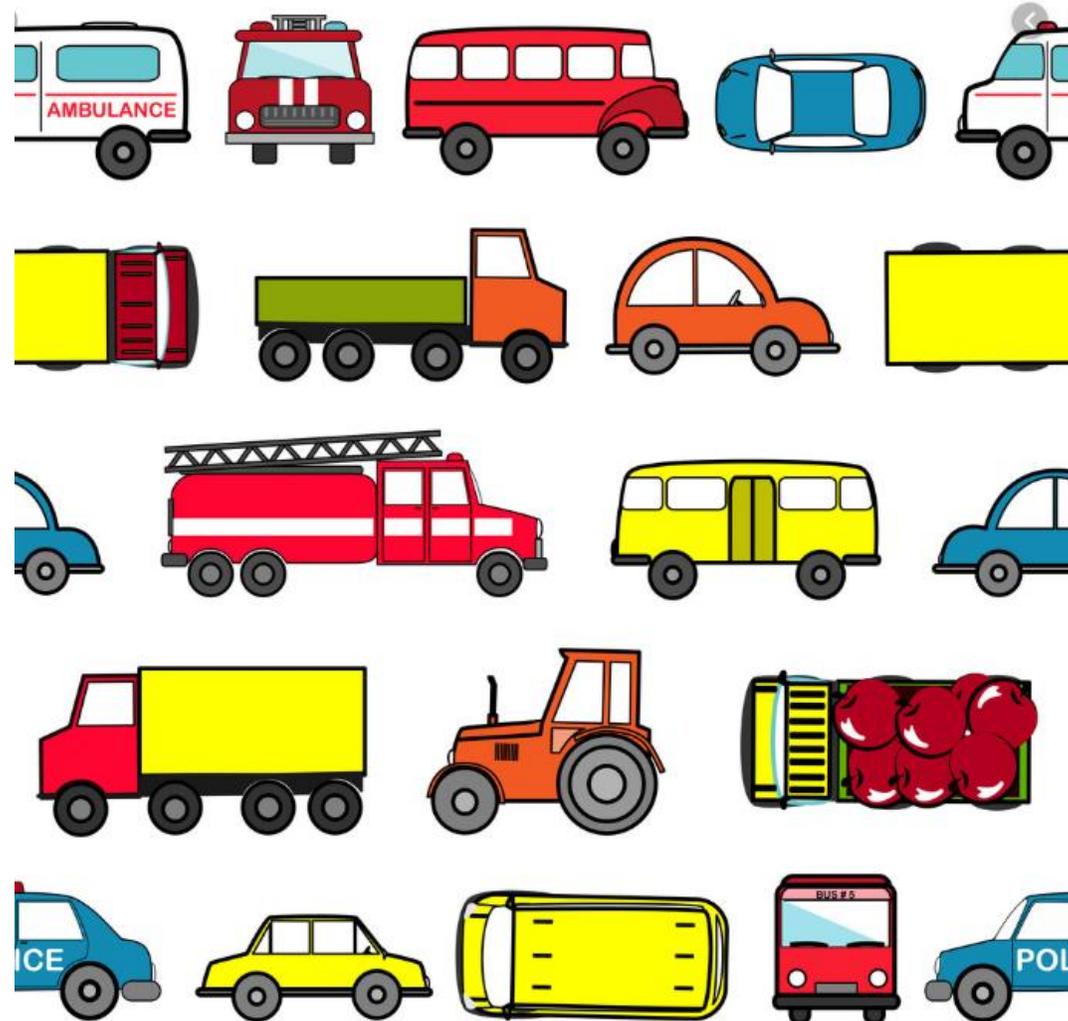


- Predictive models forecast potential traffic patterns

- Information useful for resource planning and economic development

# Crowd Counting

- Detect a crowd that exceeds expected thresholds

- Dispatch is notified with details and live view for situational awareness



- Predictive models forecast potential crowds exceeding expected thresholds

