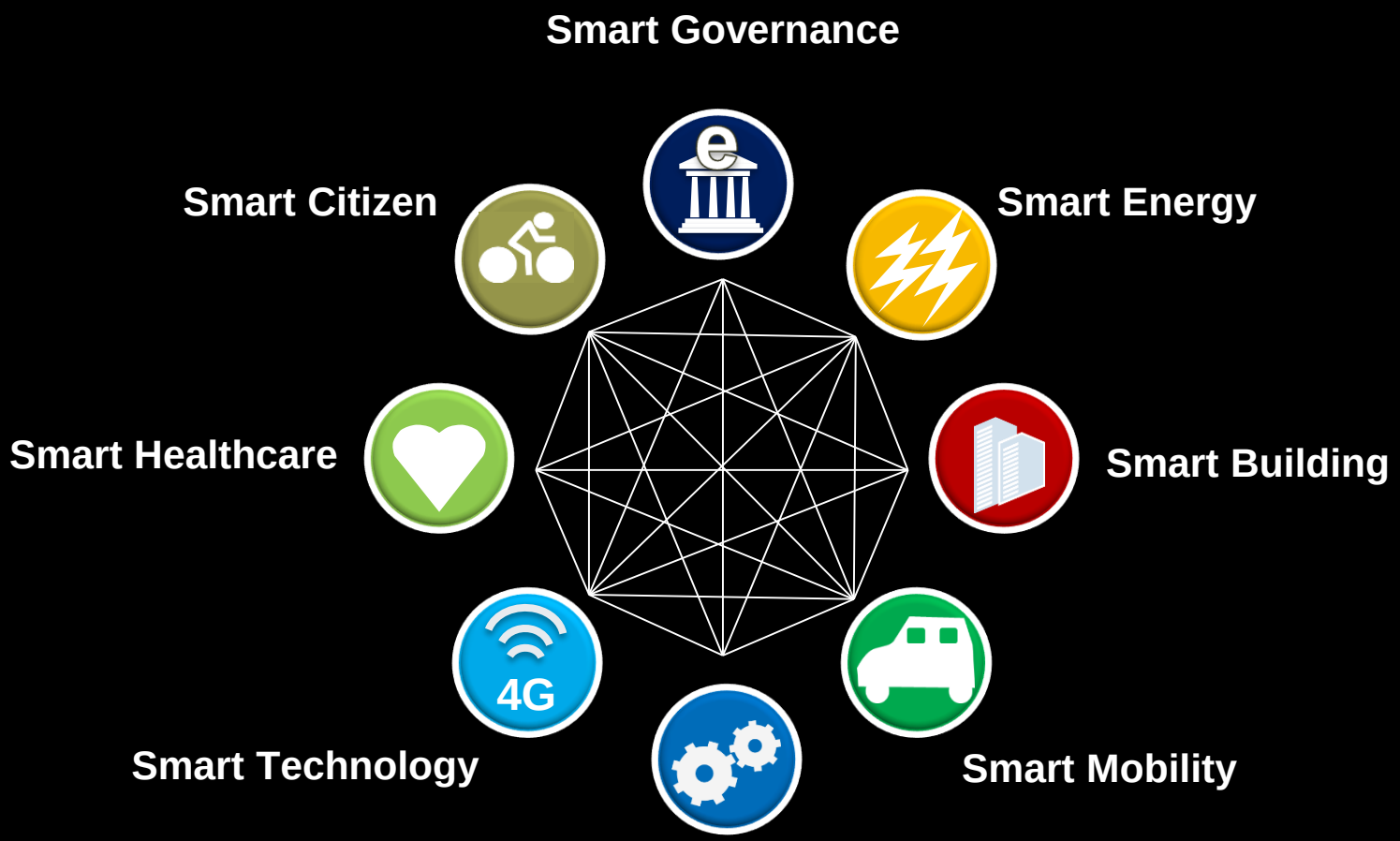
The Technology Behind Tomorrow's Smart Cities

