

Smarter City Vision

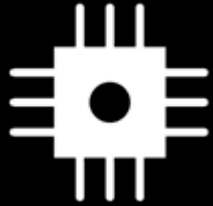
An opportunity to think and act in new ways

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Smarter Planet is about a continuing transformation enabled by some important **technology and societal changes**:



Instrumented

We can measure, sense and see the condition of practically everything.



Interconnected

People, systems and objects can communicate and interact with each other in entirely new ways.

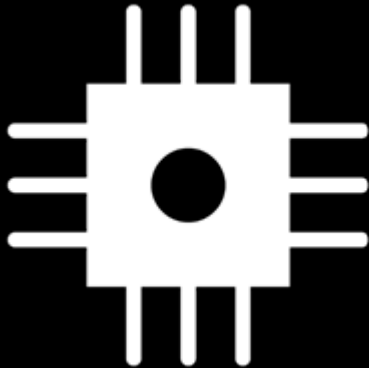


Intelligent

We can analyze and derive insight from larger and more diverse sources of information, to predict and respond better to change.



INSTRUMENTED



Sensors are being embedded across entire ecosystems – supply chains, healthcare networks, cities, natural systems.

We will be able to sense, measure and see the condition of everything.



In 2001, there were 60 million transistors for every human on the planet...

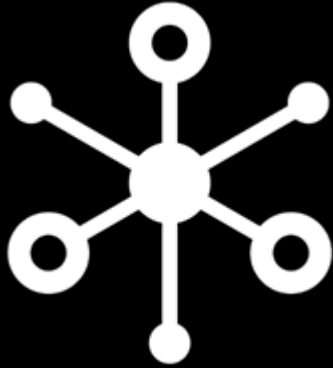
...in 2010 there will be 1 billion per human...

...each costing 1/10 millionth of a cent.

In 2005 there were 1.3 billion RFID tags in circulation...

...in 2010 there will be 33 billion.

INTERCONNECTED



People, systems and objects are communicating and interacting with each other in entirely new ways.

Cars, appliances, cameras, roadways, pipelines...even pharmaceuticals and livestock.

An estimated 2 billion people will be on the Web by 2011...

...and a trillion connected objects – cars, appliances, cameras, roadways, pipelines – will comprise the "Internet of Things."

Browse



Worldwide mobile telephone subscriptions reached 3.3 billion in 2007 and more than 4 billion by the end of 2008.

In the fourth quarter of 2007, in the USA, texts exceeded voice calls for the first time.

One billion camera phones were sold in 2007, up from 450 million in 2006.

More Smartphones than PCs will be bought in 2010-11.

3G+ devices growing 30% annually.

INTELLIGENT



The amount of information produced by the interaction of all those things will be unprecedented.

Analyzed effectively, it can provide important new insights on different timescales.

15 petabytes

Every day, 15 petabytes of new information are being generated. This is 8x more than the information in all U.S. libraries.

1 petaflop

Scientists are working to prevent influenza pandemics by modeling the viruses with a supercomputer that can operate at one petaflop, or one quadrillion operations per second.

1 square kilometer

New analytics enable high-resolution weather forecasts for areas as fine as 1 to 2 square kilometers.



Instrumented



Interconnected



Intelligent





New computing models handle the proliferation of end-user devices, sensors and actuators and connect them with back-end systems...

.....while advanced analytics turn these new mountains of data into intelligence and insight...

.....which is translated into action, making our systems, processes and infrastructures more efficient, productive and responsive.

An aerial night view of a city skyline, likely Hong Kong, with numerous skyscrapers illuminated. The text "Why Cities?" is overlaid in the center in a white, sans-serif font. The background is a dark, hazy night sky with city lights reflecting on the water.

Why Cities?

2007 was the first year in which more than half the world was living in cities.

By 2050 it will be 70%.

Every minute for the next 20 years, 30 people will leave rural India for urban India.

They will need 500 new cities.

