

CHAPTER 8 – LOGISTICS AND INFORMATION TECHNOLOGY

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- General types of information management systems
- The Internet's influence on logistics

INTRODUCTION

- Greater knowledge and visibility across the supply chain
- Greater awareness of customer demand
- Better coordination of manufacturing, marketing, and distribution
- Streamlined order processing and reduced lead times

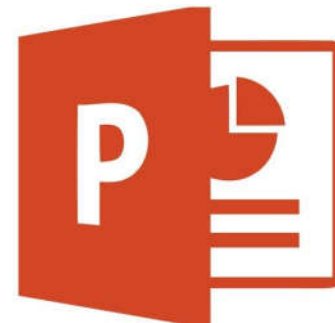
GENERAL TYPES OF INFORMATION MANAGEMENT SYSTEMS

<i>System type</i>	<i>Logistics examples</i>
Office automation system: provides effective ways to process personal and organizational business data, to perform calculations, and to create documents	Spreadsheet applications to calculate optimal order quantities, facility location, transport cost minimization, among others
Communication system: helps people work together by interacting and sharing information in many different forms	Virtual meetings via computer technology Voice-based order picking
Transaction processing system (TPS): collects and stores information about transactions; controls some aspects of transactions	Electronic data interchange Automatic identification technologies such as bar codes Point-of-sale systems
Management information system (MIS) and executive information system (EIS): converts TPS data into information for monitoring performance and managing an organization; provides executives information in a readily accessible format	Logistics information system
Decision support system (DSS): helps people make decisions by providing information, models, or analysis tools	Simulation Application-specific software such as warehouse management systems Data mining
Enterprise system: creates and maintains consistent data processing methods and an integrated database across multiple business functions	Logistics modules of enterprise resource planning systems

Source: Murphy and Knemeyer (2018)

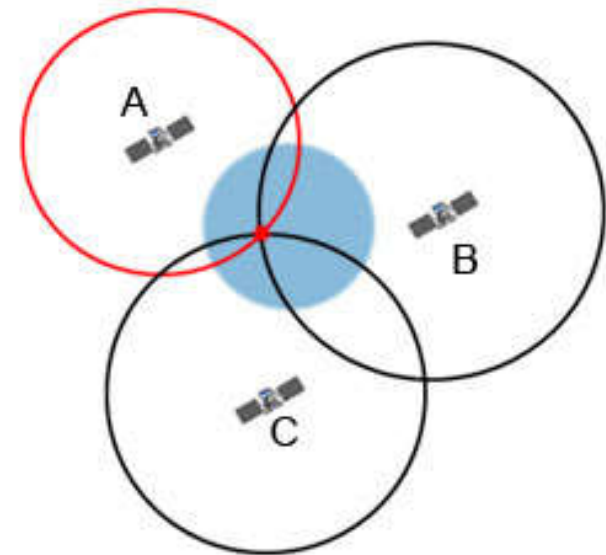
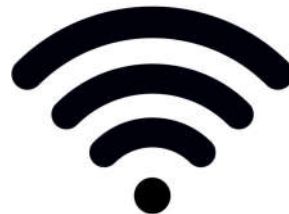
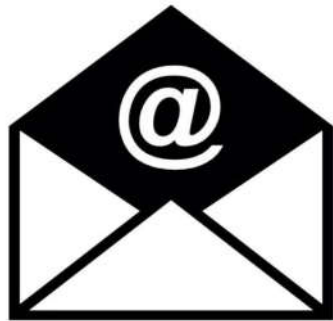
OFFICE AUTOMATION SYSTEM

Provide effective ways to process personal and organizational business data, to perform calculations and to create documents



COMMUNICATION SYSTEM

Help employees, suppliers and customers work together by interacting and sharing information in many different forms



Source: physics

TRANSACTION PROCESSING SYSTEM

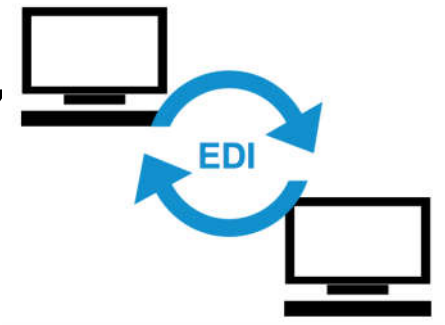
Transaction processing system: Collect and store information about transactions and control some aspects of transactions

Efficient processing of transactions:

- Batch processing
- Real-time processing

TRANSACTION PROCESSING SYSTEM

- Electronic Data Interchange (EDI): Computer-to-computer transmission of business data in a structured format.
- Common uses: invoicing, submission of purchase orders, pricing, advanced shipment notices, etc.
- Benefits: reducing document preparation and processing time, inventory carrying costs, personnel costs, shipping errors, lead times, order cycle times, and ordering costs etc.
- Drawbacks: high setup costs, lack of standard formats, incompatibility of computer hardware and software



TRANSACTION PROCESSING SYSTEM

Automatic identification technologies: an essential component in point-of-sale (POS) systems

- Optical character recognition
- Machine vision
- Voice-data entry
- Magnetic strips
- Radio-frequency identification (RFID)

TRANSACTION PROCESSING SYSTEM

- Radio-frequency identification (RFID) technology: the use of radio frequency to identify objects that have been implanted with an RFID tag.
- Components: a scanning antenna, an RFID tag (chip), and a transceiver
- RFID vs bar codes:
 - Does not require clear line of sight
 - Store much larger quantities of data
 - Read and write capabilities



MANAGEMENT AND EXECUTIVE INFORMATION SYSTEM

- Convert transaction processing system data into information for monitoring performance and managing an organization
- Provide managers and executives information in a readily accessible format

Logistics Information System



Source: Murphy and Knemeyer (2018)

DECISION SUPPORT SYSTEM

- Help managers make decisions by providing information, models or analysis tools
- Examples:
 - Vehicle routing issues
 - Inventory control decisions
 - Developing automatic order picking systems
 - Optimization models for buyer–seller negotiations

DECISION SUPPORT SYSTEM (TYPES OF TECHNIQUES)

- Simulation:
 - Technique that models a real-world system, typically using mathematical equations to represent the relationships among the system's components
- Application-specific software:
 - Technique developed to help managers deal with specific logistics processes or activities
 - Popular option includes on-demand software (software-as-a-service or cloud computing)

DECISION SUPPORT SYSTEM (TYPES OF TECHNIQUES)

- Examples of logistics-related application-specific software:
 - Transportation management systems (TMS): Software package that automates the process of building orders, tending loads, tracking shipments, audits, and payments
 - Warehouse management systems (WMS): Software package that provides oversight of the storage and flow of materials within a company's operations

DECISION SUPPORT SYSTEM (TYPES OF TECHNIQUES)

TMS Task Capabilities

Task Capability	Task Capability
Asset tracking	Carrier selection
Claims management	Driver management
Freight payment	Load planning
Load tendering	Order or shipment visibility
Package delivery verification	Package pickup tracking
Pickup scheduling	Rating
Real-time route reporting	Route optimization
Shipment consolidation	

Source: Murphy and Knemeyer (2018)

DECISION SUPPORT SYSTEM (TYPES OF TECHNIQUES)

- Data mining:
 - Is the application of mathematical tools to large bodies of data in order to extract correlations and rules
 - Dependent on data warehouses: Central repository for all relevant data collected by an organization
- Machine learning:
 - A computer-based discipline leverages algorithms that can “learn” from data