FROST & SULLIVAN

Eight Characteristics of a Smart City



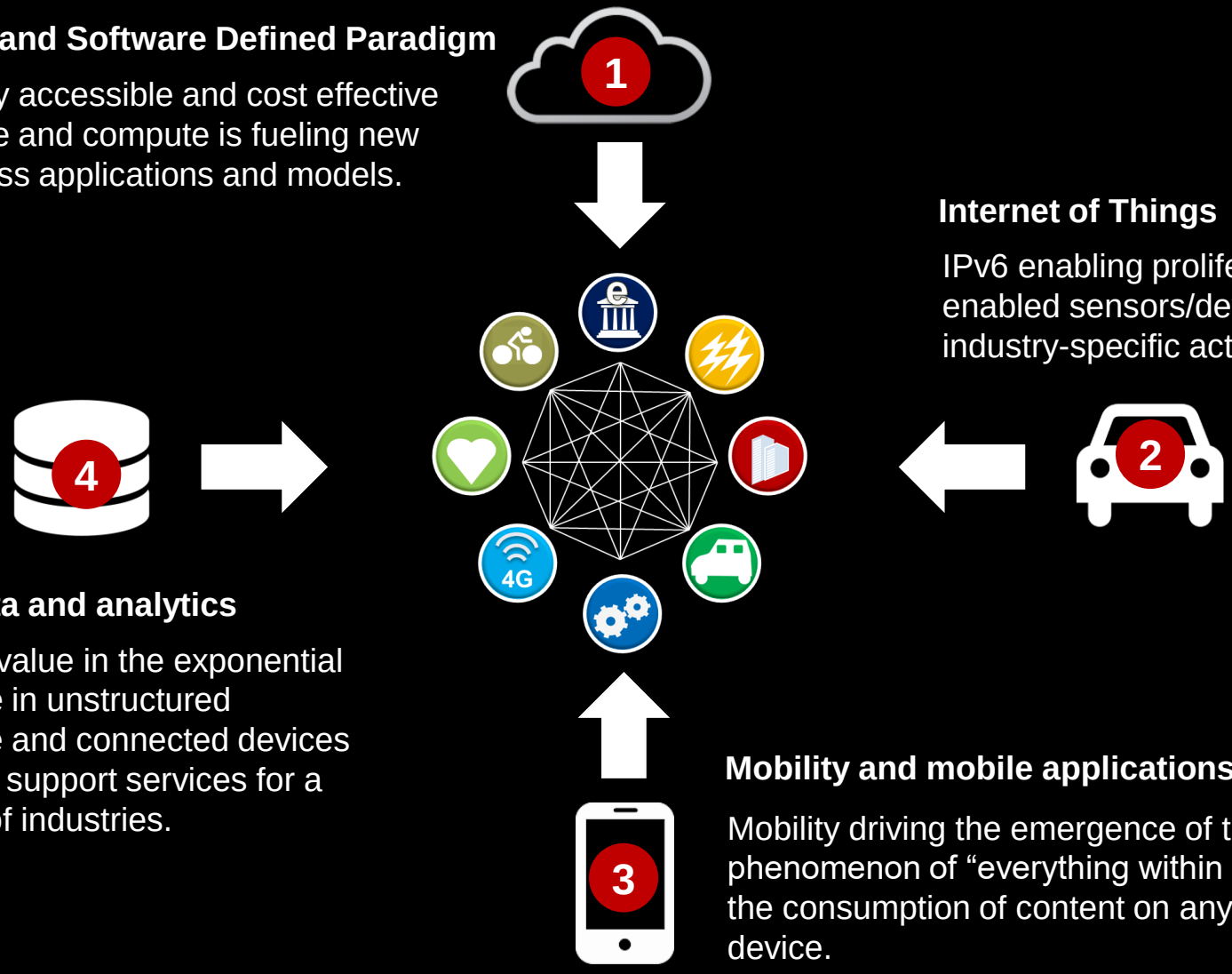
Nexus of Cloud Computing, Big Data, Mobility and the Internet of Things Reshapes Industries, and Cities

Cloud and Software Defined Paradigm

Readily accessible and cost effective storage and compute is fueling new business applications and models.