**Our Smarter Planet
will be built by the
cities of the world**



Cities are **centers of growth**, and the keys to connectivity and competitiveness

Cities play increasingly large roles in

- Creating wealth
- Enhancing social development
- Attracting investment
- Harnessing human and technology resources to create productivity and competitiveness gains

Some cities outpace entire countries in economic output

New York, LA, Chicago, Boston and Philadelphia – together, the fourth largest economy in the world.

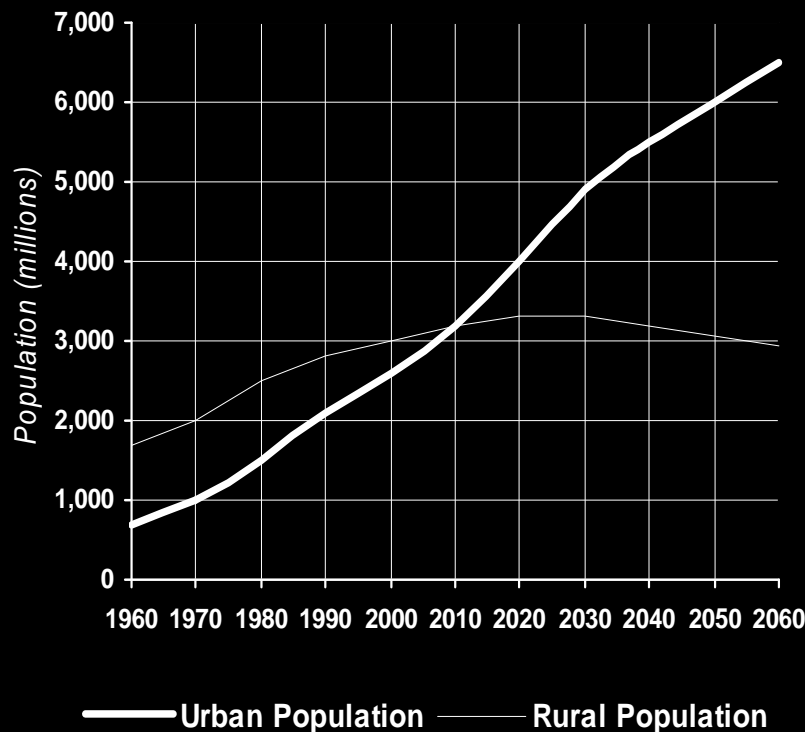
Sao Paulo and Bangkok each have 10% of their respective country's total population, but account for 40% of GDP

The pace of urbanization is unprecedented...

Urban population is projected to nearly double from 3.3B (2007) to 6.4B (2050)

Asia's urban areas will grow by more than 100,000 people a day

Figure I.1 Urban and Rural populations of the world, 1950-2050



...and growth is stressing every piece of our infrastructure

Energy



In the near term we'll need to extract more oil and natural gas than ever before. Projections show energy consumption increasing by 50% in the next 25 years.