- Information useful for resource planning and economic development

# Predicting Crowd Counts

Red = Actual values
Blue = Predicted by Model
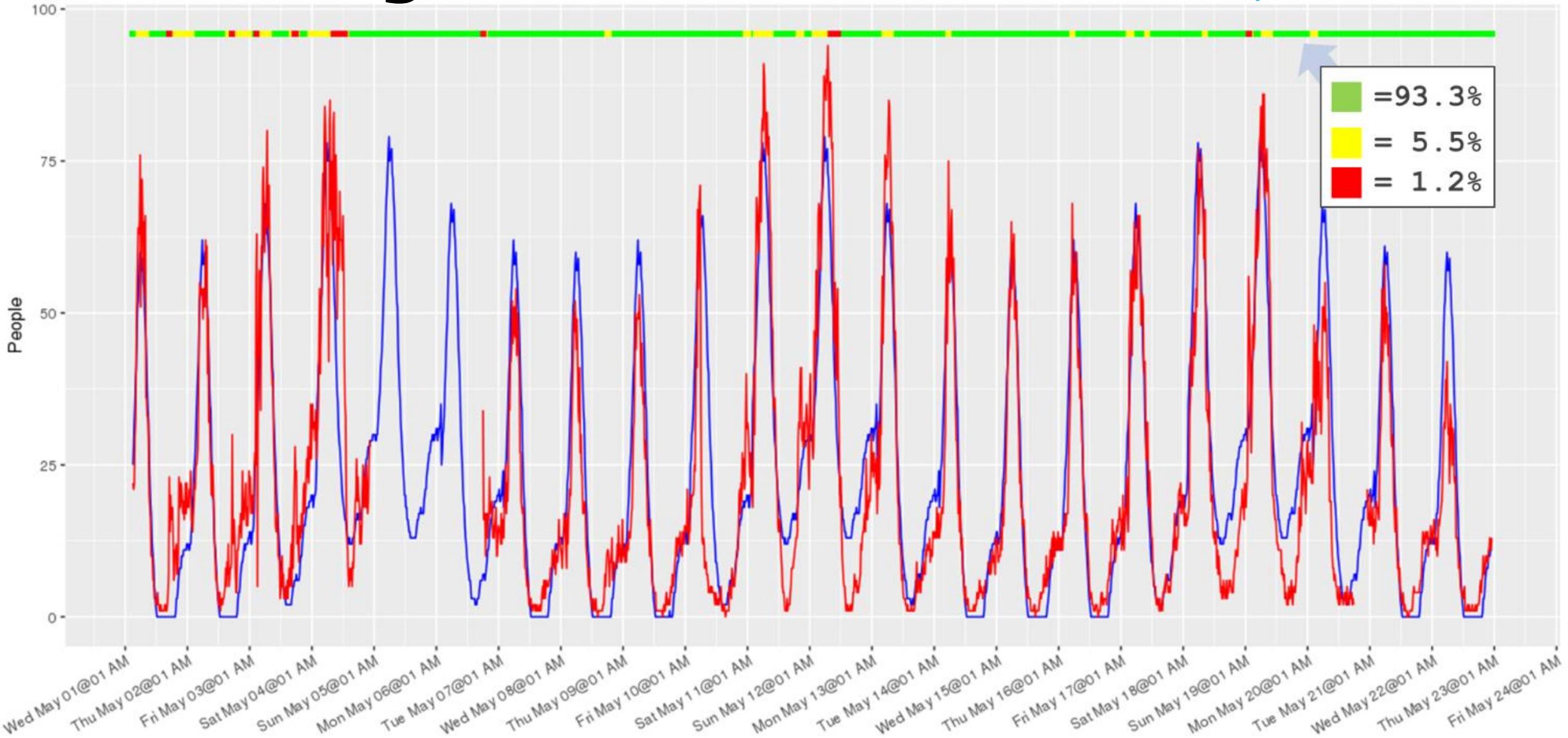
# Las Vegas Metrics



| 4,263,311 | 1,153,182 | 433,635 | 65TB / 2.64 GB |
|-----------|-----------|---------|----------------|
| Traffic Counts | Unique License Plates | Crowd Counts | Data Generated / Data Stored |

