

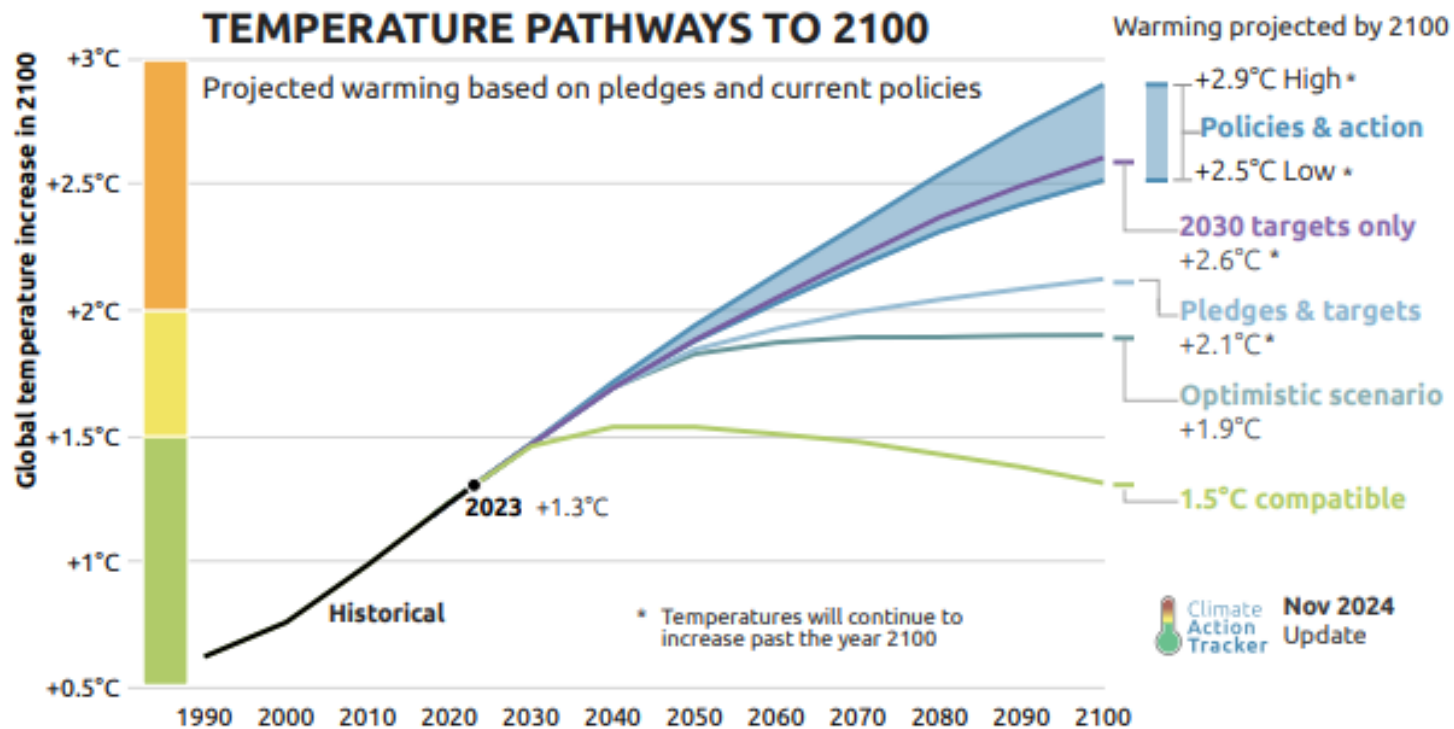
# THE PHYSICAL INTERNET INEVITABLE OUTCOME OR WISHFUL THINKING?



# AGENDA

- What is the issue?
- What is the Physical Internet?
- Why a Physical Internet is inevitable
- The importance of planning for a PI
- Collaboration and the PI
- Where do we go from here?