Food



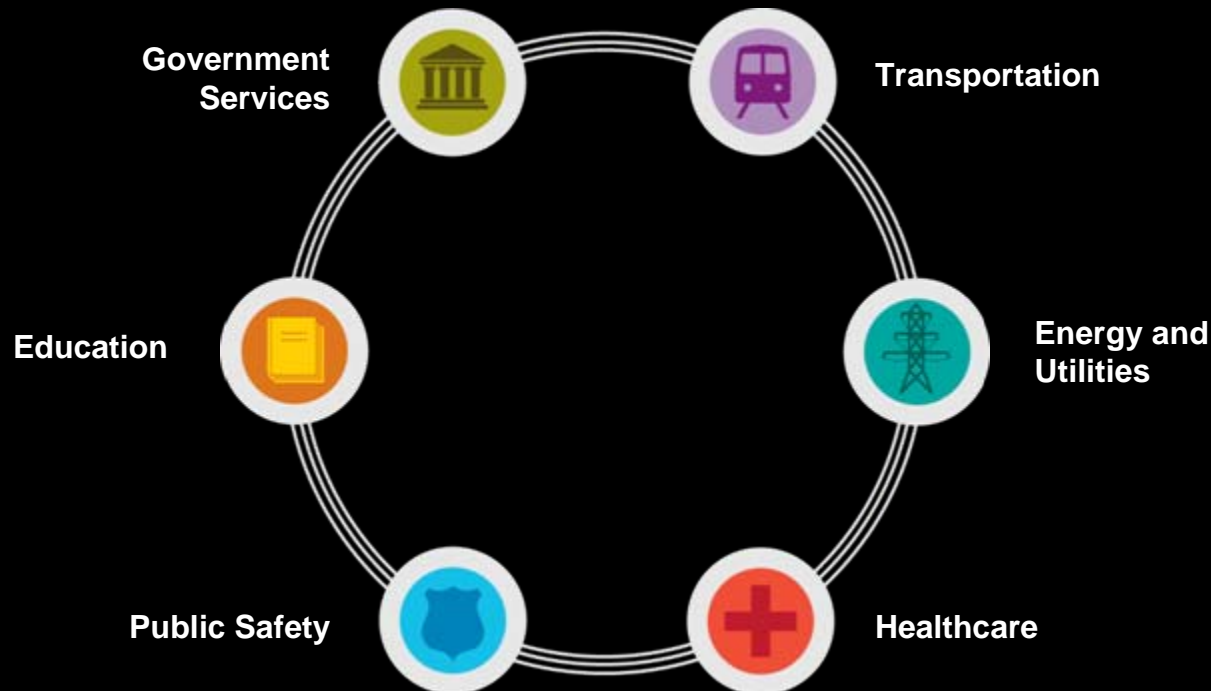
820 million people around the world are undernourished. Yet 50% of the food we produce is wasted between field and fork.


Water



In the last 100 years global water usage has increased at twice the rate of population growth. Today, one in five people still lacks clean drinking water.

The city is a microcosm of the major challenges and opportunities facing the planet today— **intensified and accelerated.**





A Smarter City connects physical, digital, social and business infrastructures to leverage collective intelligence and abilities.

Benefits? Optimizations and integration to reduce costs of service operation, cut emissions, reduce wastage of time, energy, and materials, improve public safety, enable pursuit of sustainable prosperity.

How? Gather data on service consumption or the behavior of individuals, crowds, vehicles, etc
Make more data available, faster, to city systems. Apply analytics and optimization.
Deliver insight in “ever more near real time”.

Which Systems? Energy, water, transportation, buildings, public safety, health, education, constituent services.

What? Improve the planning and operation of city systems - and thus the quality of life and work in the city.

All cities benefit from advanced information and communications technologies

Intelligent Transportation Systems

- Integrated Fare Management
- Road Usage Charging
- Traffic Information Management

Public Safety

- Surveillance Systems
- Emergency Management Integration
- Micro-Weather Forecasting

Energy Management

- Network Monitoring and Stability
- Smart Grid – Demand Management
- Intelligent Building Management
- Automated Meter Management

Telecommunications

- Fixed and mobile operators
- Media Broadcasters

Water Management

- Water purity monitoring
- Water use optimization
- Waste water treatment optimization

