NXN
FORMERLY nexGen group

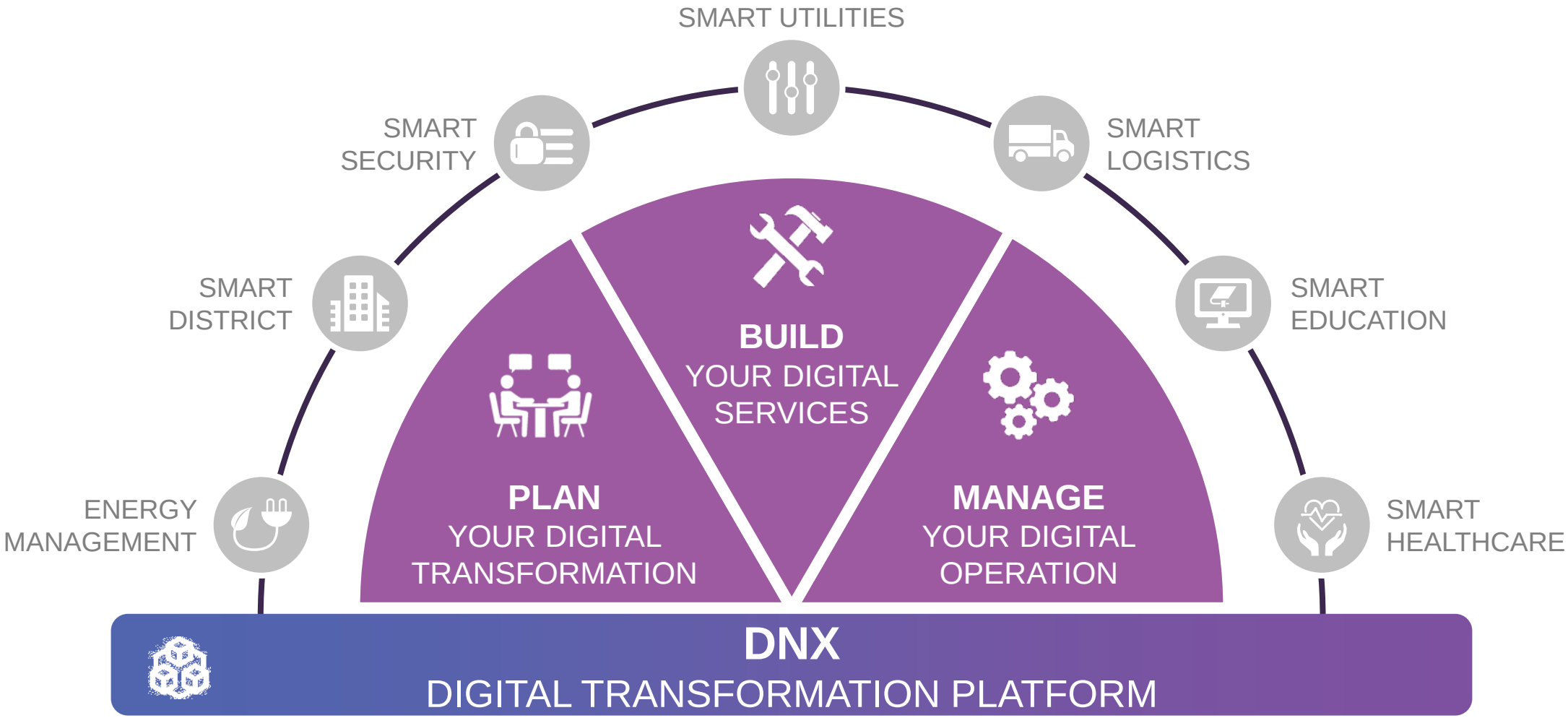
zain

IoT and Smart Port & Smart Logistics Transformation

Anwer Kotob, Projects Director

NXN – The ZAIN “Digital Transformation Company”

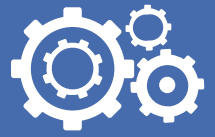
PLAN, **BUILD** and **MANAGE** the digital transformation of cities, districts and organizations to help them become world-class, living and working spaces for society to benefit from and enjoy.



