

Public Infrastructure Evolution with Cloud Network Systems

Information Systems Research Laboratory,
Central Research Laboratory, Hitachi Ltd.

Research Director, Kimiya Yamaashi

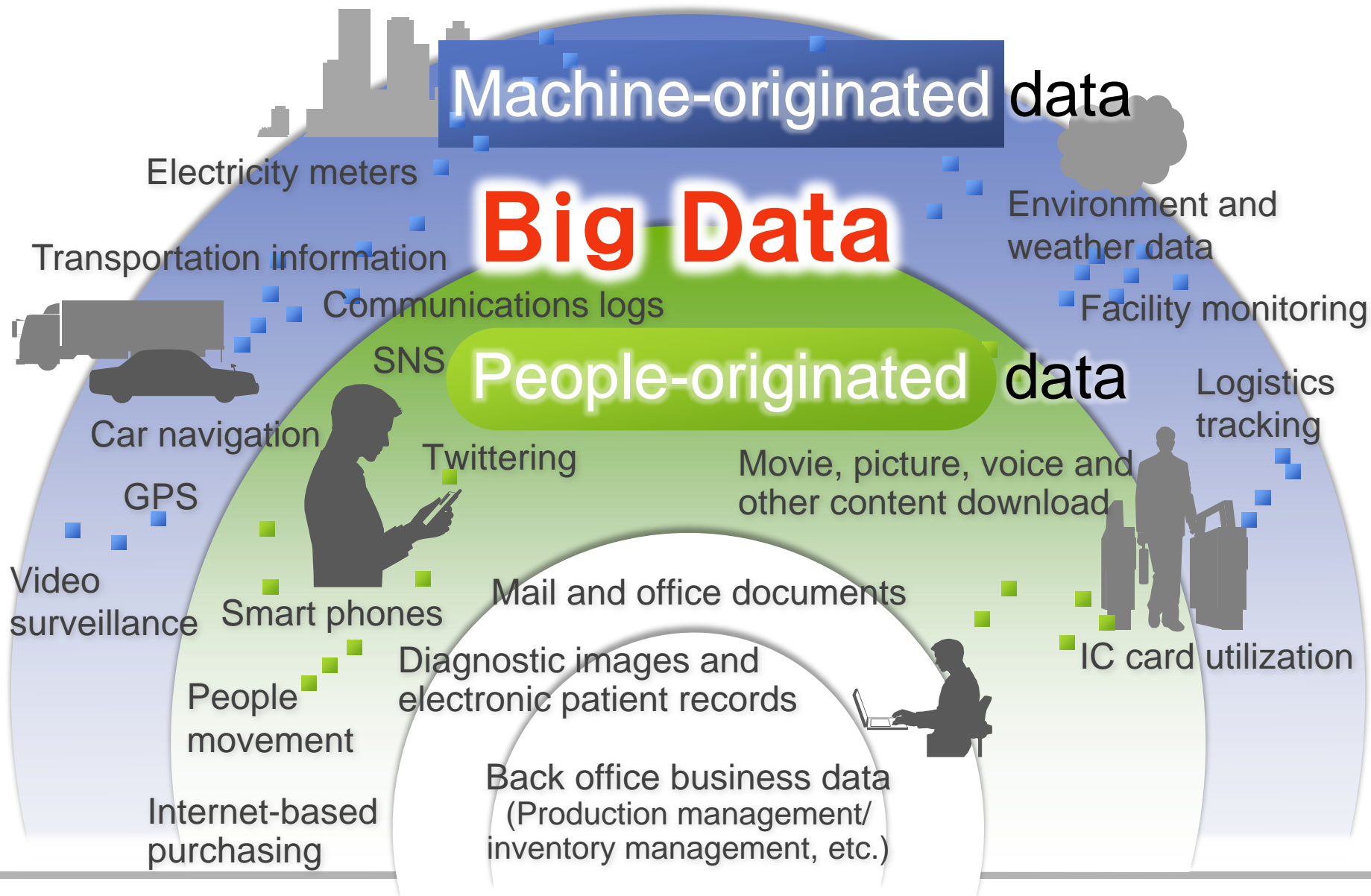
Contents

- 1. Public Infrastructure evolution with big data
- 2. Network progress promotes the evolution
- 3. Future vision: Fusion of public infrastructure
- 4. Conclusion

Contents

1. Public Infrastructure evolution with big data
2. Network progress promotes the evolution
3. Future vision : Fusion of public infrastructure
4. Conclusion

1-1. Society is Overflowing with Beneficial “Data”



Future Spread utilizing Big Data related Business

- Apply utilizing Big Data included unstructured Data to the actual business
- Enhance platform technologies for utilizing Big Data

NOW Launch utilizing Big Data related business

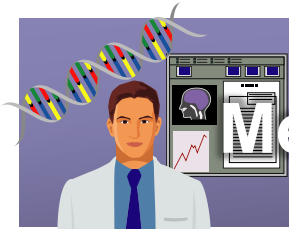
- Progress the development of high value service by informatized/intelligent Big Data globally
- Enhance various technologies for utilizing Big Data