Environmental Management

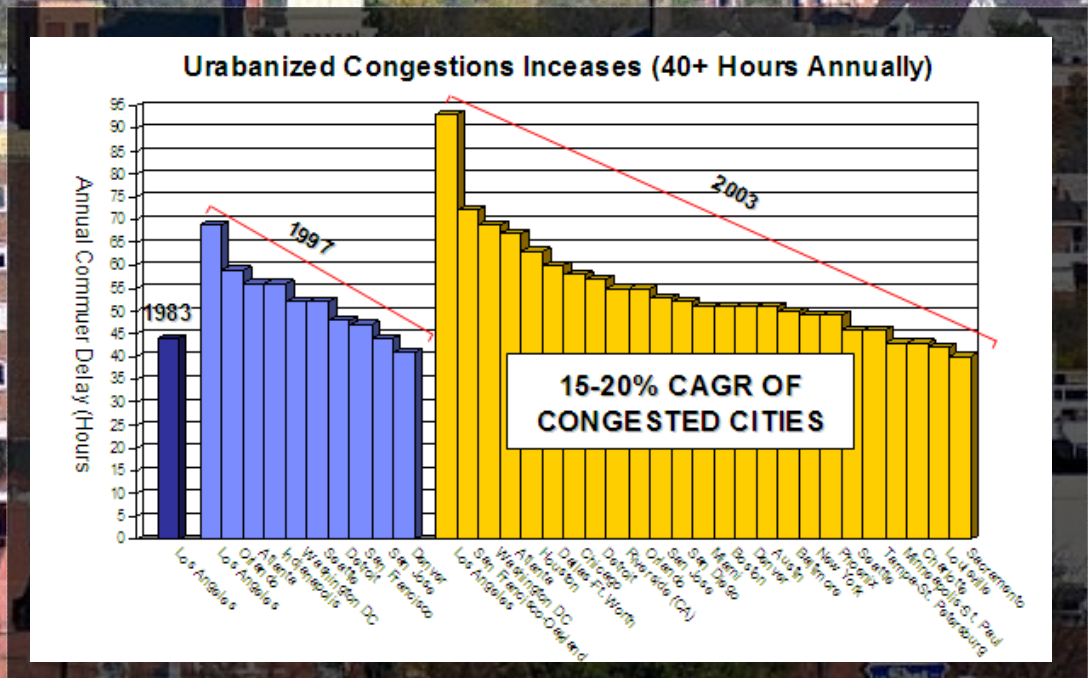
- City-wide Measurements
- KPI's
- Carbon Management
- Scorecards
- Reporting



An aerial, high-angle photograph of a dense urban skyline, likely New York City. The image is filled with numerous skyscrapers of varying heights and architectural styles, packed closely together. The lighting is soft, suggesting either early morning or late afternoon, with some buildings catching the light and others in shadow. The overall color palette is dominated by the grays and blues of the buildings, with some warmer tones from the sky and the tops of the structures. The word "Transportation" is overlaid in the center in a clean, white, sans-serif font.

Transportation

Congestion within cities is accelerating at a rapid pace – an increasing issue for more cities and governments



Chronic traffic congestion creates significant impact to cities and citizens

Productivity and Quality of Life

Americans experienced travel delays of 4.2 Billion Hours in 2007 - - equivalent to a week of work per traveler

Economic Impact

Gross Regional Product is reduced by up to 10% as a result of transportation congestion