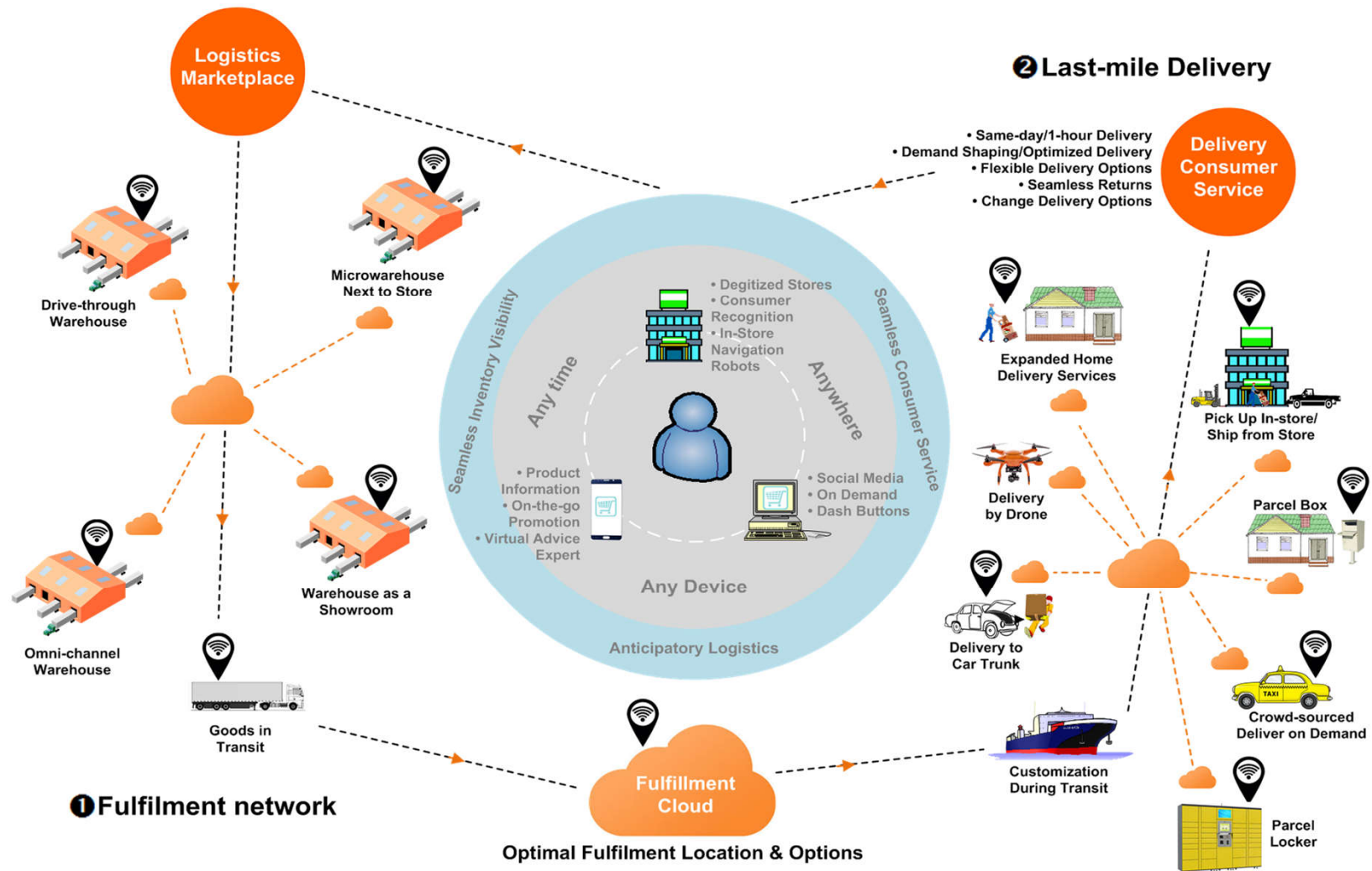
ENTERPRISE SYSTEMS

- Create and maintain consistent data processing methods and an integrated database across multiple business functions
- Enterprise resource planning (ERP):
 - Lets a company automate and integrate the majority of its business processes, share common data and practices across the enterprise, and produce and access information in a real-time environment
 - Shortcomings: Costs of installation, Time-consuming installation process, Initially lacked strong application-specific logistical capabilities such as TMS or WMS

THE INTERNET'S INFLUENCE ON LOGISTICS

- Online retailing
- Cloud computing
- Electronic procurement

THE INTERNET'S INFLUENCE ON LOGISTICS (ONLINE RETAILING)



Source: DHL (2015)

THE INTERNET'S INFLUENCE ON LOGISTICS

Similarities between online retailing and in-store retailing include:

- Logistical functions and activities:
 - Transportation
 - Warehousing
 - Materials handling
 - Order management
- Equipment and materials:
 - Bar coding
 - Warehouse management systems

THE INTERNET'S INFLUENCE ON LOGISTICS

Differences between online retailing and in-store retailing:

- Online retailing:
 - More, smaller orders
 - Order management systems must handle large volumes of orders
 - IMS transmits each order so it can be filled in a timely fashion
 - Smaller orders dictate open-case picking
 - Totes and push carts used
 - Packaging is small cartons, envelopes, and bags
 - Transportation companies used with extensive delivery networks
 - Outbound shipments usually picked up by vans
 - Return rates much higher and from ultimate consumers

THE INTERNET'S INFLUENCE ON LOGISTICS

Differences between online retailing and in-store retailing:

- In-store retailing:
 - Fewer, larger orders
 - Order management system is set up to handle orders from resellers
 - Full-case picking
 - Warehouse set up to handle large volume orders
 - Variety of materials handling equipment used
 - Packaging generally cartons that hold large volume orders
 - Transportation methods and companies vary by request of buyer
 - Outbound shipments may be picked up by tractor trailers or railcars
 - Return rates lower and from resellers

THE INTERNET'S INFLUENCE ON LOGISTICS (CLOUD COMPUTING)