1-3. Big Data Utilization Fields

- Data Generated by People



Retail field One-to-One marketing



Medical field Personalized medical care

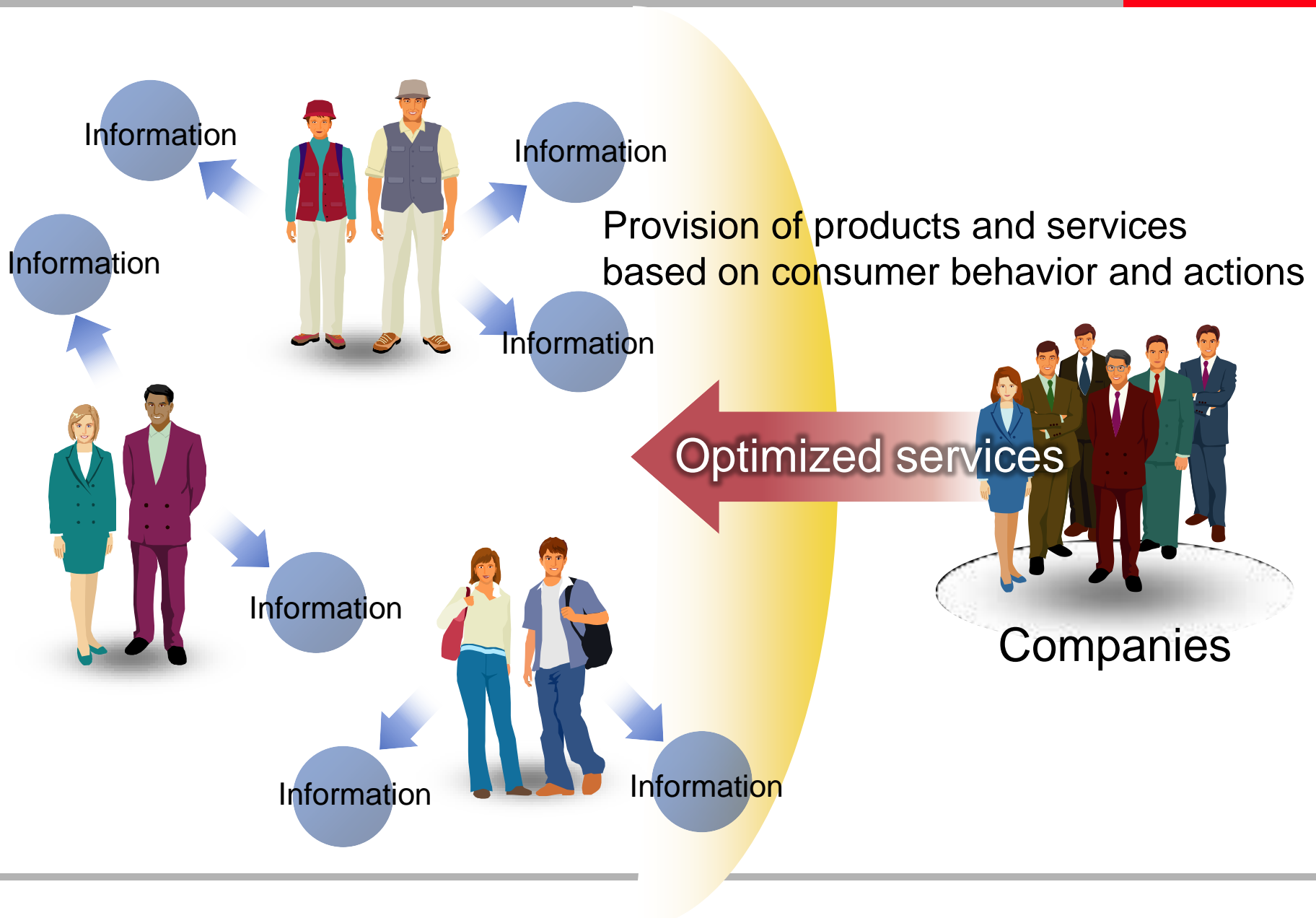


**Banking/
insurance field** Banking and insurance services
tailored to specific customer segments



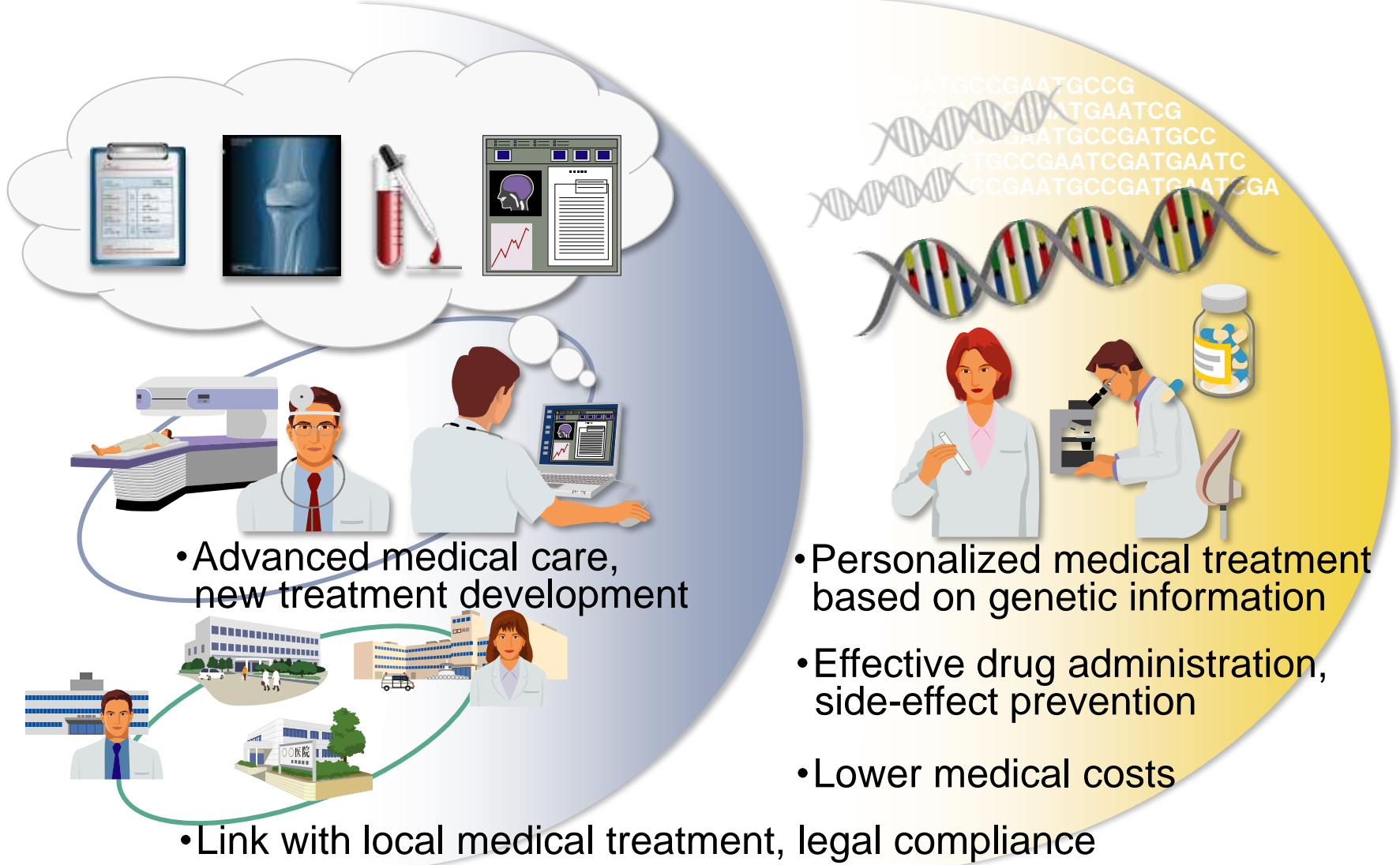
**Public
administration field** Public opinion analysis,
decision-making support