SMART PORT TRANSFORMATION

SMART PORT – USE OF DIGITAL TECHNOLOGIES FOR:

Achieving operational excellence (productivity of terminals)



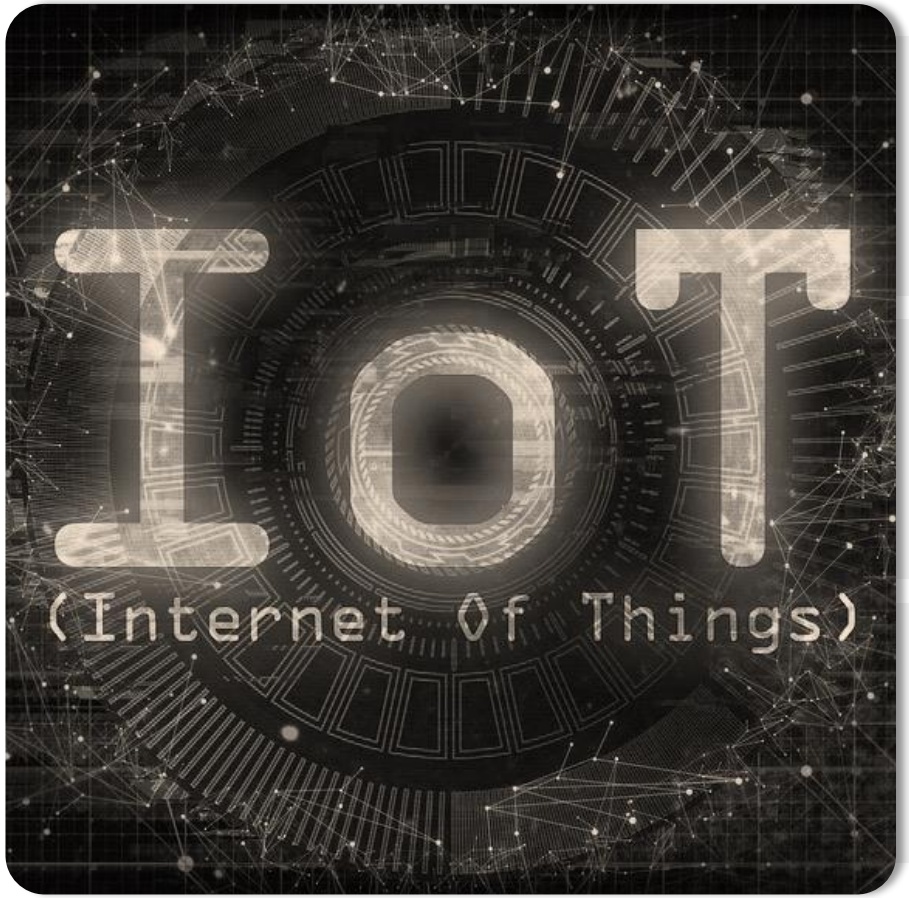
Introducing agile and sustainable operations

Enabling creativity and innovation

- Digitalization will fundamentally change the value chains within global logistics chains.
- Established via connecting the direct and indirect stakeholders.
- Transparency of information relevant to all processes of the supply chain.
- Participation in the network of connected ports offers ports around the globe the opportunity to jointly influence the ongoing transformation in ports worldwide.