# Traditional cities manage multiple utilities & services

EMERGENCY PREVENTION & RESPONSE

GAS

SURVEILLANCE

FIREFIGHTING

AMBULANCE

MOBILITY

WATER

DIGITAL

WASTE

POLICE

PUBLIC TRANSIT

FLOOD MANAGEMENT

ELECTRICITY

HEALTH SERVICES

DRONE

Digital has emerged as the core utility
that interconnects these into an ecosystem…

DELLTechnologies

# The digital core transforms utilities & services…



SMART ADMIN

SMART GRID

SMART SURVEILLANCE

SMART EMERGENCY FIRE SERVICES

SMART EMERGENCY HEALTH SERVICES

SMART TRAFFIC

SMART WATER

DIGITAL

SMART GARBAGE

SMART POLICE

SMART TRANSPORT

SMART SOCIAL SERVICES

SMART GRID

SMART HEALTH

SMART ECONOMIC DEVELOPMENT
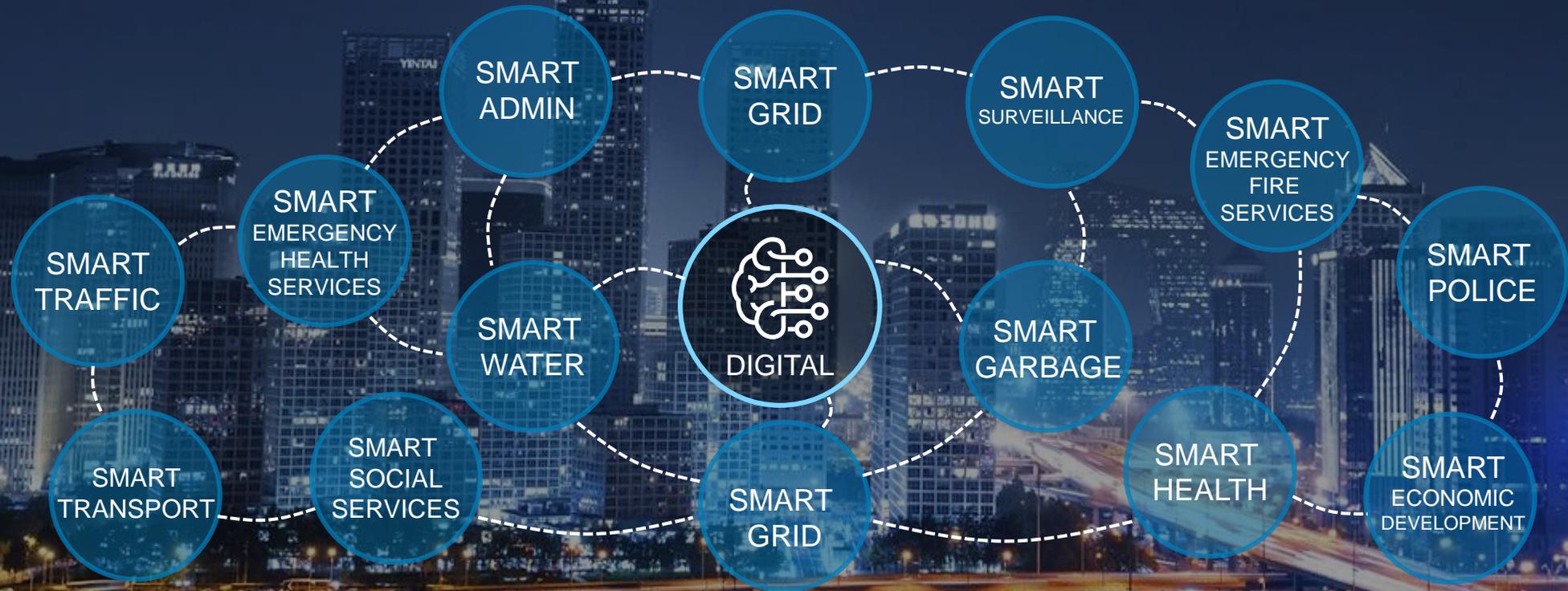
… making them intelligent, efficient and responsive