Internet of Things

IPv6 enabling proliferation of IT enabled sensors/devices across industry-specific activities



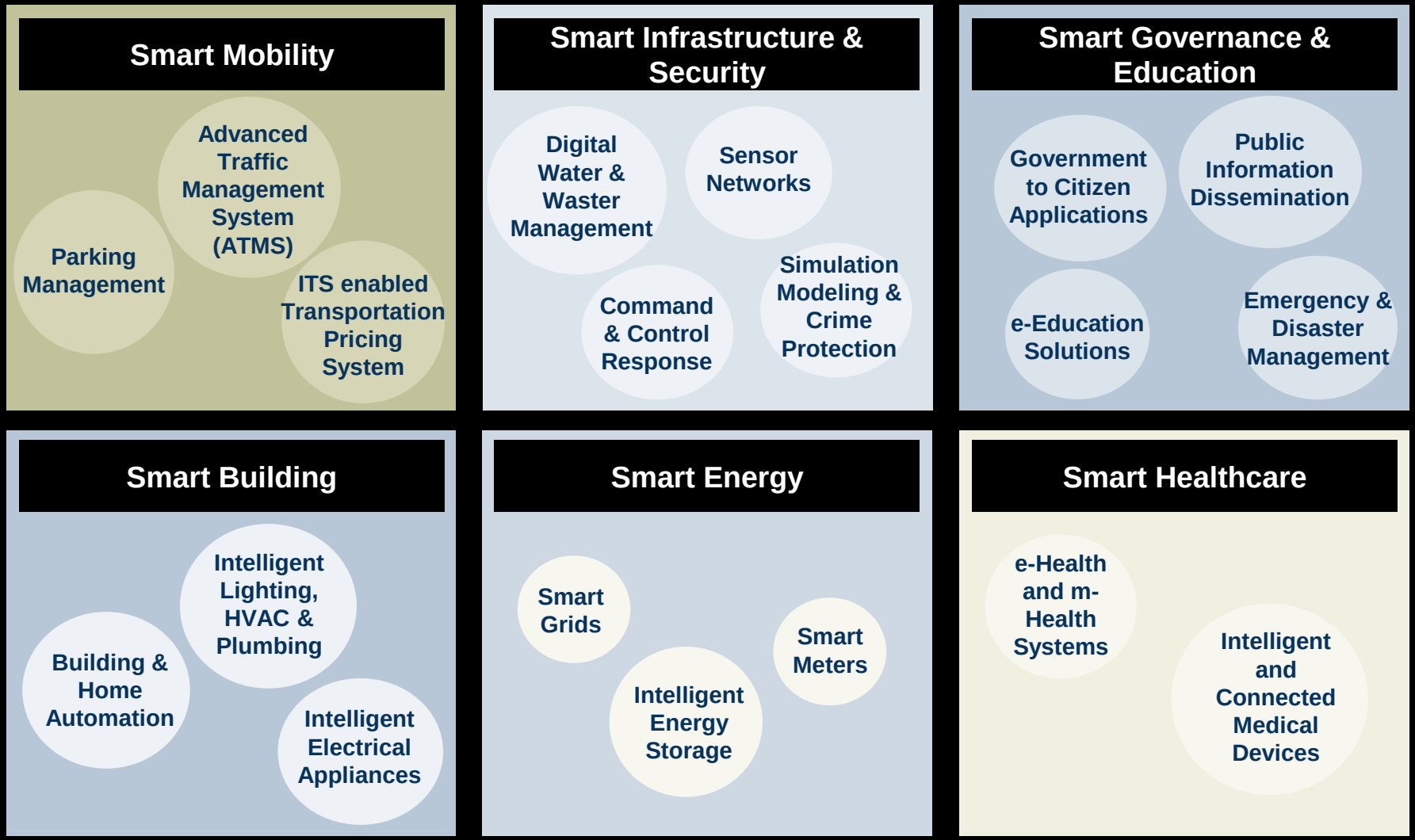
Big Data and analytics

Finding value in the exponential increase in unstructured machine and connected devices data will support services for a variety of industries.