ROLE OF IoT (INTERNET OF THINGS)

IoT is the convergence of the physical and digital worlds, focused on turning data into an asset and source of value:



3 A's: Aware, Autonomous, Actionable

Provides the means to track all devices and shipments

Optimize operations and improve customer service by providing the eco-system with real-time information

ROLE OF IoT

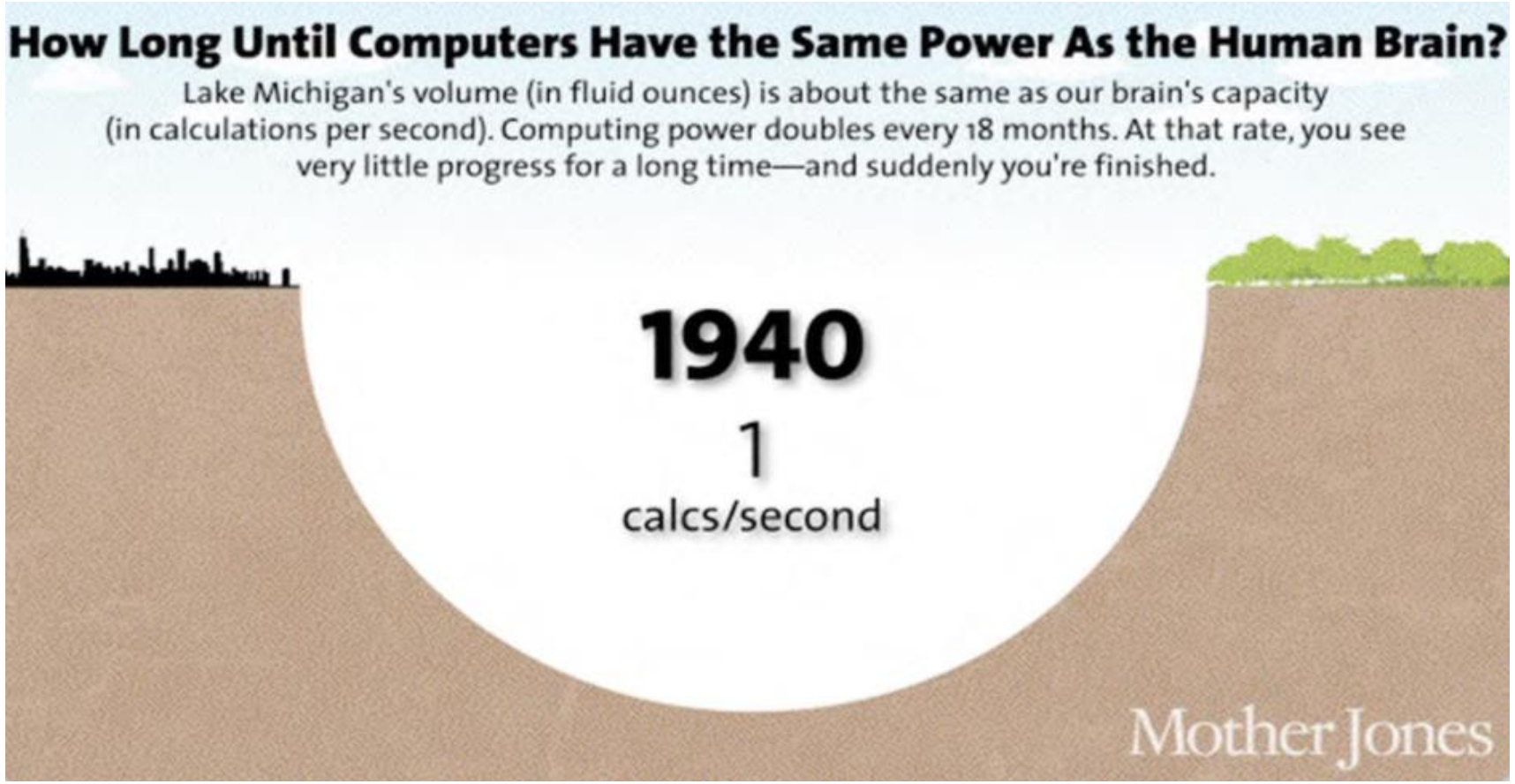
VISIBILITY	Drive data visibility across the port's ecosystem
ENABLE SMARTNESS	By providing the ability to sense, measure, monitor and consequently analyze
DECISION MAKING	IoT isn't just about gathering data; it's about using it to make better decisions
BETTER UNDERSTANDING OF CONTEXT	The analysis of data enables a better understanding of contexts, situations, and people moving within them
INTEGRATED INFRASTRUCTURE	Real-time analytics using real time data on the status of cargo, availability of port facilities, and enables ships and terminals to be part of an integrated infrastructure
ACTION	That understanding enables actions that make operations more efficient, optimize resources, and improve life and work conditions