1-4. One-to-One Marketing Utilizing Big Data



1-5. Big Data Utilization in the Medical Field

- Advanced and personalized medical care utilizing various data



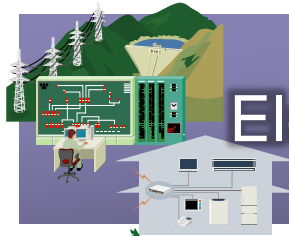
1-6. Big Data Utilization

- Data Generated by Machines and Equipments



Maintenance
field

Preventive maintenance and
operation services



Electricity field

Power supply-demand forecasting
services



Transportation
field

Crowd movement analytics and
forecasting services

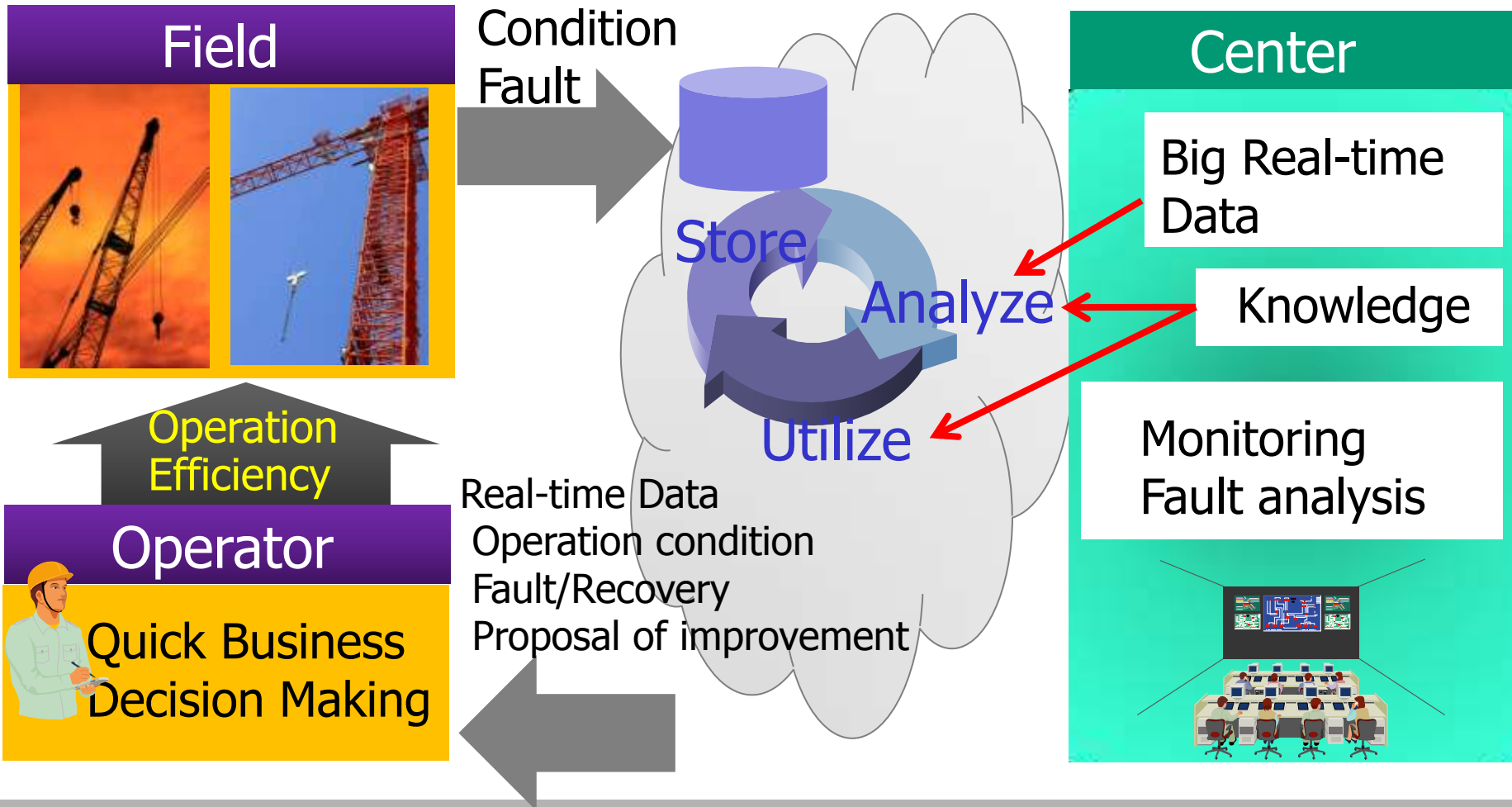


Communications
field

Communications analysis services

1-7. Big Data Utilization in Maintenance Field

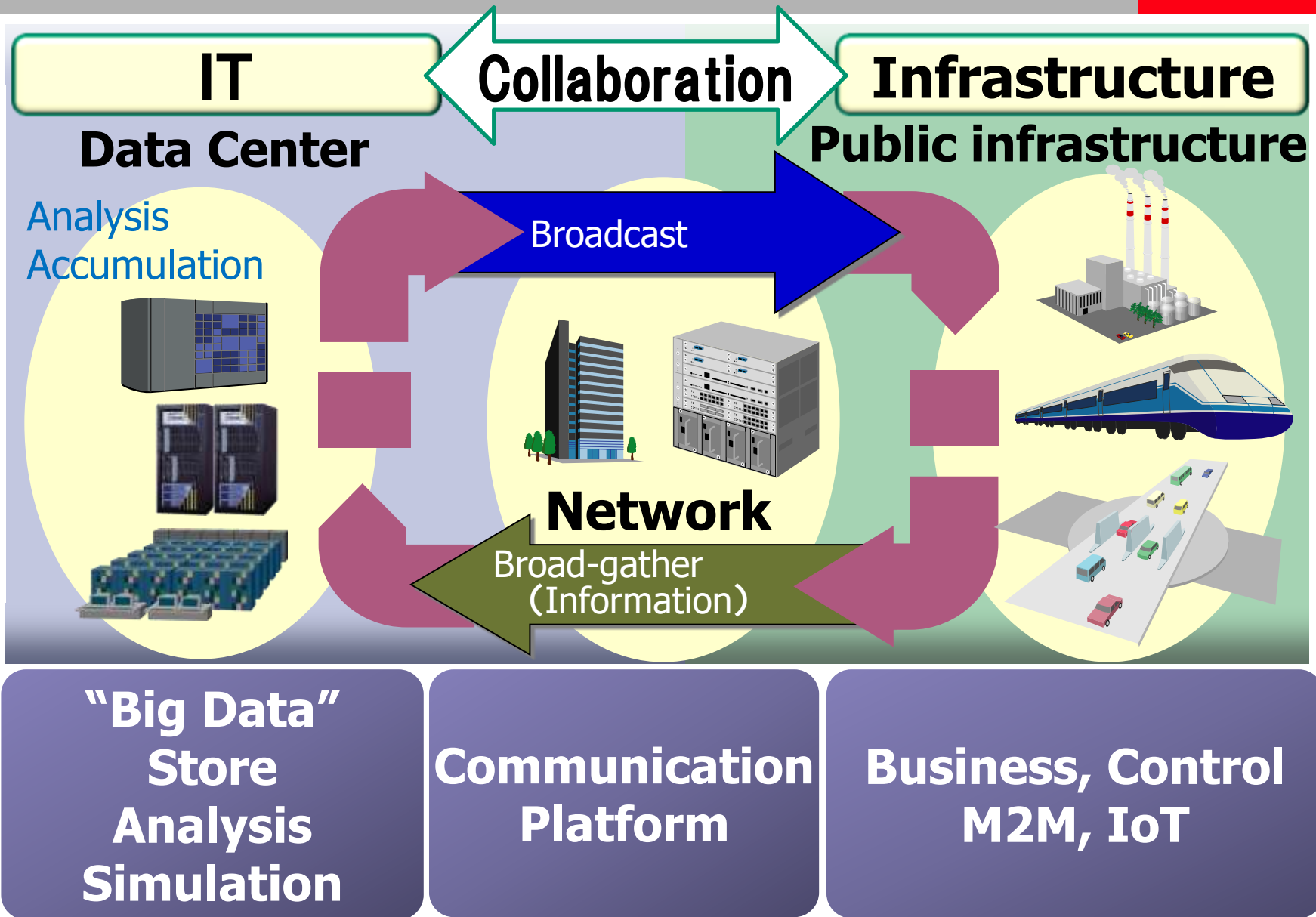
- Maintenance through cloud network with big data
Monitoring the condition of 'cranes' and utilizing them efficiently



Contents

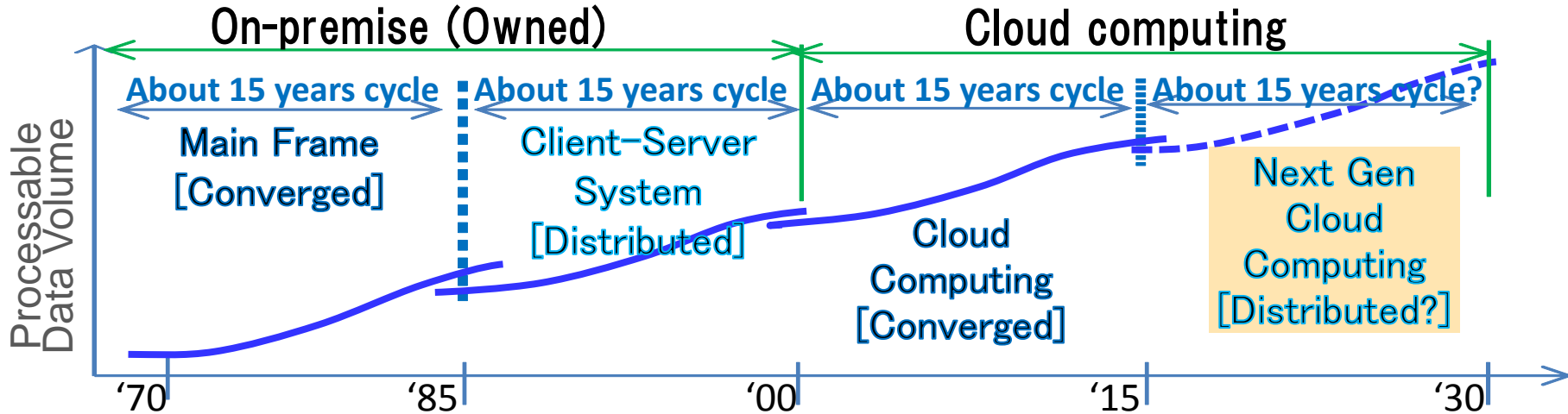
- 1. Public Infrastructure evolution with big data
- 2. Network progress promotes the evolution**
- 3. Future vision : Fusion of public infrastructure
- 4. Conclusion

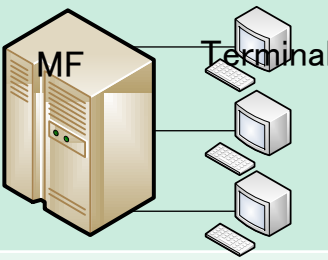
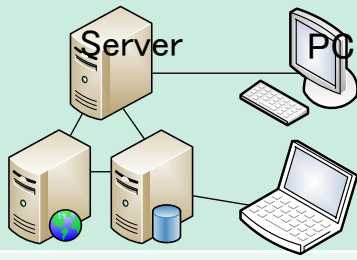
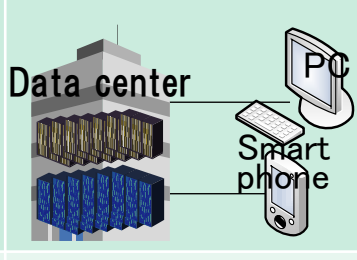
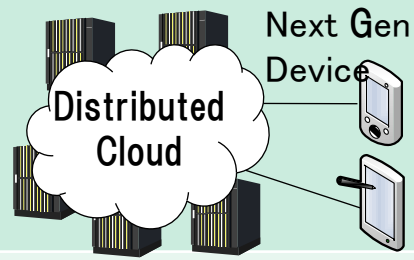
2-1. IT × Infrastructure “Collaboration”