Mobility and mobile applications

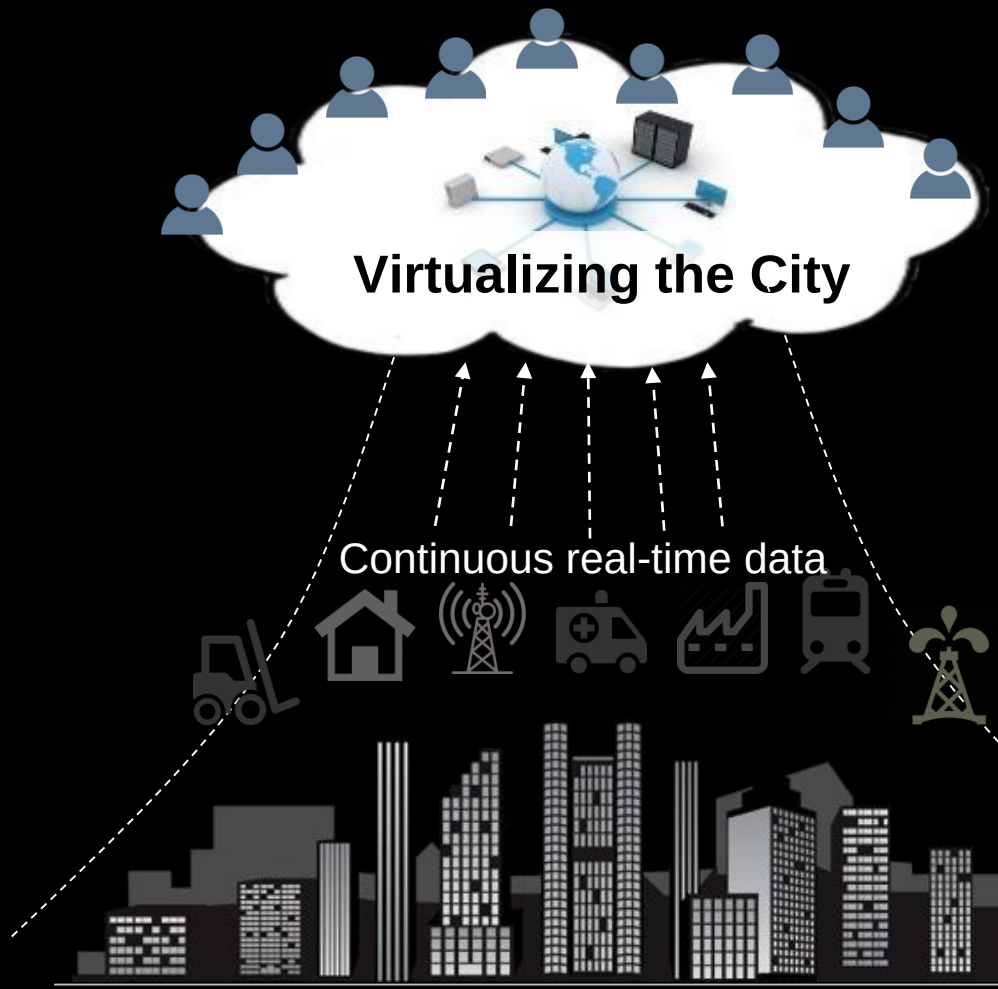
Mobility driving the emergence of the phenomenon of “everything within the app” and the consumption of content on any IP enabled device.

These Technologies Span Across Different Areas



Clout: Cloud of Things

Combining Internet of Things and Cloud Technology to enable the creation of new services



Expected Impact of ClouT

1. Improve citizens' interaction with city services
2. Save energy, time and resources
3. Support new business models
4. Develop a CIaaS Model (*City Infrastructure as a Service*) to foster entrepreneurship and attract investment
5. To create a more cohesive and supportive society

Evolving Security Threats

As threats move from the cyber world into the physical world, more robust security solutions and measures need to be put in place.