DELLTechnologies

# Digital City Accelerator Platform – Building Blocks

**APPLICATION PLATFORM**

| API Management | Container Orchestration – ISV Apps | IPaaS (Boomi) | Application Marketplace |

**IOT PLATFORM**

| Time Series DB | MQTT Broker |
| VMWare Pulse IOT Center | Boomi |

Liota

EDGEX FOUNDRY

Dell EDGE Gateway

Pivotal Cloud Foundry

Dell EMC ECS

**DATA PLATFORM**

| Data Governance | OPEN DATA |
| Data Catalog | Data Ingestion | Analytics Framework |

Structured Data Store

HADOOP Platform

Dell EMC ISILON

**CORE DiCi INFRA**

RSA Security

| VMWare vSphere | VMWare NSX | VMWare vSAN |

Dell EMC
VxRail HCI / VxRack SDCC

DELLTechnologies

# "Digital" has been transforming these utilities...

| Physical Asset > | "Smart" Asset > | Connected "Smart" Asset > | "Smart" System > |
|---|---|---|---|
| **Bin** | **Smart Bin** | **Smart Connected Bin** | **Smart Waste Management** |



Increasing Intelligence ⟶
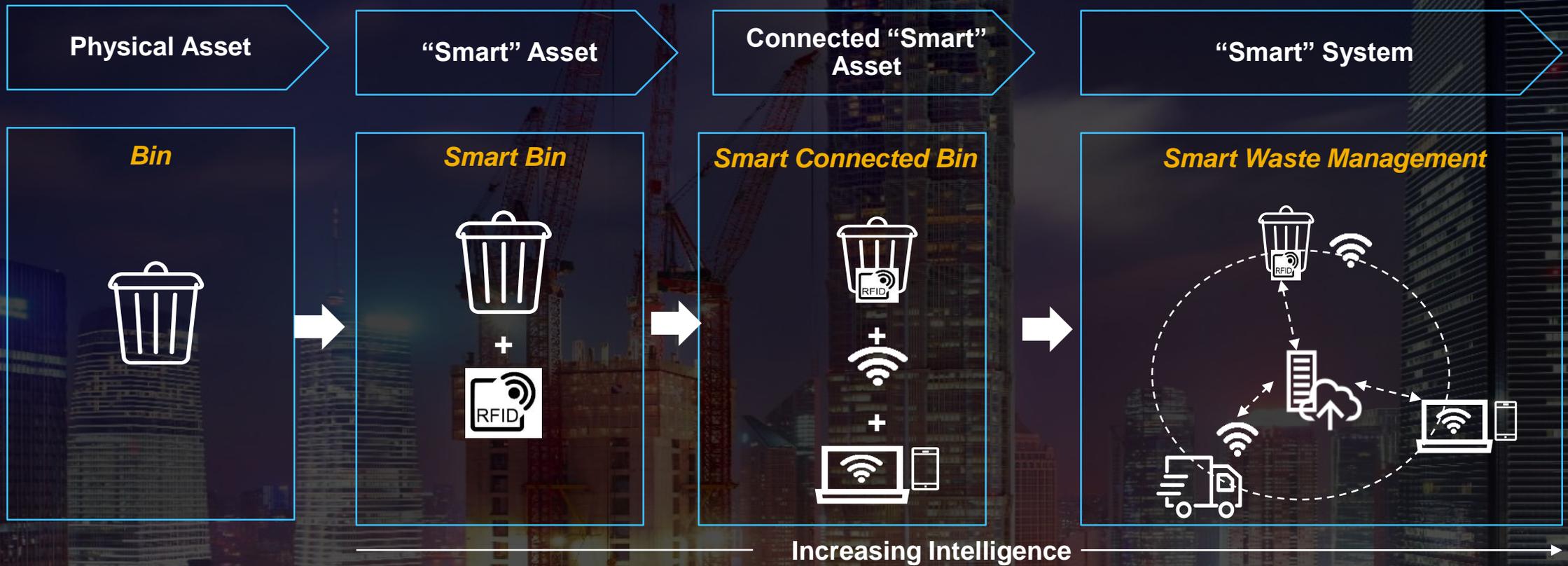
... into interconnected and intelligent systems