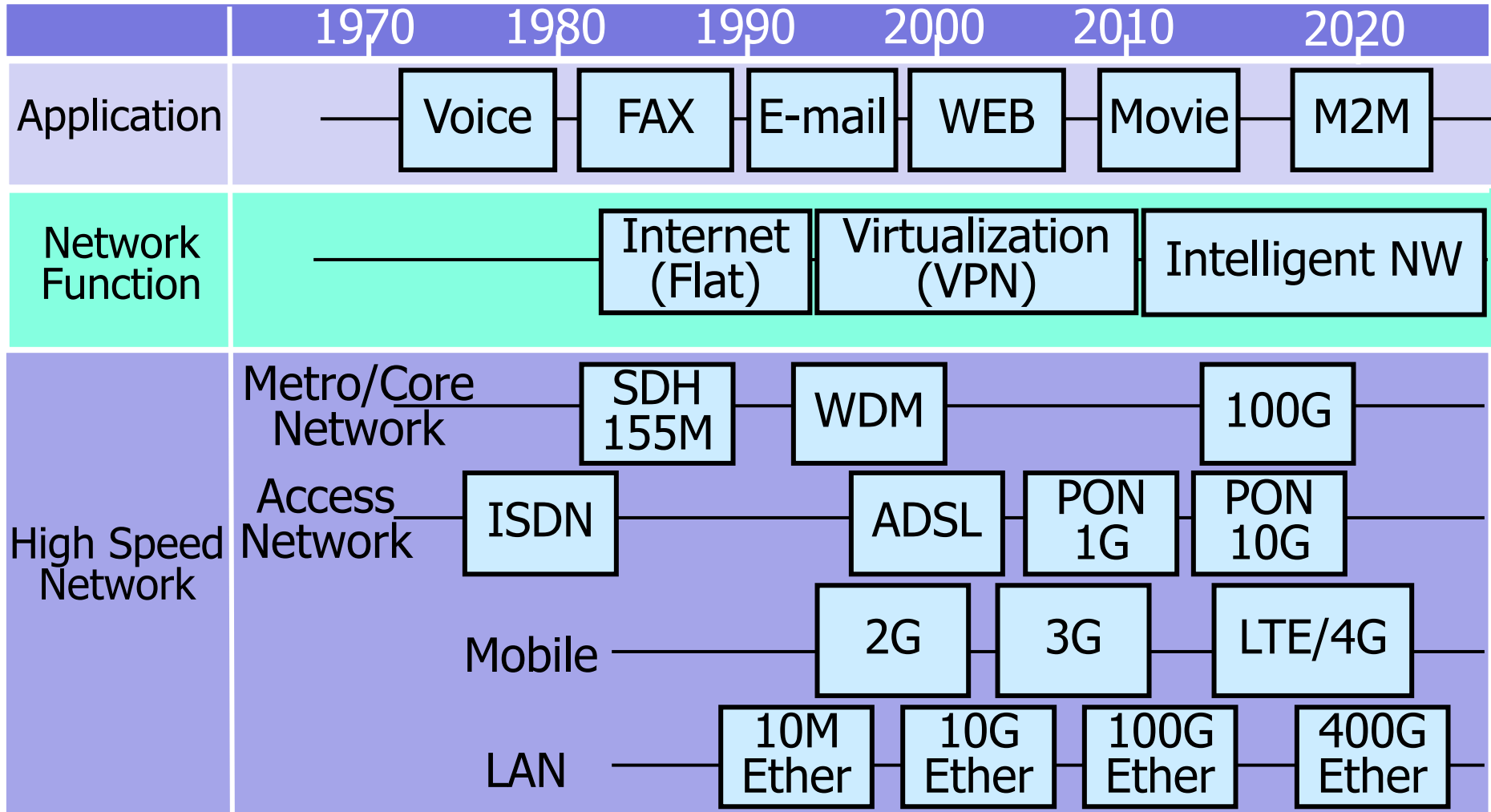
2-2. Paradigm Shift of IT technology

● Network innovation makes computing paradigm shift.



Architecture				
	Main Frame	Client-Server	Cloud	Distributed Cloud ?
Network	Serial (1)	LAN (x100+)	Internet (x100)	Wireless (x100)
Terminal	Dumb terminal	PC	Smart Phone	Next Gen Device
Computer	Main Frame	UNIX Server/PC Server	Virtual Server	Next Gen Server

2-3. Network Technology Roadmap

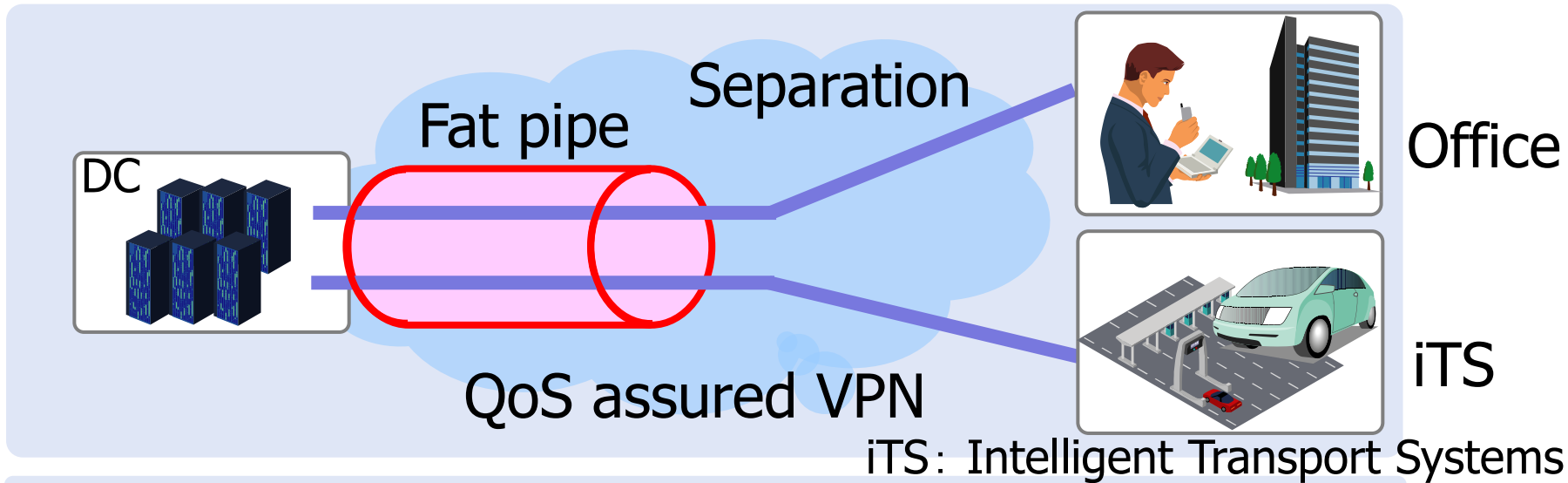


Many users and services are converged on the cloud network.

Reliable Network technology will be key features in business fields.