# WHY DO WE NEED SOMETHING LIKE THE PHYSICAL INTERNET?

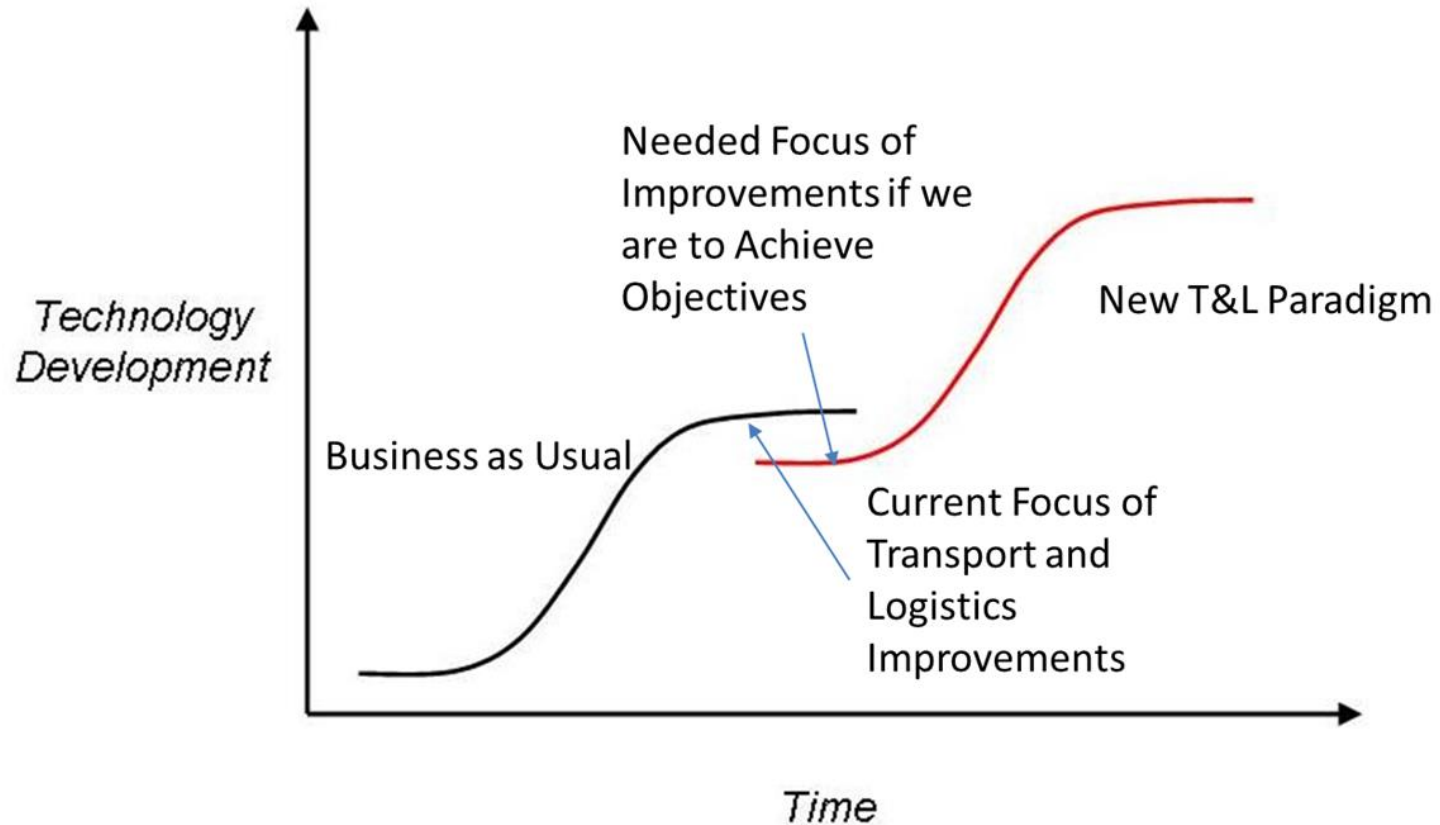


In terms of the ambition of climate targets, 2024 has been a year marked by minimal progress, with almost no new national climate targets (NDCs) or net zero pledges even though governments have agreed to (urgently) strengthen their 2030 targets and to align them with the 1.5°C goal of the Paris Agreement. **As a result, our warming projections have actually increased slightly under both the 2030 targets and the optimistic scenarios, from 2.5°C to 2.6°C and from 1.8°C to 1.9°C, respectively.**