DELL Technologies

# Creating a scalable and intelligent "System of Systems"

| Asset | Smart Asset | Smart Connected Asset | Connected System | System of Systems |

**City Infrastructure**

**Intelligence Transportation Services**

**Public Safety and Emergency Services**

**Smart City System**

**Smart Infrastructure and Operations**

**Events and Experiences**
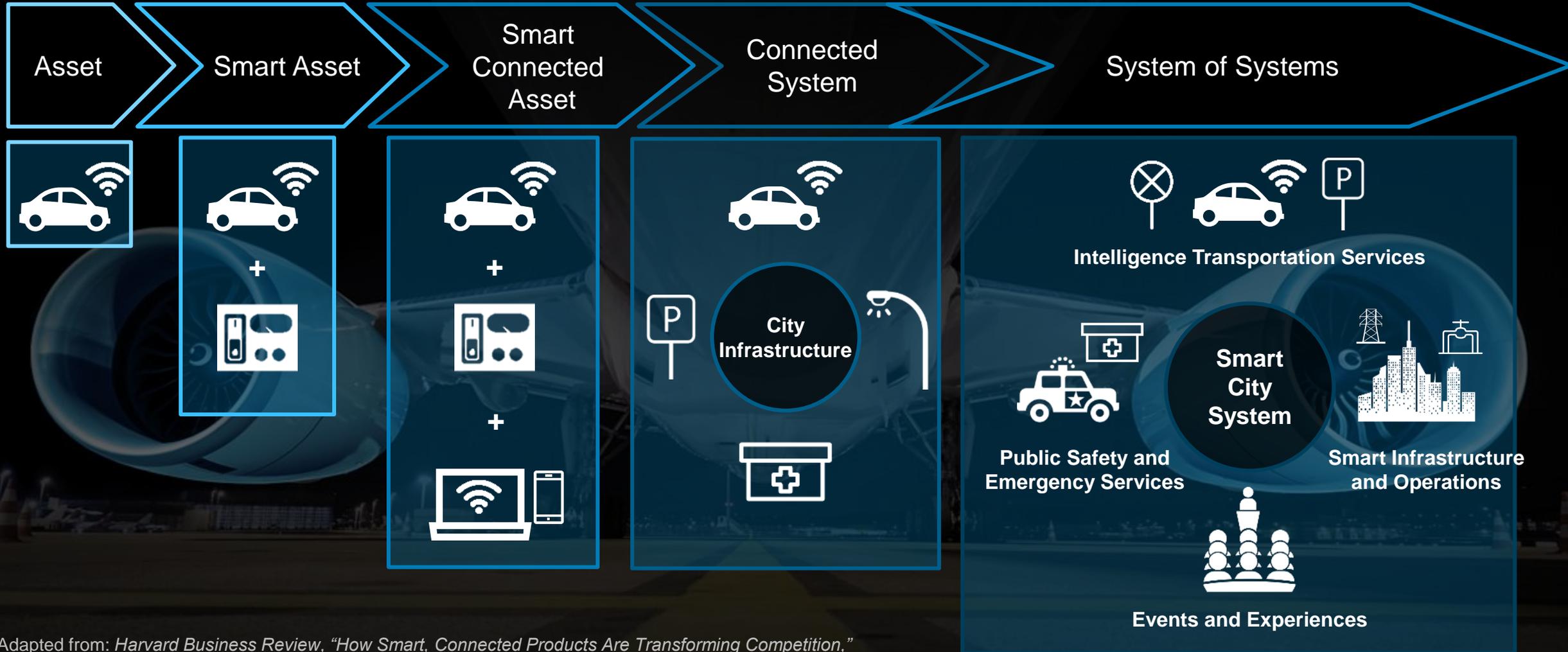
Adapted from: *Harvard Business Review, "How Smart, Connected Products Are Transforming Competition,"*
*By Michael E. Porter and James E. Heppelmann, November 14*