2-4. Key features: Virtualization (VPN)

- Wide area network is shared by many users and services
Network resource is separated for each users and services

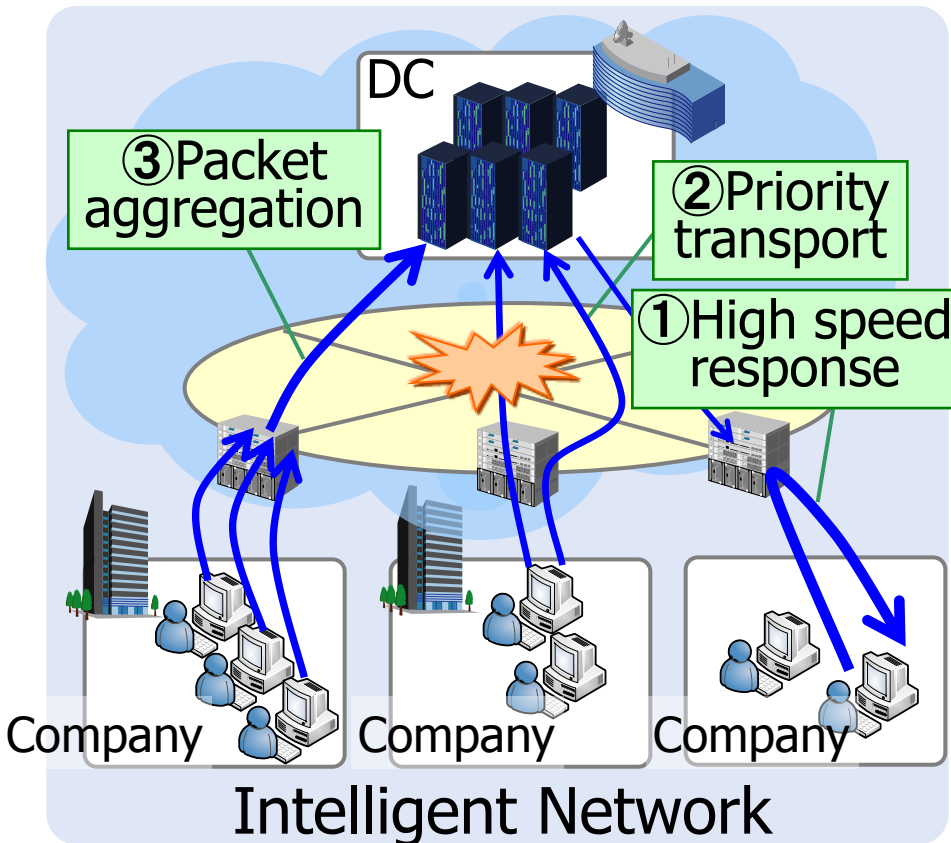


#	Issue	Approach
①	Virtual path optimization	Optimal circuit calculation on centralized control system
②	Bandwidth Optimization	

Network virtualization gives public infrastructure the high-security and assured data transfer

2-5. Key features: Intelligent Network

- Intelligent processing in network brings value added services such as high speed response for data request



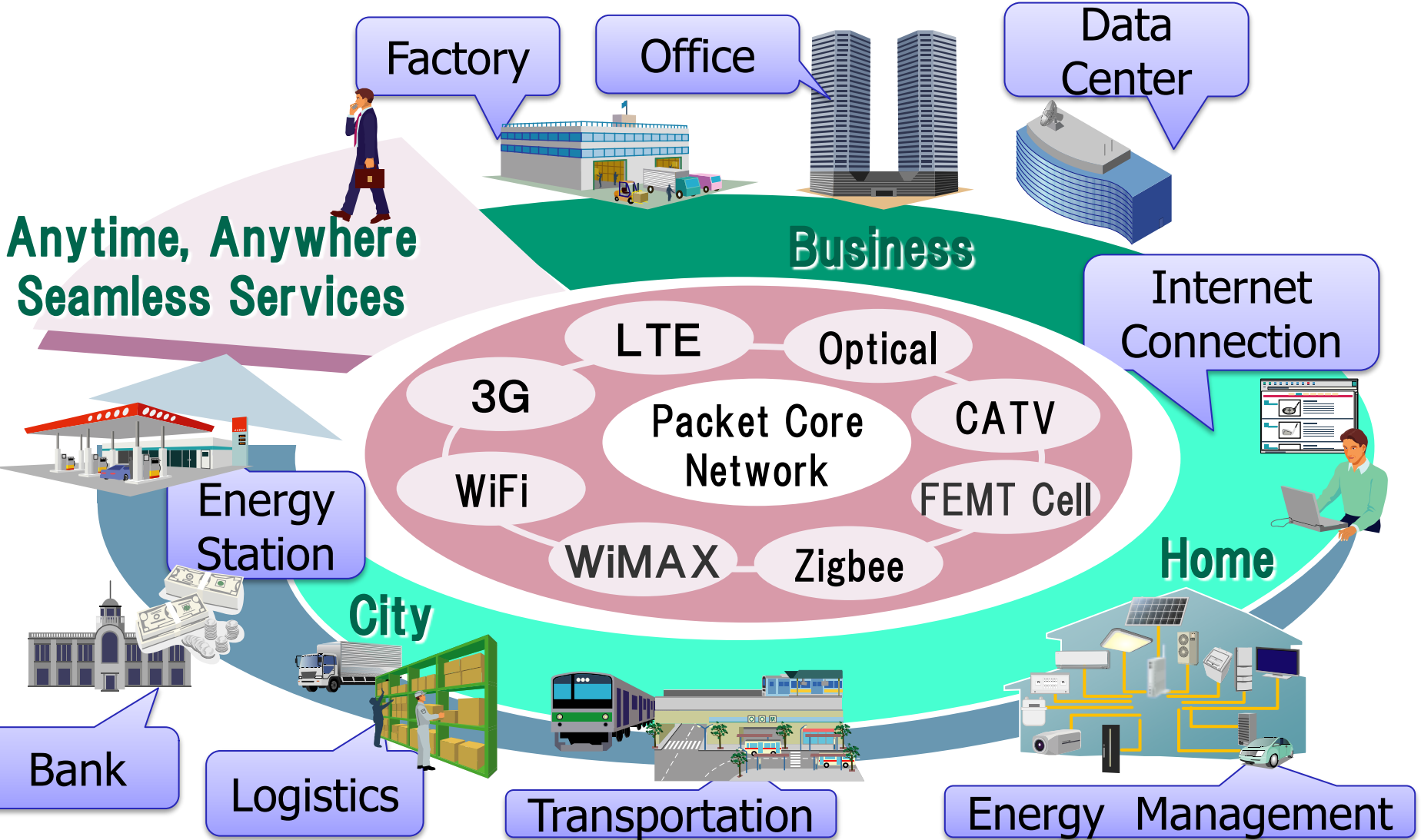
Issues and approach

#	Issue	Approach
①	Response deterioration due to distance	High speed response in Network by local nodes
②	Quality deterioration for important data	Priority transport based on data contents
③	Resource Occupancy by massive data	Packet Aggregation

Intelligent Network gives public infrastructure more stable and more real-time basis control