ROLE OF IoT

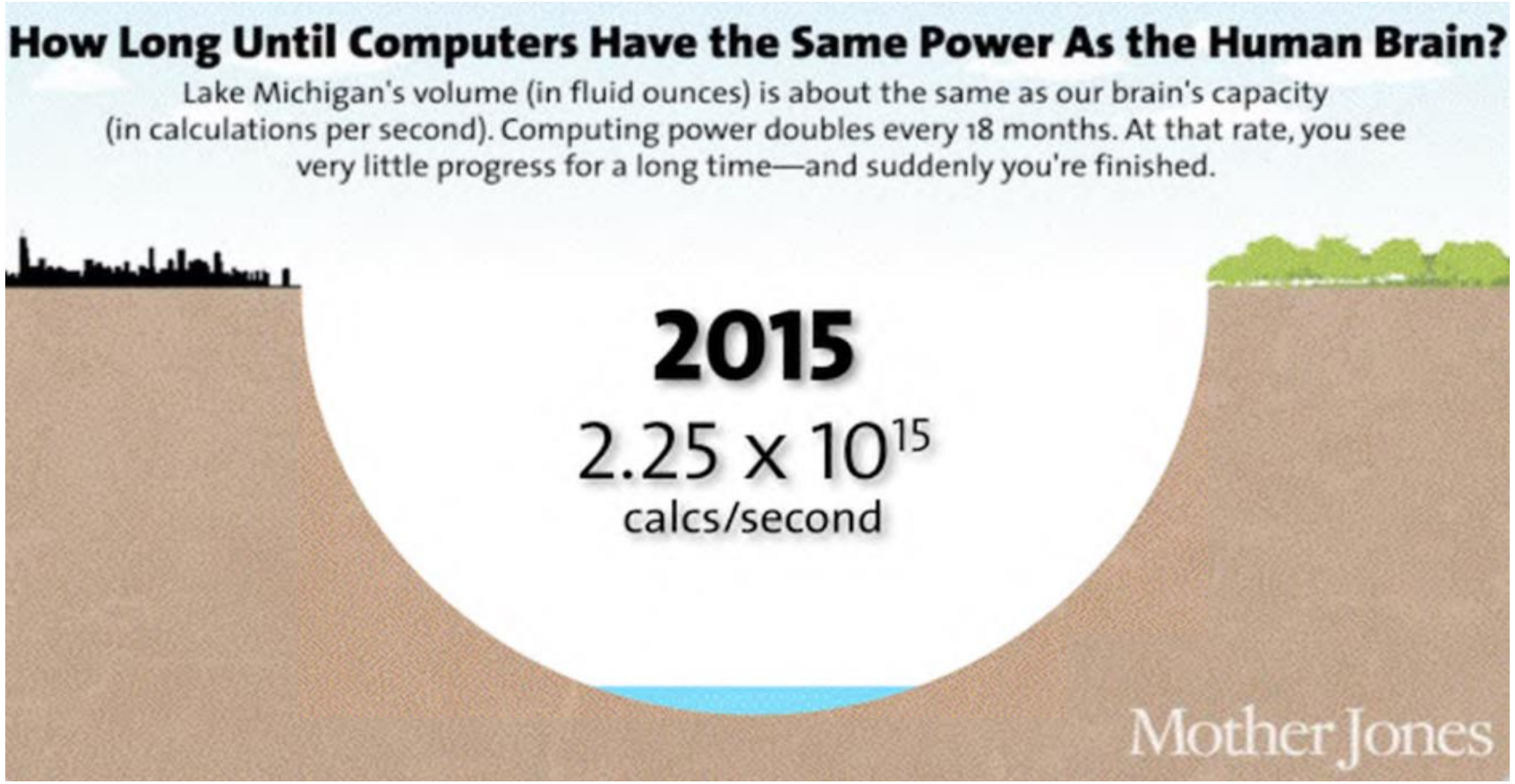
DIGITAL TWIN

Implement a digital twin to the port: a digital replica of operations that will mirror all resources at the port, tracking ship movements, infrastructure, weather, geographical and water depth data with 100% accuracy. This digital twin enables operators to run different scenarios, using real-time information to improve decision-making, problem-solving, and support planning.