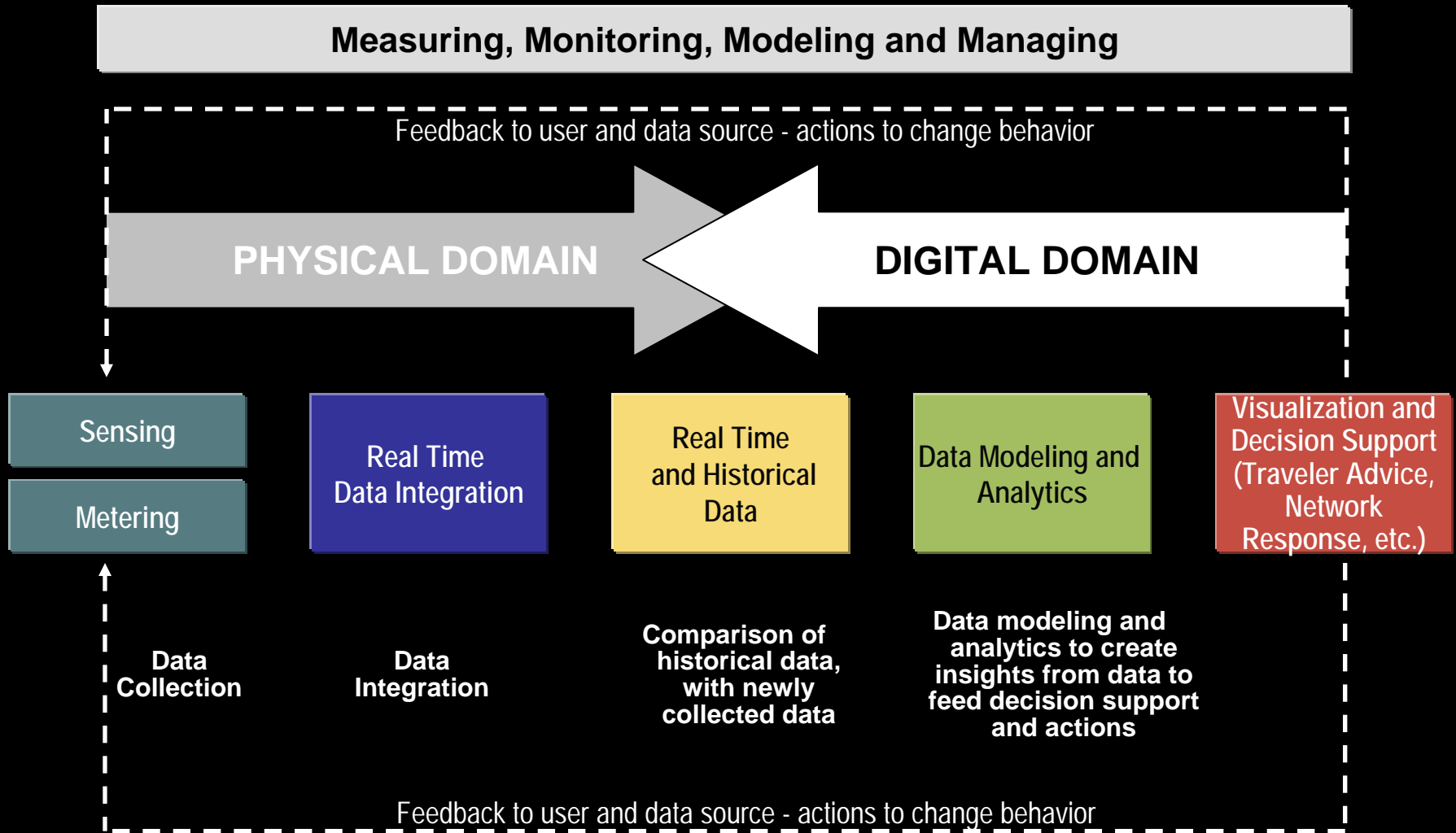
Fuel and Time Cost

Congestion cost Americans \$87 Billion in 2007 - - an increase of 50% in the past decade

Environmental Impact

Prior to the implementation of its congestion pricing program, London traffic and CO2 emissions were 20% higher

The intersection of the 'physical' with the 'digital' provides the ability to create a Smarter City



The accumulation of real-world data contains valuable information about patterns of behavior

Operational/ Transactional



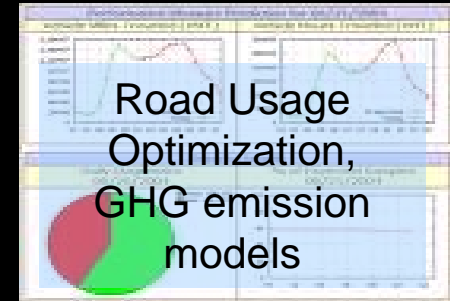
- Toll collection only - disconnected operational data
- Transaction data from the management of payments
- Little automated use is made of real-time traffic data

Insights



- More granular charging, by location
- Analysis of traffic patterns to manage city congestion.
- Modeling traffic to predict and manage entire system

System wide control



- Dynamic and congestion based pricing
- Route planning and advice, shippers, concrete haulers, limo companies, theatres, taxis etc
- City-wide, dynamic traffic optimization

Cleaner mobility...