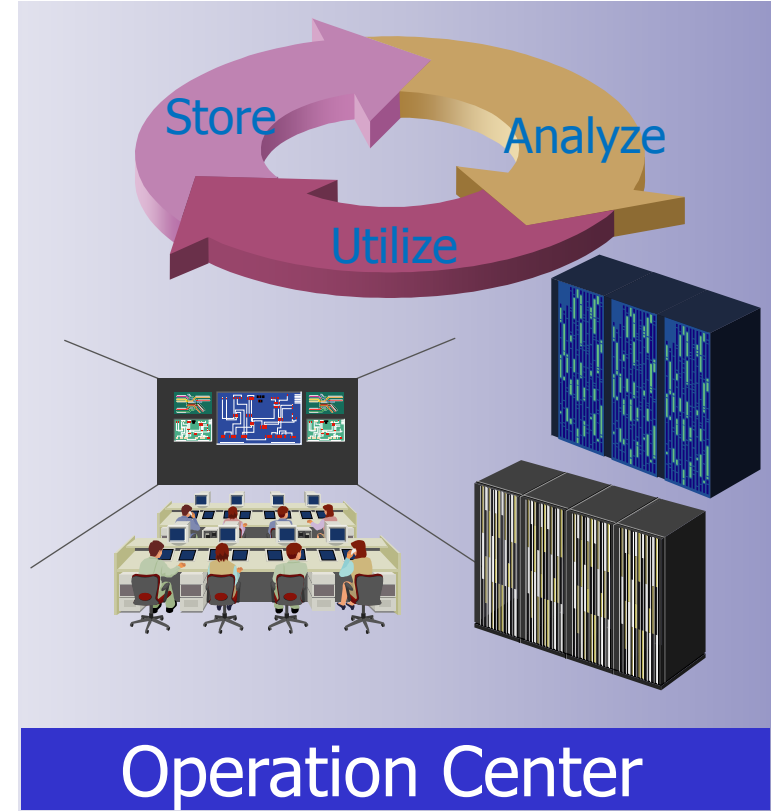
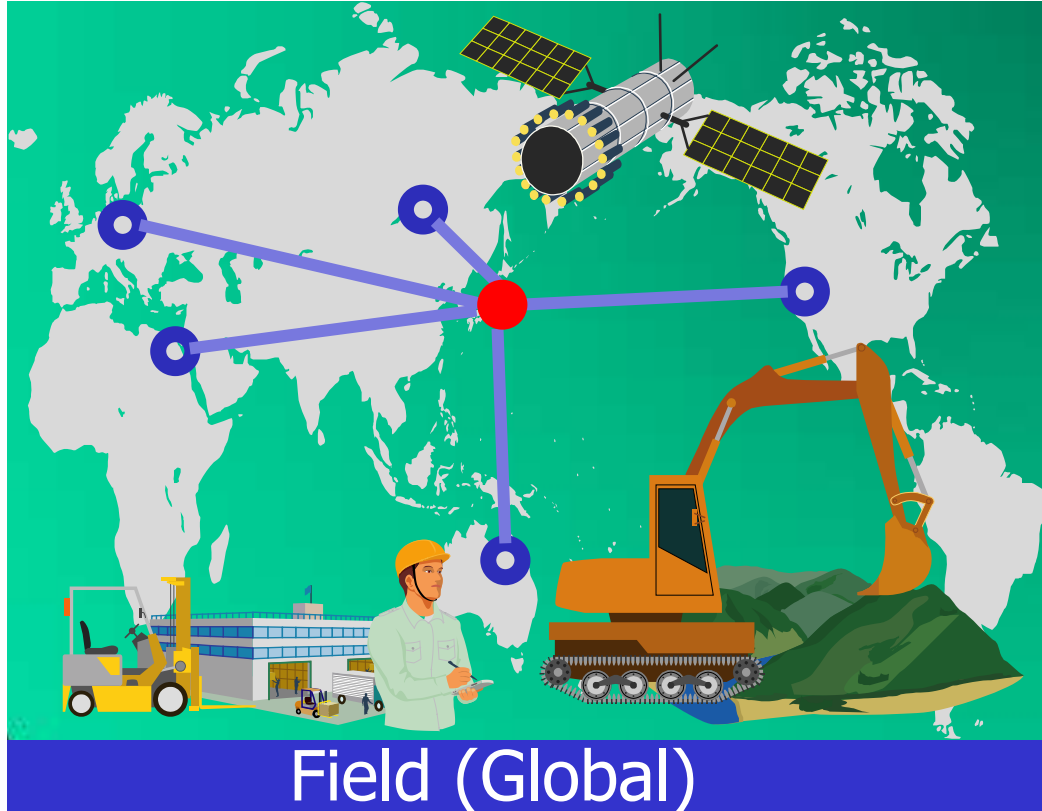
2-6. Cloud network connects everything

● We can connect services seamlessly at anytime, anywhere



2-7. Global operation of construction machinery

- Construction machineries are connected through cloud network
- (Now) Maintenance information is corrected by slow network
- (Future) Machineries are operated with real-time feedback through reliable and high-response wide-area network

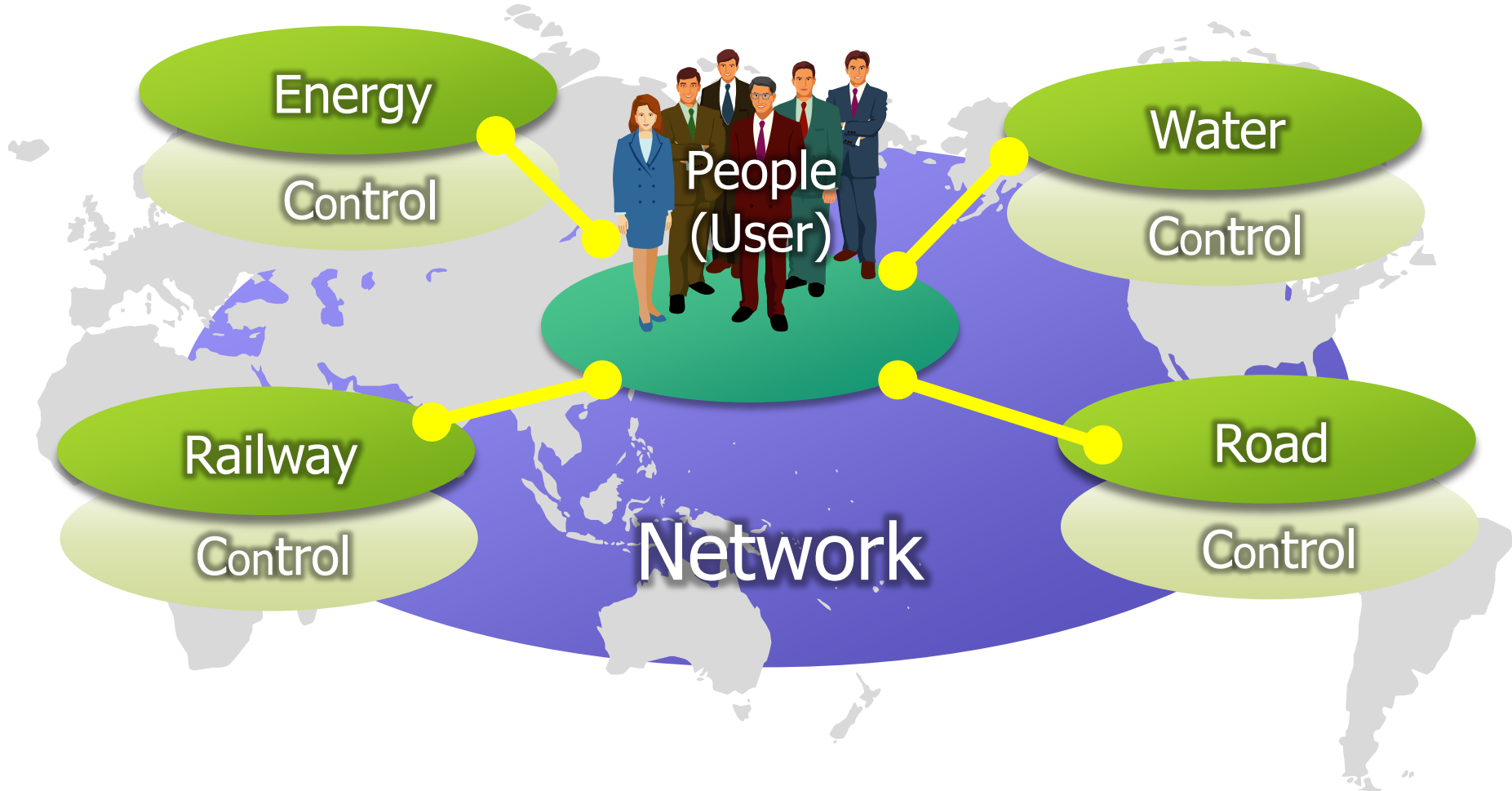


Contents

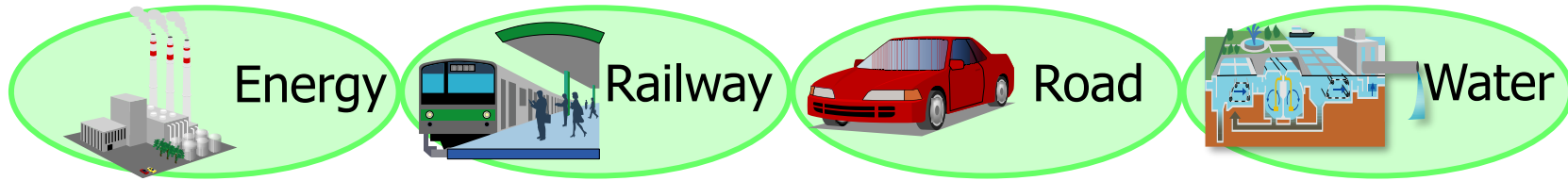
- 1. Public Infrastructure evolution with big data
- 2. Network progress promotes the evolution
- 3. Future vision : Fusion of public infrastructure**
- 4. Conclusion

3-1. Fusion of Public Infrastructure

- Progress of network technologies accelerate the consolidation of public infrastructure