A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources

- Advantages:
 - Pay-per-use
 - It is a viable option for firms that could not afford to purchase, install, and maintain application-specific software such as TMS and WMS
 - Faster and less costly installation
 - Smaller IT staff
 - Regular upgrades and updates from the software provider

THE INTERNET'S INFLUENCE ON LOGISTICS (CLOUD COMPUTING)

- Disadvantages:
 - Upgrades and updates can be too numerous and too frequent
 - Limited amount of customization
 - Security issues

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THE INTERNET'S INFLUENCE ON LOGISTICS (E-PROCUREMENT)

Uses the Internet to make it easier, faster, and less expensive for an organization to purchase goods and services

- Benefits:

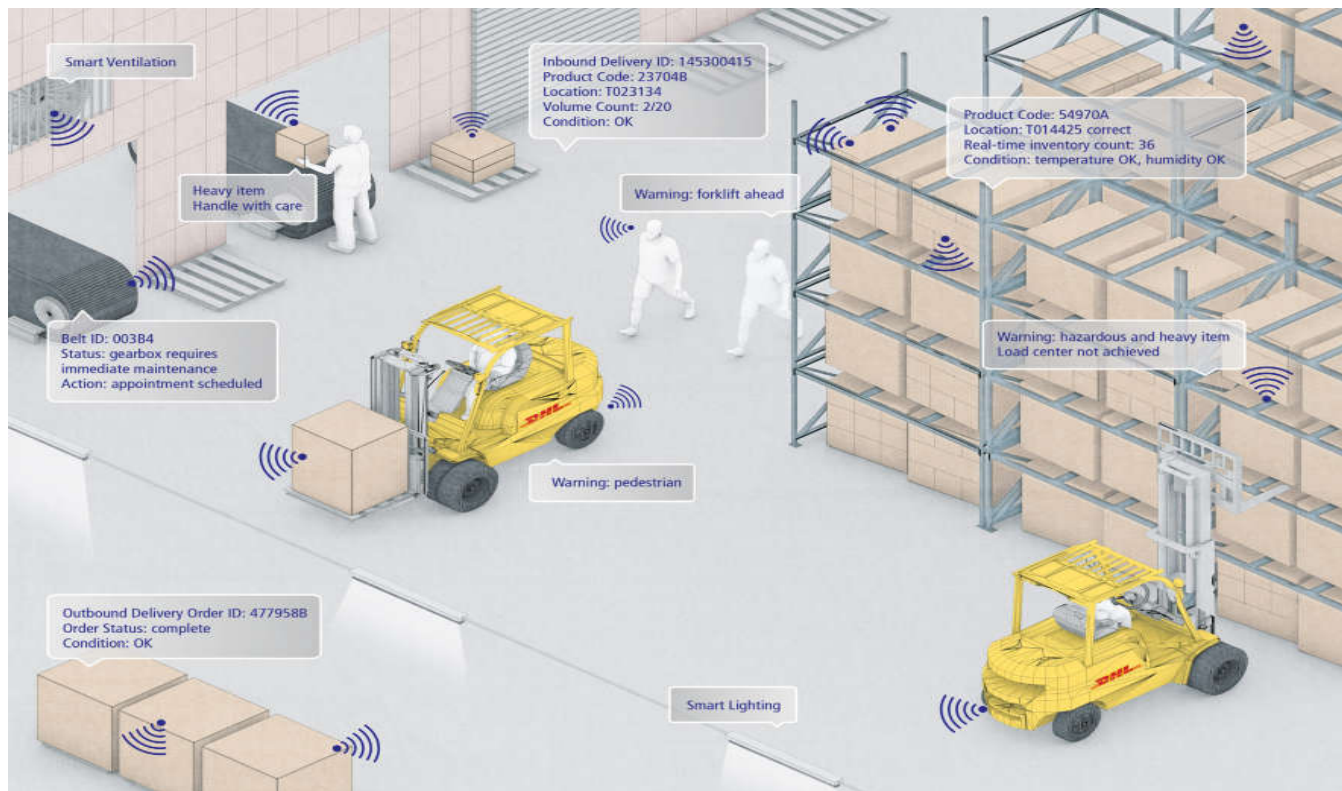
- Transactional benefits: Measures the benefits of enhanced transactional efficiency associated with e-procurement
- Compliance benefits: Focus on the savings that come from adherence to established procurement policies
- Management information benefits: Result from management information, customer satisfaction, and supplier satisfaction levels
- Price benefits: A result of adopting e-procurement

THE INTERNET'S INFLUENCE ON LOGISTICS (E-PROCUREMENT)

- Drawbacks:
 - Security risk of transmitted information
 - Impersonal as human interaction is replaced by computer transactions