**DELL**Technologies

# From edge to the cloud: Digital Cities vision
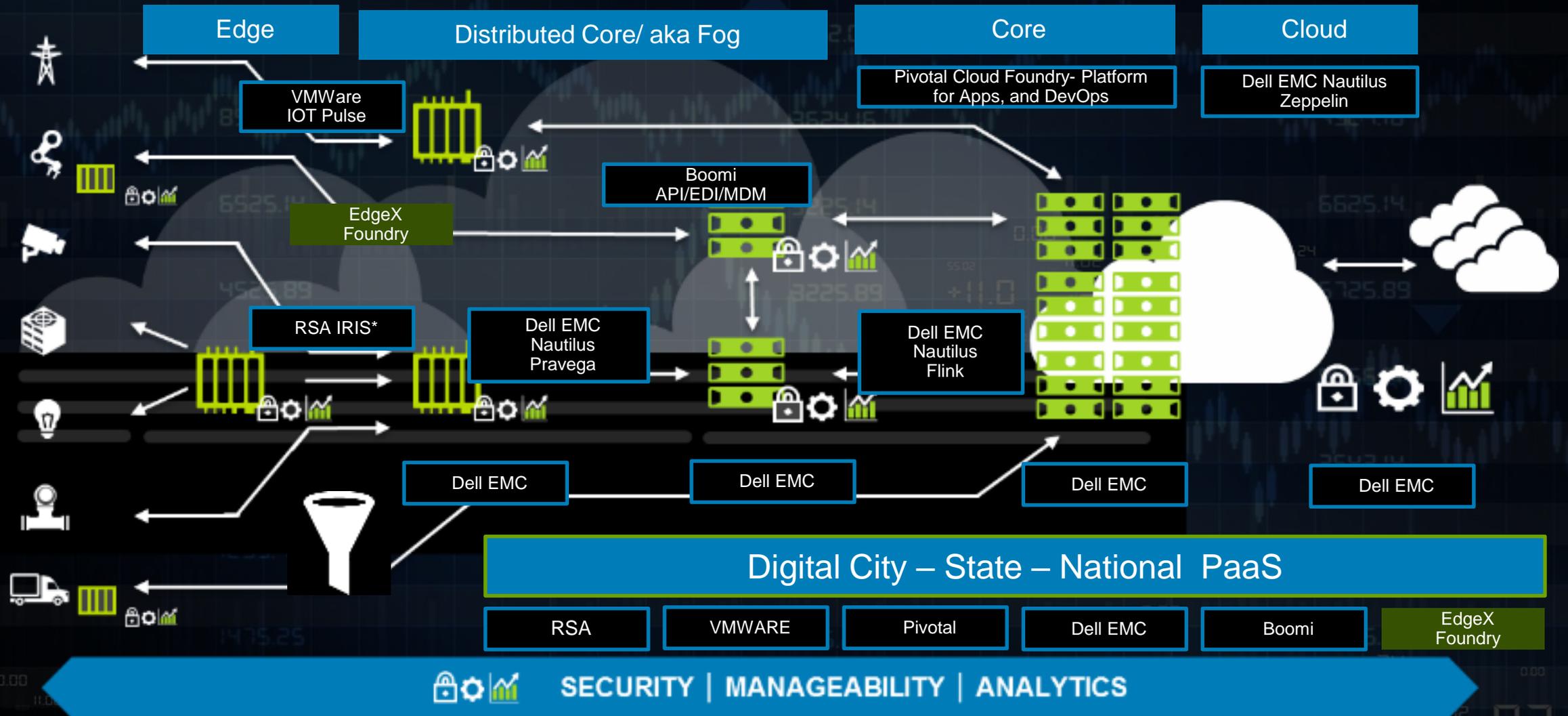
# Every Digital City has a unique journey

It is important to get started today!