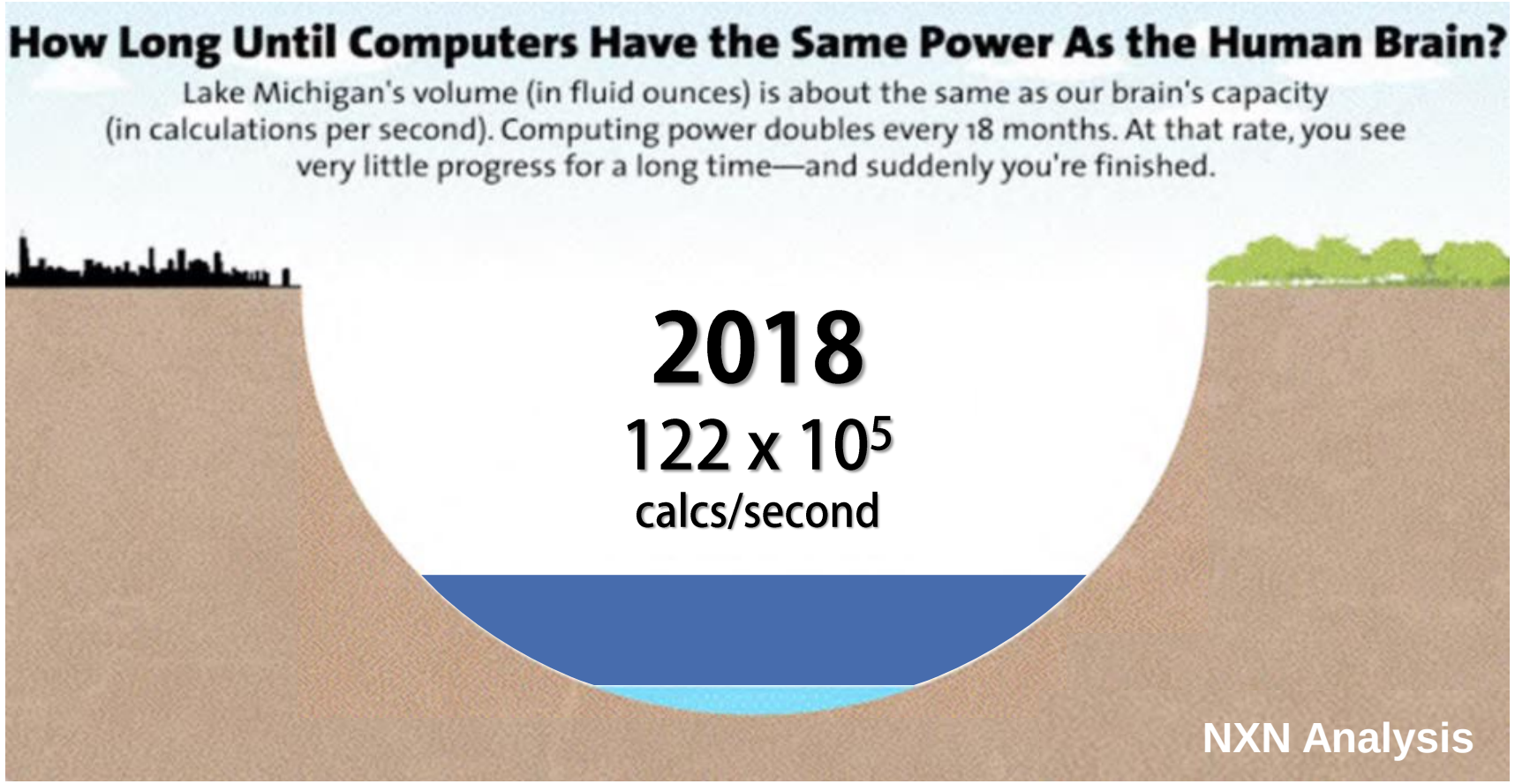
UNDERSTANDING – GRADUALLY, THEN SUDDENLY



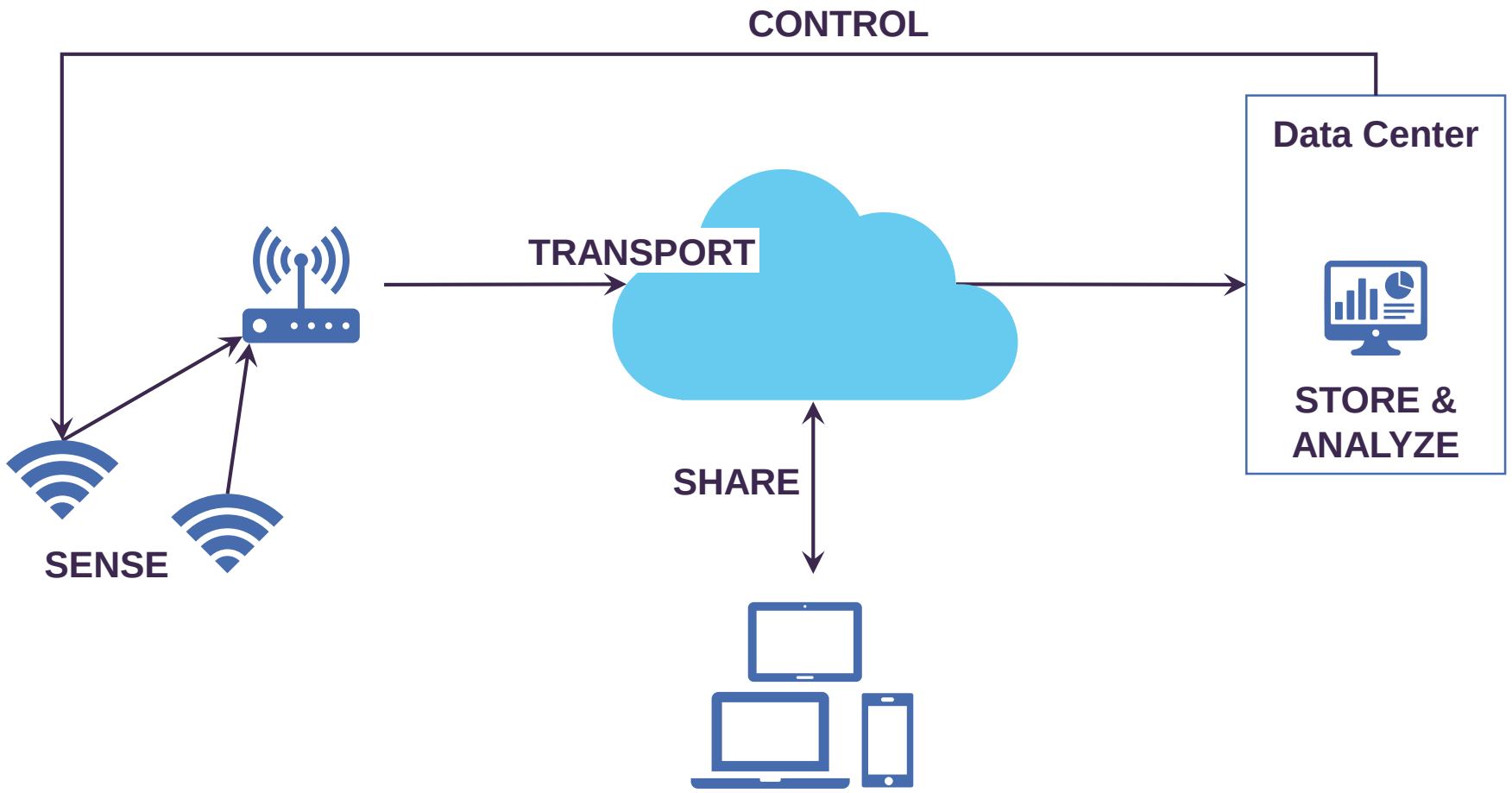
UNDERSTANDING – GRADUALLY, THEN SUDDENLY



UNDERSTANDING – GRADUALLY, THEN SUDDENLY



IoT – WHAT'S IN THE BOX



IoT Use Cases

Ports and container terminals have started to deploy sensors in cranes, container handling equipment, containers, trucks, and at gates to enable:

1. **Optimize management of existing infrastructure**
2. **Reduce environmental impact**
3. **Optimized multi-modal operations**
4. **Optimise the flow of information to manage trade flows efficiently:**
   - Automate port processes
   - Develop and take advantage of new business models

SMART LOGISTICS

- Managing the **efficient delivery of a service or product** from producer/provider to the end-customer.
- Includes all the tasks associated with **material and resources handling** (e.g. packaging, inventory management, transportation, warehouse management, & delivering to the end-customer).