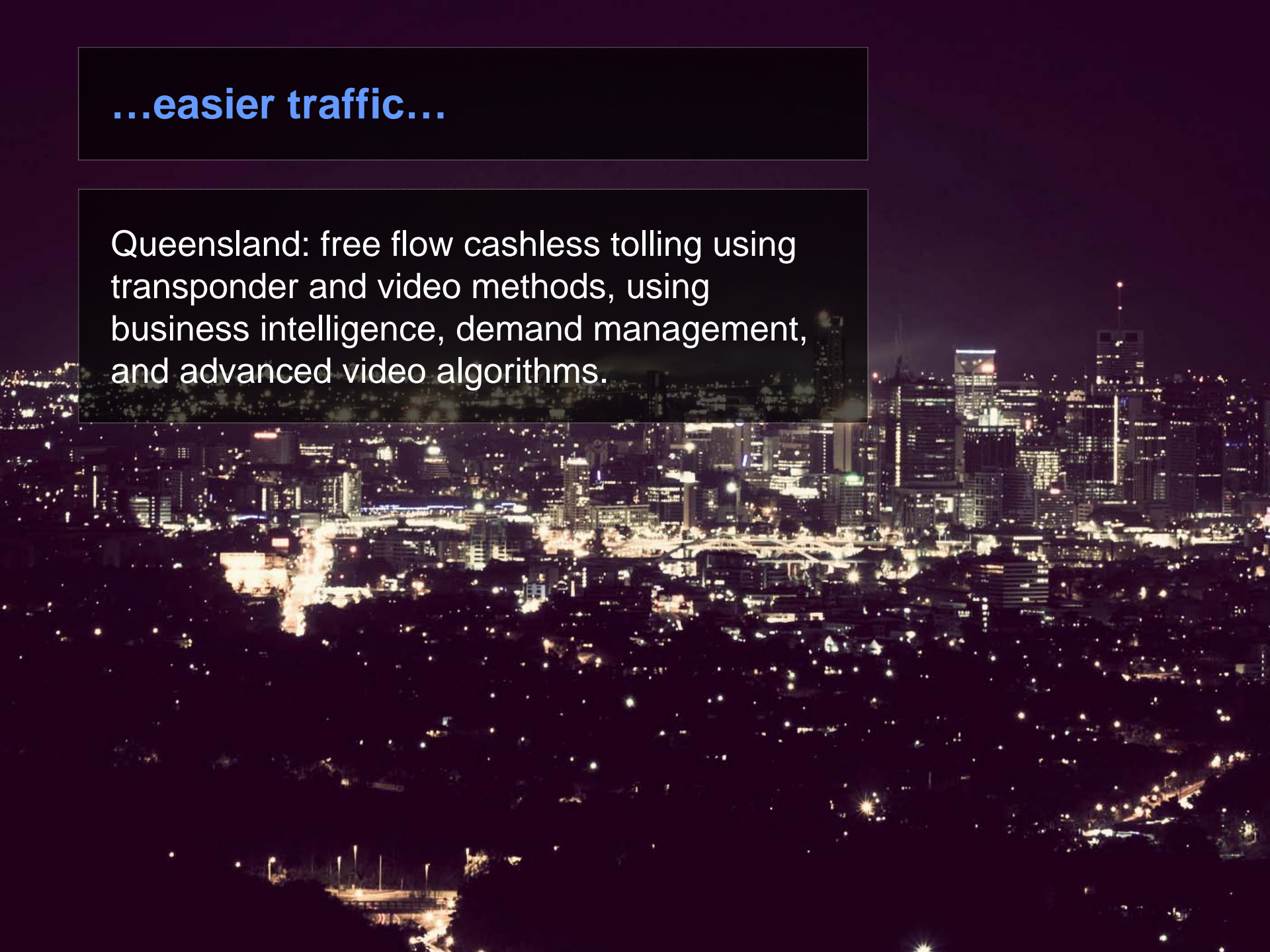
London, Singapore, Stockholm and others are deploying smarter traffic systems.