As-is

**DIFFERENT STARTING POINTS**
*Legacy systems vs. greenfield*

**DIFFERENT OUTCOME PRIORITIES**
*Traffic/sustainability/ Public safety, etc.*

**DIFFERENT APPROACHES**
*Vertical solutions vs. horizontal platforms*

**DIFFERENT FUNDING & OPERATING MODELS**
*Budget vs. PPP / Build vs.As-a-Service*

*Ideal end state*
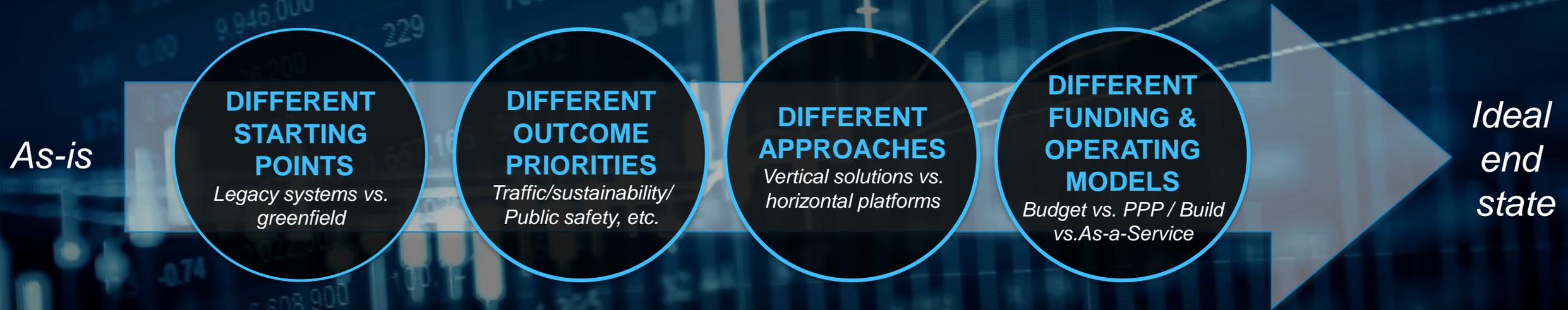
Start small but build a foundation to scale

**D&LL**Technologies

# Key Focus Areas

## Environment and Utility

- ✓ Water quality and conservation
- ✓ Energy Efficiency
- ✓ Waste management – recycling –disposal
- ✓ Public space management ( cleaning, maintain)
- ✓ Air quality management, public, industrial

## Economic Growth

- ✓ Increased revenue from financial transactions
- ✓ Increases investments
- ✓ Create/retain more jobs and business in my city
- ✓ Encourage startups/local eco-system

## Citizen Engagement

- ✓ Increase scope, value and feedback surveys
- ✓ Citizen engagement - P2P, P2G. G2P
- ✓ Analyze / predict well to drive new policies

## Mobility

- ✓ Reduce traffic & congestion
- ✓ Reduce trip time
- ✓ Improve transport/public safety
- ✓ Reduce pollution from transport

## Public Safety

- ✓ Reduce response times to incidents
- ✓ Crime deterrence, prevention, resolution
- ✓ Reduction in pedestrian, transport accidents
- ✓ Increased identity and clearance
- ✓ Identification of threats, terrorism

## Digital Government

- ✓ Smart city dashboard
- ✓ Inter-government efficiency and sharing
- ✓ E-Gov services integrated and mobile
- ✓ City population IDM

**DIGITAL CITY STRATEGY**

DELLTechnologies

# Where do you begin?

## Solve a specific problem:

Public safety, traffic management, smart lighting

Immediate benefits for citizens and the city

Build a foundation for future projects

DELL Technologies

# The way forward

Individual projects build toward a Smart City

The right foundation lets the pieces fit seamlessly as your city continues to grow its digital footprint.