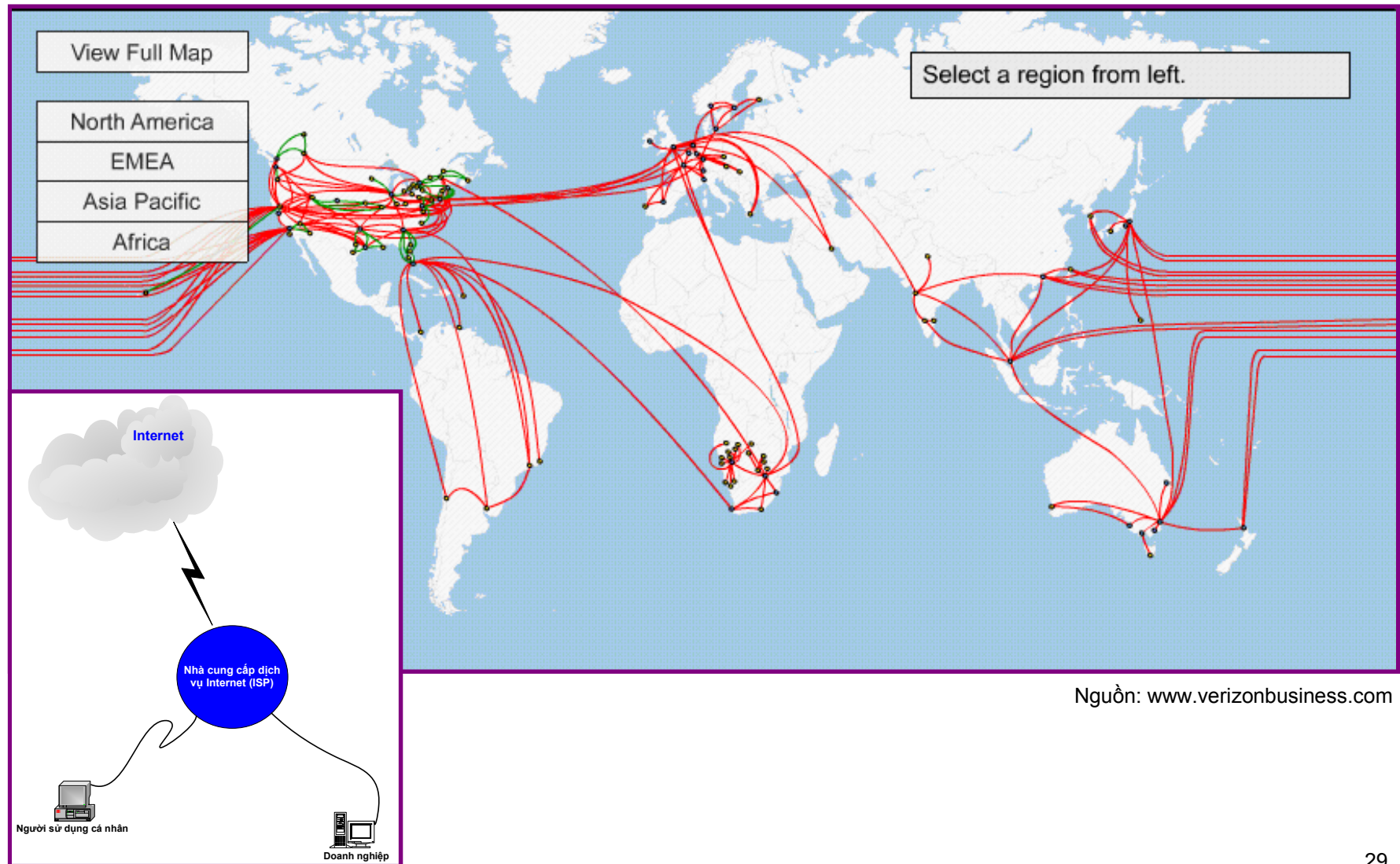
THE INTERNET'S INFLUENCE ON LOGISTICS (IOT)

Sensors and data-communication technology that is built into physical objects, enabling the objects to be traced and controlled over the Internet



Source: DHL (2015)

THE INTERNET'S INFLUENCE ON LOGISTICS (IOT)



Nguồn: www.verizonbusiness.com

THE INTERNET'S INFLUENCE ON LOGISTICS (IOT)

- Potential benefits extend across various types of logistics activities, including areas such as:
 - Warehousing
 - Transportation
 - Last-mile delivery

CHAPTER 8 – LOGISTICS AND INFORMATION TECHNOLOGY

THANK YOU!