- This includes the **management and optimisation** of materials, products, information and human interaction/tasks.

SMART LOGISTICS

- Managing the **efficient delivery of a service or product** from producer/provider to the end-customer.
- Includes all the tasks associated with **material and resources handling** (e.g. packaging, inventory management, transportation, warehouse management, & delivering to the end-customer).
- This includes the **management and optimisation** of materials, products, information and human interaction/tasks.

ROLE OF IoT

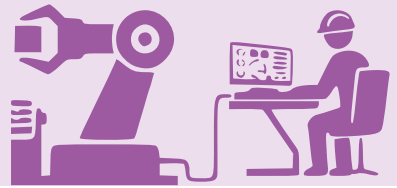
- IoT is a key enabler for pervasive connectivity among people, machines, devices, products and other entities.
- The **data it generates** is needed for the **optimisation** of any and all processes, analysis of the data produces the **insights** regarding the current state of the processes and how they can be optimized.

SMART LOGISTICS

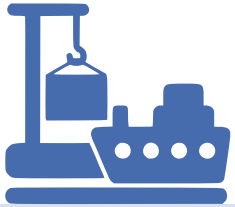
- Managing the **efficient delivery of a service or product** from producer/provider to the end-customer.
- Includes all the tasks associated with **material and resources handling** (e.g. packaging, inventory management, transportation, warehouse management, & delivering to the end-customer).
- This includes the **management and optimisation** of materials, products, information and human interaction/tasks.

ROLE OF IoT

- **Warehouse Automation** (**robotics in the warehouse**, automated **guided vehicles** for order-picking processes)
- Amazon:
  - The “click to ship” cycle: Used to be 60-75 mins with employees. Same job in **15 mins** by robots
  - Robot-equipped warehouse can hold **50% more inventory per sq. ft.** than centers without robots.
  - The operating costs have been sliced by **20%** per warehouse.