Dell Technologies along with the extensive partner network has the subject matter expertise to make this happen

Digital Police

Digital Health

Digital Economic Development

Digital Education

Digital Services (Permitting, Licensing, Inspection, & Zoning) Digital Tourism

Digital Water

Digital Transportation

Digital Administration

Digital Grid

Digital Social Services
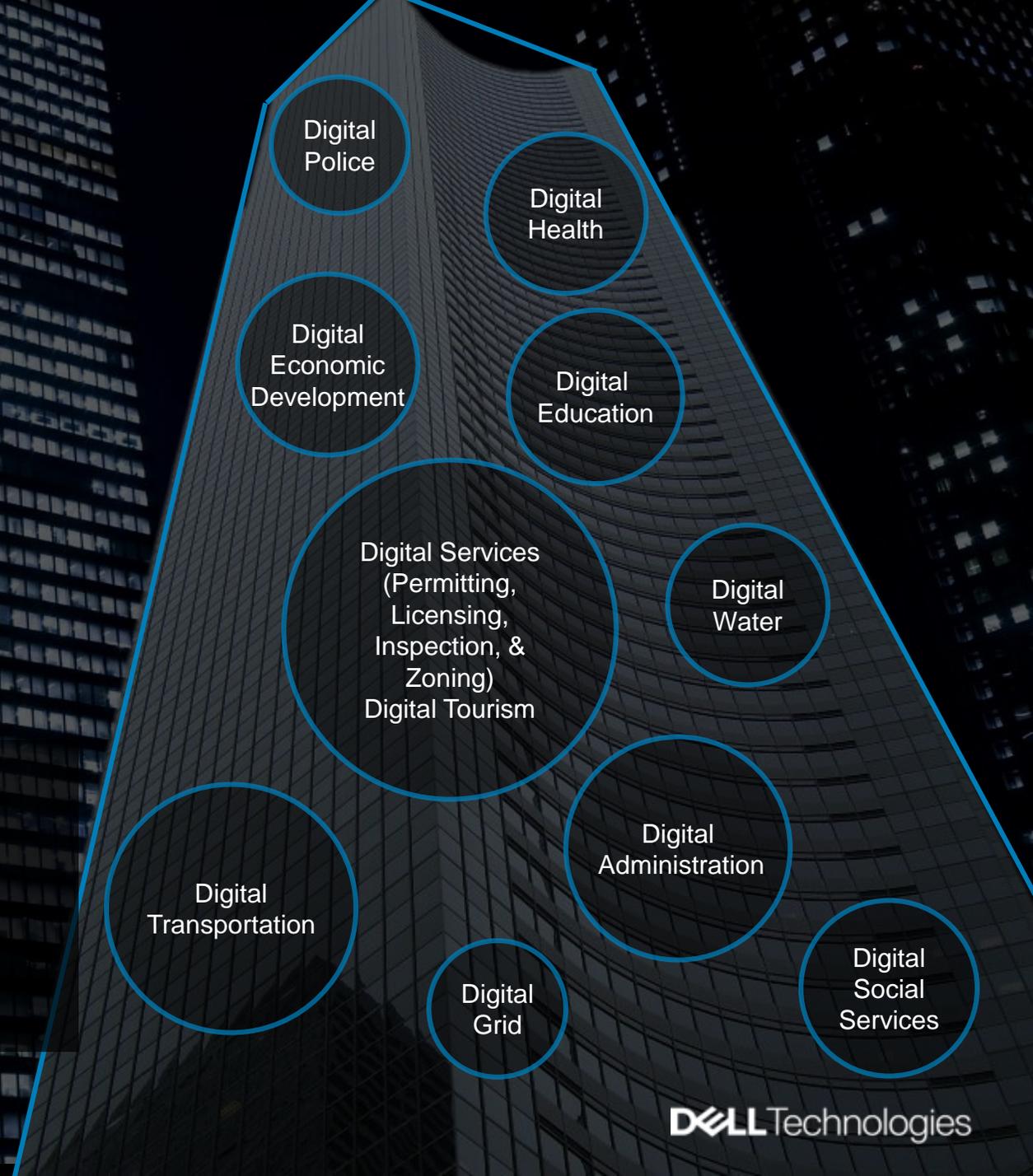
DØLLTechnologies

# Dell Technologies Digital Communities

**Let's begin the Journey.. Together**