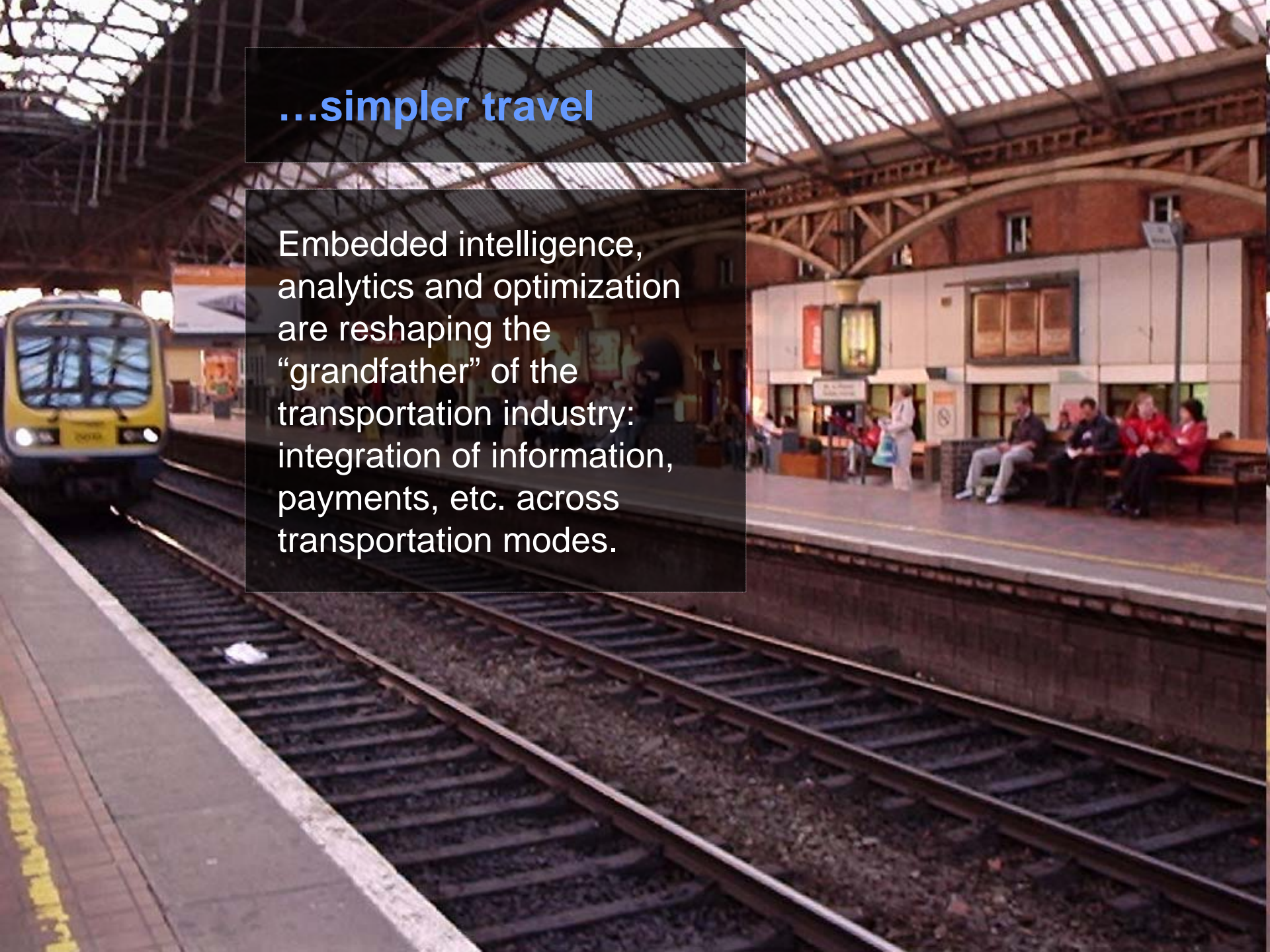
Stockholm has seen approximately 20 percent less traffic, a 12 percent drop in emissions and a reported 40,000 additional daily users of public transportation.



...easier traffic...

Queensland: free flow cashless tolling using transponder and video methods, using business intelligence, demand management, and advanced video algorithms.