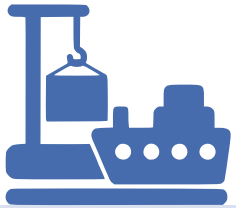


SMART PORT MANAGEMENT



- Includes managing the **movement of ships, containers, and other cargo**, the loading and unloading of ships and containers, and customs activities. Also includes anchorages, channels, tugs, berths, warehouse, and other **storage spaces** that are allocated and released.
- Also involves managing the **cost of operating the port.**

SMART PORT MANAGEMENT

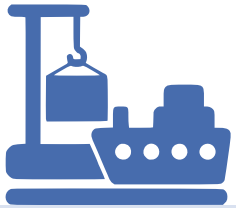


- Includes managing the **movement of ships, containers, and other cargo**, the loading and unloading of ships and containers, and customs activities. Also includes anchorages, channels, tugs, berths, warehouse, and other **storage spaces** that are allocated and released.
- Also involves managing the **cost of operating the port.**

ROLE OF IoT

- Internodal traffic: Coordinate vehicle movement to improve traffic flow between port and cargo destinations.
- Synchronize and optimize the movement of ships and trucks through the port:
  - Enhance productivity by optimizing cargo operations.
  - Increase asset utilization and asset availability.
  - Geolocation and tracking of vehicles and goods: product tracking and identification, asset management and geolocation processes for vehicles.

SMART PORT MANAGEMENT

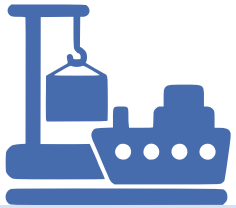


- Includes managing the **movement of ships, containers, and other cargo**, the loading and unloading of ships and containers, and customs activities. Also includes anchorages, channels, tugs, berths, warehouse, and other **storage spaces** that are allocated and released.
- Also involves managing the **cost of operating the port.**

ROLE OF IoT

- Monitor health and status of critical port and terminal infrastructure. Increase asset life through predictive maintenance:
  - APM to address maintenance needs of assets, e.g. machinery, tools and equipment, and vehicles that operate in the port,
  - Reduce unplanned downtime, increase asset availability, minimize maintenance costs, and reduce risk of failure.
- Improve maintenance operations:
  - AR (Augmented Reality) for maintenance & repairs.

SMART PORT MANAGEMENT



- Includes managing the **movement of ships, containers, and other cargo**, the loading and unloading of ships and containers, and customs activities. Also includes anchorages, channels, tugs, berths, warehouse, and other **storage spaces** that are allocated and released.
- Also involves managing the **cost of operating the port.**

ROLE OF IoT

- Safety and security: Control port access and provide detection and early-warning systems.
  - Video analytics, user tracking, facial recognition
- Environment & Sustainability: Reduce energy consumption and monitor environmental impact.
- Street light management
  - Adaptive Controls: ~35% Savings
  - Adaptive + LED: ~65% Savings
- Energy management in buildings
  - Save 60% of lighting energy
  - Save up to 18% of HVAC energy

PORT OF ROTTERDAM

VISION: Be the smartest port in the world. Embarked on a multi-year digitisation initiative to **transform the port's operational environment** using Internet of Things (IoT). The initiative will also prepare the Port of Rotterdam's entire 42-kilometre site to host **connected ships** in the future.

FOCUS:

- Collect, process and analyze real-time water (hydro), weather (meteo) sensor data and communications data
- Centralized dashboard for safer and more efficient traffic management at the port.
- Save up to one hour in berthing time per ship: Savings of about $80,000 US dollars in savings for ship operators and enables the port to dock more ships each day.
- Creating a digital twin of the port – an exact digital replica of port operations: Will help us test out scenarios and better understand how the port can improve efficiencies while maintaining strict safety standards.
- New R&D facility called the Rotterdam Additive Manufacturing LAB (RAMLAB): A 3-D printing field lab that caters specifically to seaports and shipping companies

Thank You