Virtual environment: Enterprise security

Protecting:

- **Against the employee**
- **IT infrastructure**
- **Protecting enterprise digital assets**

Physical environment: Critical infrastructure security

Protecting:

- **Customers & citizens**
- **Critical infrastructure**
- **Machine to machine interface**
- **Physical objects**

Human environment: IoT security

Protecting:

- **The user from himself/ herself**
- **Human from machines**
- **The human to machine interface**

Man vs Man

- **cyber criminals**

- **cyber terrorism**
- **state sponsored attacks**

- **intelligent machine attacks**

Man vs Machines

There Are Four Different Roles Smart Cities Players Can Take

1 Integrators

Smart city integrators are project integrators that bring together various sectors of the smart city through pre-packaged platforms thereby providing a unified , holistic and end-to-end integration of multiple sectors
Example: IBM, Oracle, Accenture, Siemens

2 Network Service Providers

Smart city network providers offer collaborative networks, data analytics and enterprise working solutions that connect people, assets, systems and products by leveraging on their networking and M2M capabilities.
Example: Cisco, Verizon, Ericsson, AT&T

3 Pure-Play Product Vendors

Smart city product vendors provide "hard assets" like smart meters and distribution devices (e.g., automated switches, controllers for capacitor banks and voltage regulators) that operate as the main nodes of connectivity.
Example: Eaton, Honeywell, ABB, Schneider Electric, Siemens

4 Managed Service Providers

Smart city managed service providers offer round-the-clock monitoring, complete management, compliance monitoring, and on-site consulting. These services are provided either in-house, co-managed, or are completely outsourced (third party providers)
Example: IBM, Serco, SAIC, Infosys

Selective List of Products and Services Portfolio That can be Offered in Key Smart City Segments

Based IT	Transportation	Energy	Buildings	Infrastructure	Security	Healthcare	Governance
City cloud computing	Traffic management	Smart grids; energy management	Building Energy Management	Asset Utilization and Maintenance	Identity Management	Integrated health record system	eServices Transactions and Payments
Data-centric consulting services	Electric vehicle charging infrastructure	Smart meters	Building Automation	Analytics and Return on investment analysis	Cyber security	eHealth	eCommunication Notifications and alert service
Information management services	Tolling and congestion charging	Smart home appliances	Energy Harvesting	Augmented reality repairs	Intelligent, real time security management	Mobile Health	eAdministration Tools for public administration
IT advisory services	Integrated mobility management	Flow and regenerative technologies	Buildings as Energy Storage Units	Remote maintenance	Sensor actuator solutions	Tele-consultation facility	eSecurity Law enforcement and emergency management
Managed security services	Geo fencing and asset tracking	Renewable integration	Building as a Generator (Prosumer)	3D printing	Logistics or mobility security management	Home health	eBusinesses Registration services Patent renewals
Authentication and monitoring (Sensors, video surveillance)	Parking management and payment solutions		Intelligent Buildings		Building security	Data and business analytics for healthcare	mGovernance (mobile governance) SMS tax returns SMS utility bills

Future of Technology in Smart Cities

City-based cloud system, fully digitally connected city, fully networked and context-aware mobile-enabled infrastructure will bring new waves in connectivity in the future

	Cloud services and software components	Smart systems based on the Internet of Things	Future Internet platforms and services
2016	City-based cloud system	Smart power management portable systems	Fully networked and context-aware mobile-enabled infrastructure of sensors and connectivity
2020	Open and federated content platforms	Smart systems enabling integrated solutions e.g., health and care	Living Lab approach—a balanced mix of technological and social innovation
2025	Cloud-based fully connected city	Software agents and advanced sensor fusion; telepresence	Digitally connected city, with citywide wireless Internet, fully networked parking, self-driven cars, etc.

Source: Cisco.com; ibm.com; Alcatel-Lucent.com; Frost & Sullivan

Key Questions

How does the city use IT to integrate key functions?

How does the city optimise its IT security?

How does the city ensure that IT enables agility and adaptability?

There is no end point. How does the city ensure that IT allows it to keep evolving?

How does a holistic view of the city get created by IT without compromising security?