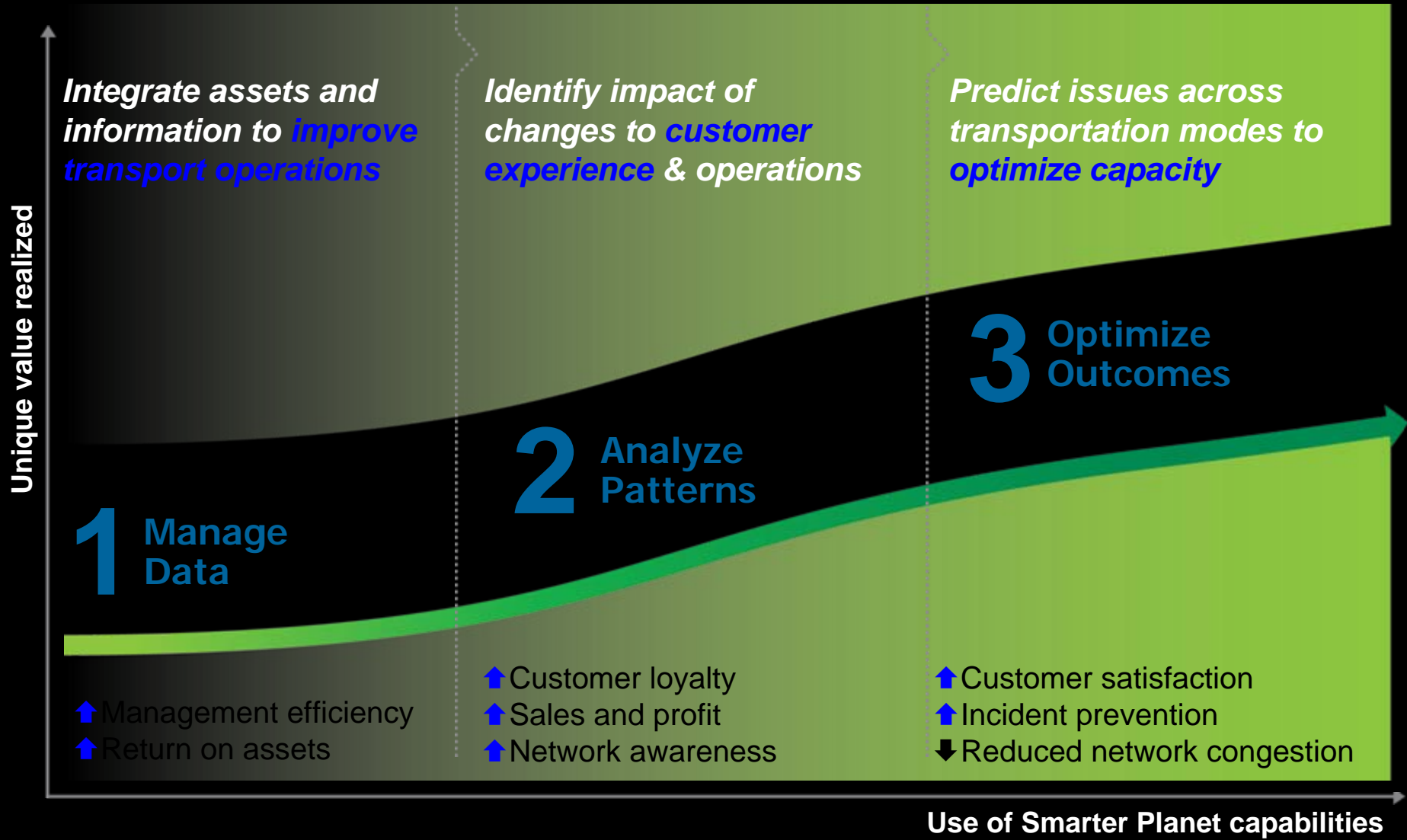


A photograph of a train station platform. A yellow train is on the tracks on the left. People are sitting on benches on the right. The station has a large, arched glass and steel roof. The text is overlaid on the image.

...simpler travel

Embedded intelligence, analytics and optimization are reshaping the “grandfather” of the transportation industry: integration of information, payments, etc. across transportation modes.

Building Capabilities for Smarter Cities - Transportation

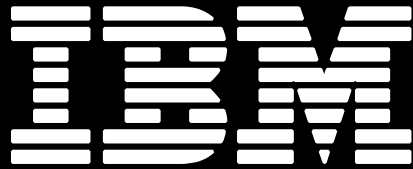


**“Gentlemen, we
have run out of
money. Now we
must think”**



How will you infuse intelligence into your city's systems to create opportunity, improve quality of life, and compete on a global scale?





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