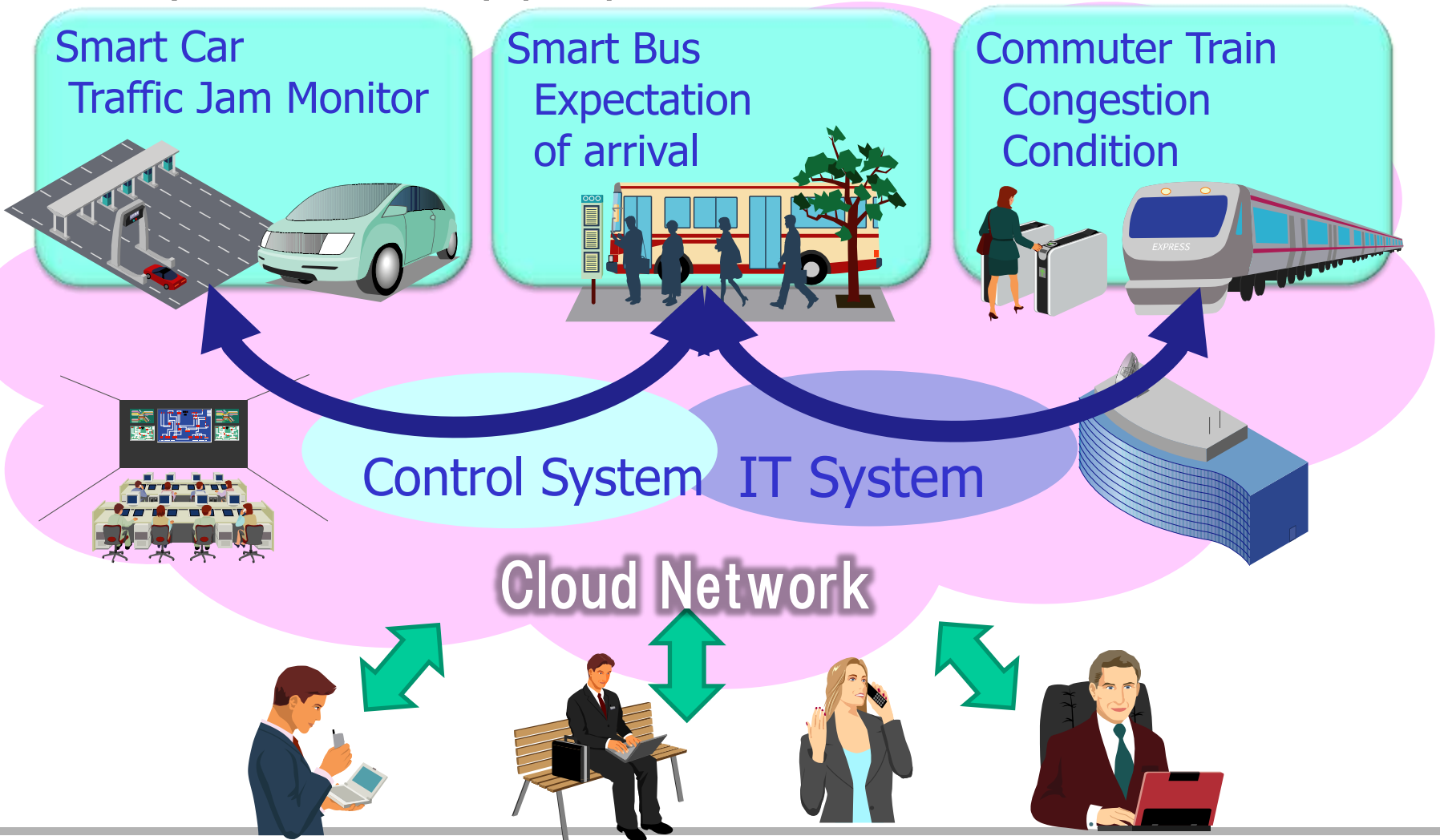
3-2. Structure of the next Public Infrastructure



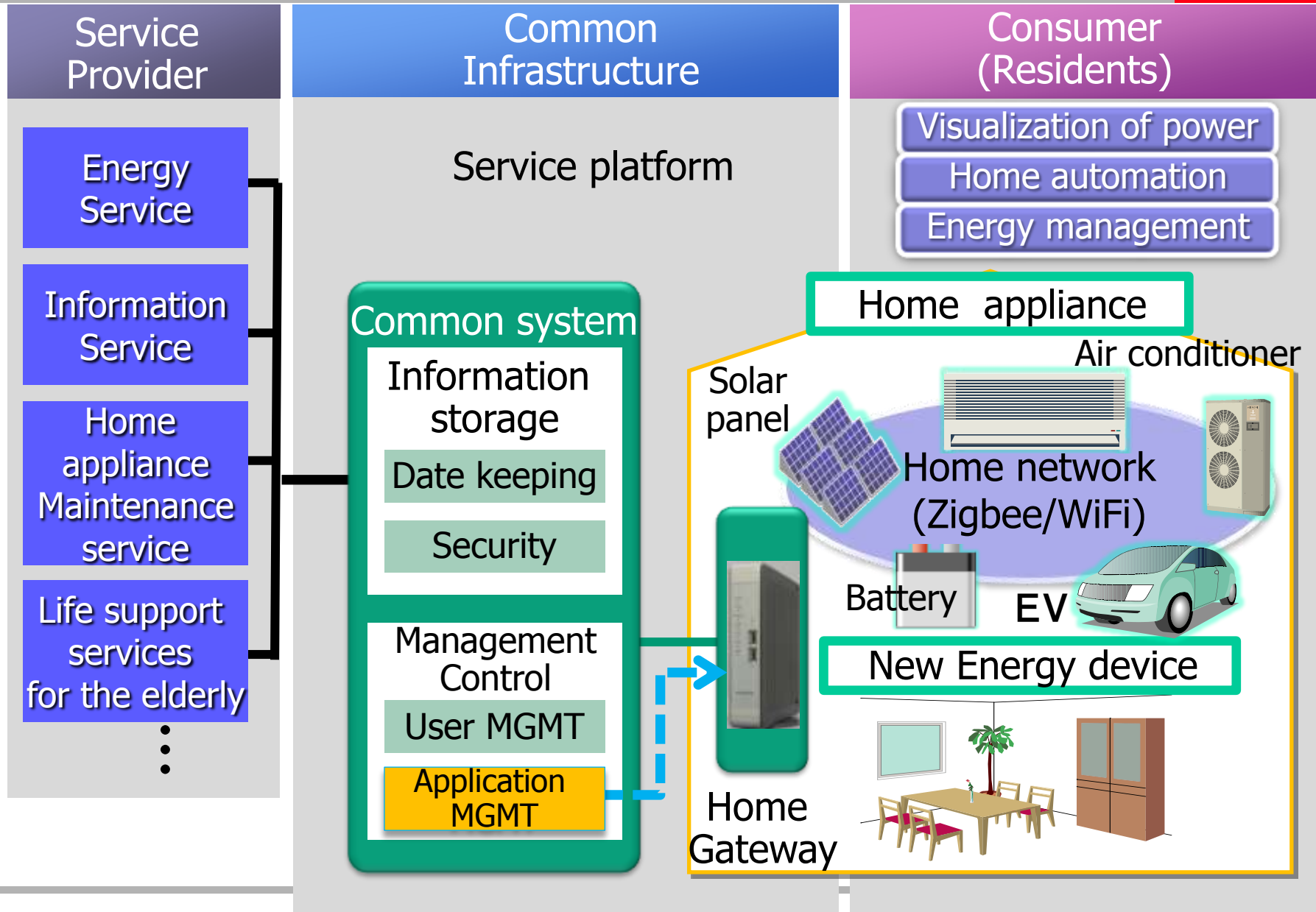
	Smart Grid	Next Generation Transport System	Green Mobility	Intelligent Water
System Services	<ul style="list-style-type: none"> *Power generation *Energy mgmt 	<ul style="list-style-type: none"> *Signal Control *IC Card Ticket *User assistance 	<ul style="list-style-type: none"> *ITS / ETC *Vehicle mgmt *EV corporation 	<ul style="list-style-type: none"> *Water purification *plant mgmt
Products	<ul style="list-style-type: none"> *Power Plant *CO₂ Collection *Storage Battery 	<ul style="list-style-type: none"> *High Speed train *Commuter Train *Mono-rail 	<ul style="list-style-type: none"> *Storage battery *Navigation Terminal 	<ul style="list-style-type: none"> *Pomp *Desalination *Water treatment
Technology	<ul style="list-style-type: none"> *Sensing *Image Processing 	<ul style="list-style-type: none"> *Real-time control *Security 	<ul style="list-style-type: none"> *Simulation 	<ul style="list-style-type: none"> *Data management *Maintenance
	* Network Technology			

3-3. Next Generation Transport System

- Next Generation Transport systems connect each other and easily accessible by people

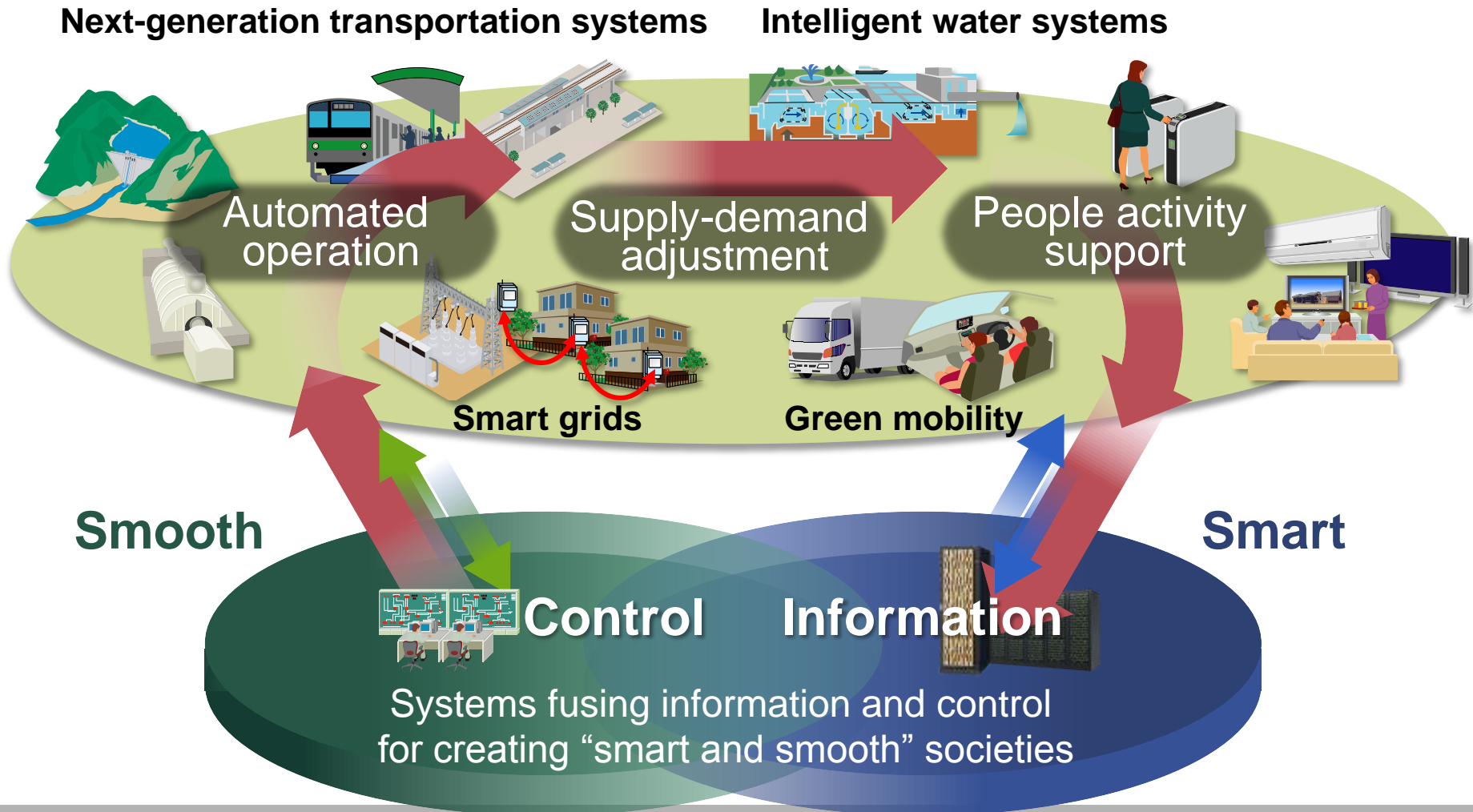


3-4. Next Generation Home Network



3-5. Big Data Utilization in the Smart City Field

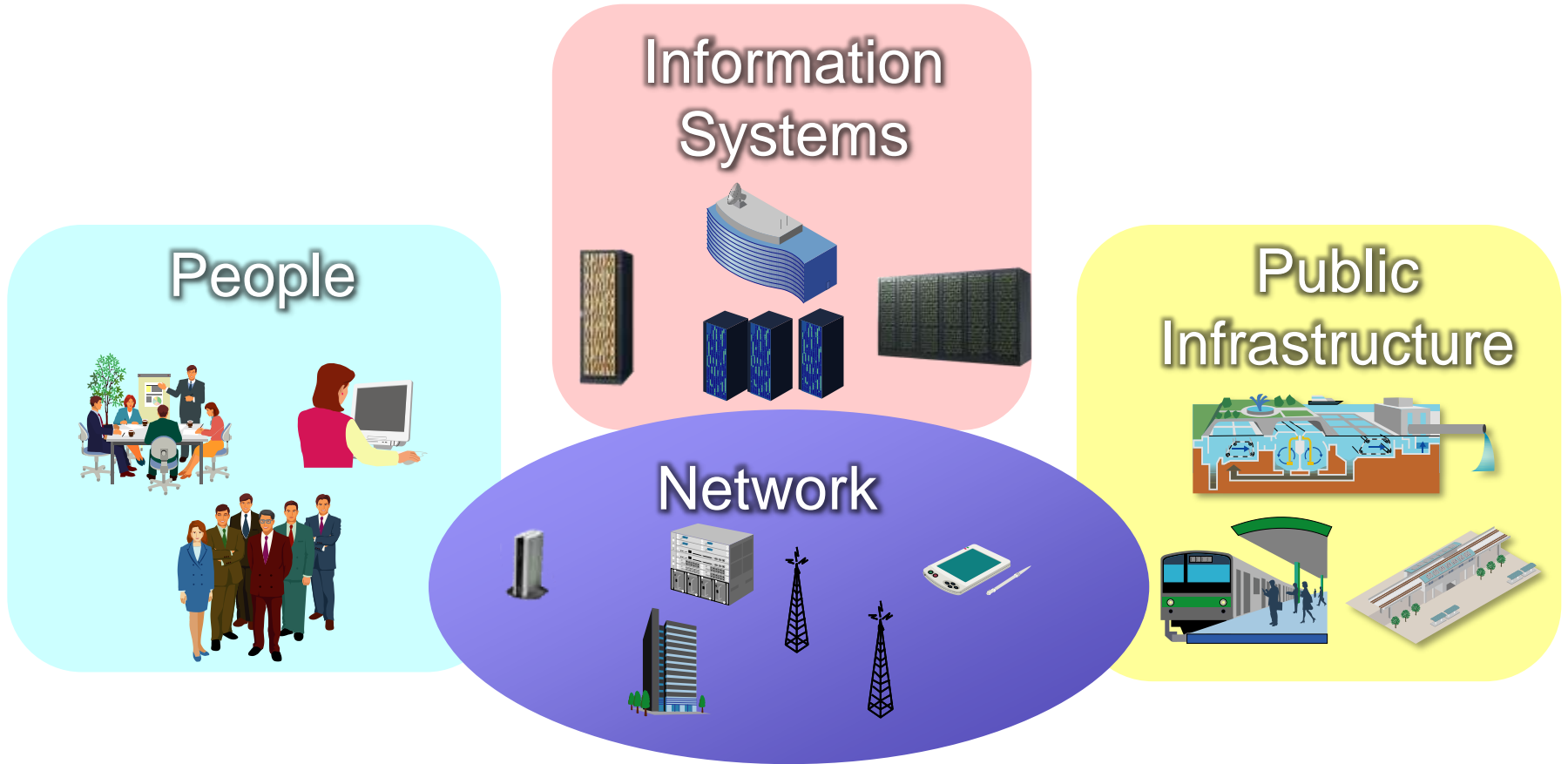
- Connect social infrastructure and lifestyles with services to create a safe, secure, comfortable and eco-friendly society



Contents

- 1. Public Infrastructure evolution with big data
- 2. Network progress promotes the evolution
- 3. Future vision : Fusion of public infrastructure
- 4. Conclusion**

4. Conclusion



Network Technology accelerates the connection of people and public Infrastructure with Information Technologies

HITACHI
Inspire the Next 