# CURRENT EFFORTS TO LOWER THE EMISSIONS FROM VEHICLES ARE NOT SUFFICIENT



# ANOTHER APPROACH IS NEEDED

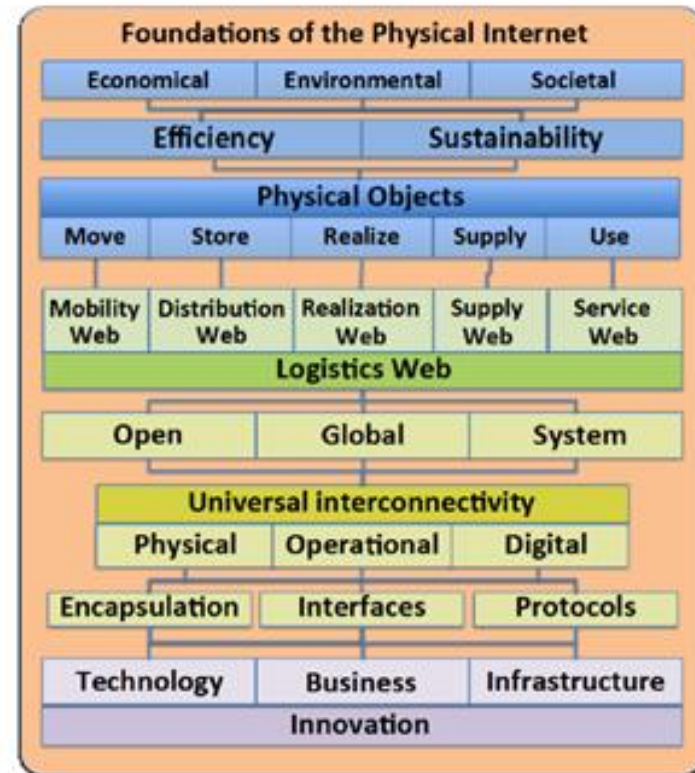




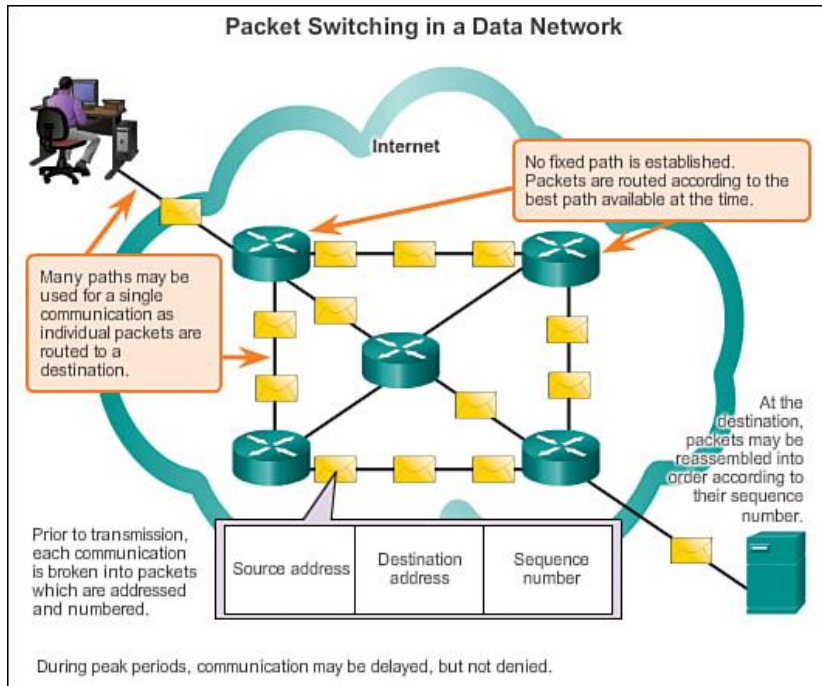
# THE PHYSICAL INTERNET VISION OF HOW THE FUTURE OF SUPPLY CHAIN OPERATIONS MIGHT LOOK IS BASED ON INTERNET LOGIC

■ The Physical Internet vision is built around the idea of an open, global logistics system characterized by:

- Interconnectivity/integration of:
  - Physical assets
  - Digital information/data
  - Operational systems and processes
- Realized through:
  - Encapsulation (standardized containers, material handling systems, etc.)
  - Standard interfaces (digital and physical)
  - Standard protocols (operational and informational)



# LIKE THE INTERNET, THE PHYSICAL INTERNET IS BASED ON TWO FUNDAMENTAL CONCEPTS

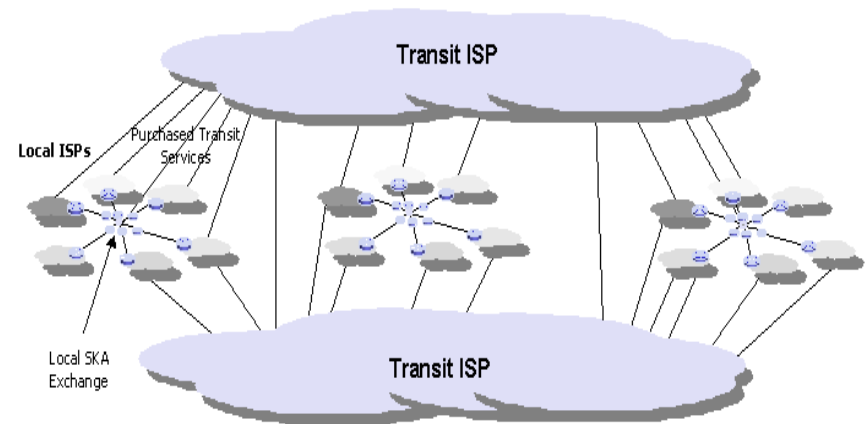


Source:

<http://www.ciscopress.com/articles/article.asp?p=2164577&seqNum=6>, accessed 30 June 2017

## 1. Standardized packets switched and transported from host to host

See Kleinrock, L (1964), Communication Nets

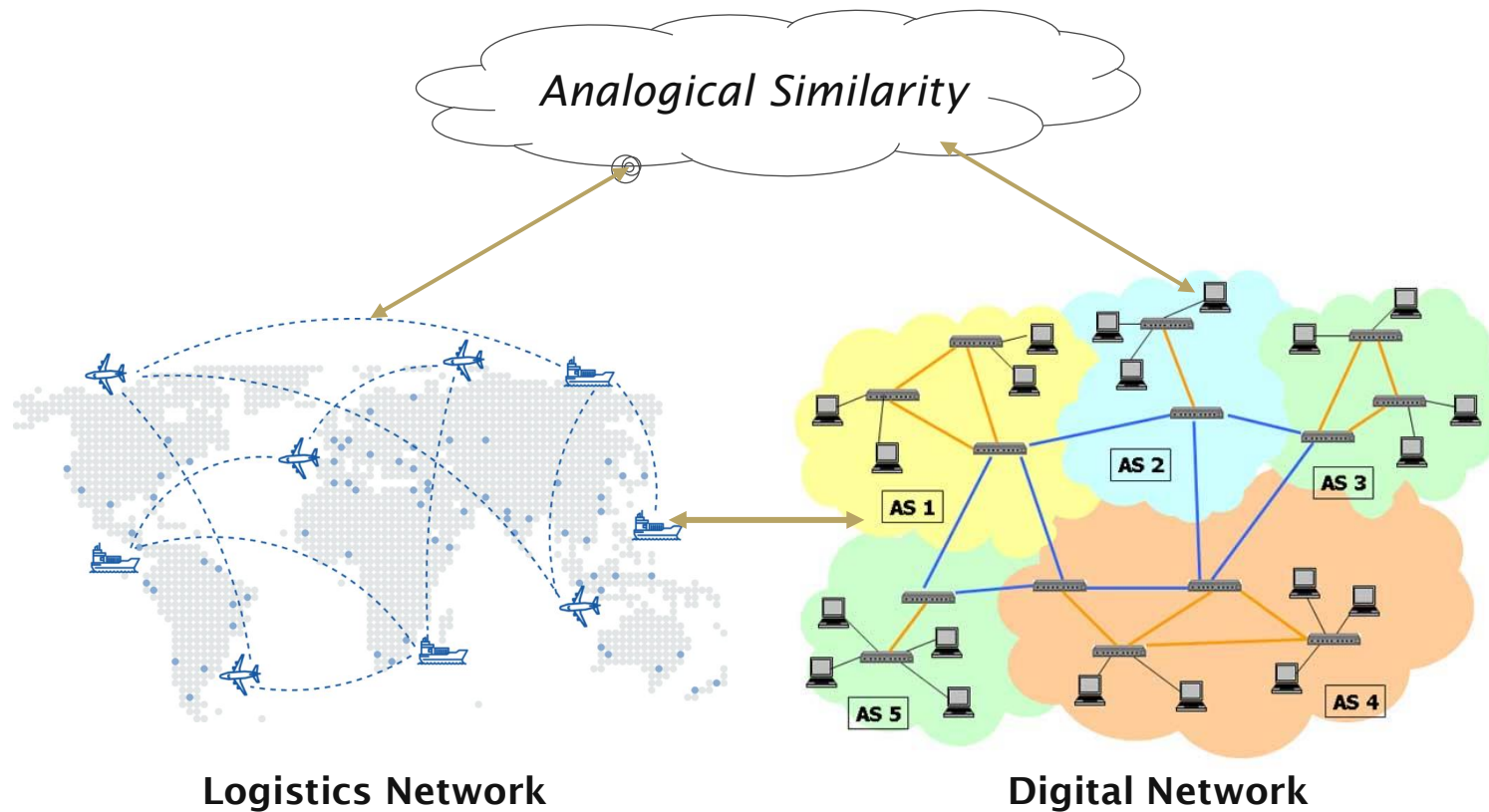


Source: Huston, G., Interconnection, Peering, and Settlements

## 2. Connection of independent networks operating based on independent concepts connected through routers and switches

See Roberts, L (1967), Multiple Computer Networks and Intercomputer Communication

# THIS ANALOGY BETWEEN THE INTERNET AND LOGISTICS OPERATIONS ASSOCIATES TRANSPORT NETWORKS WITH DIGITAL NETWORKS



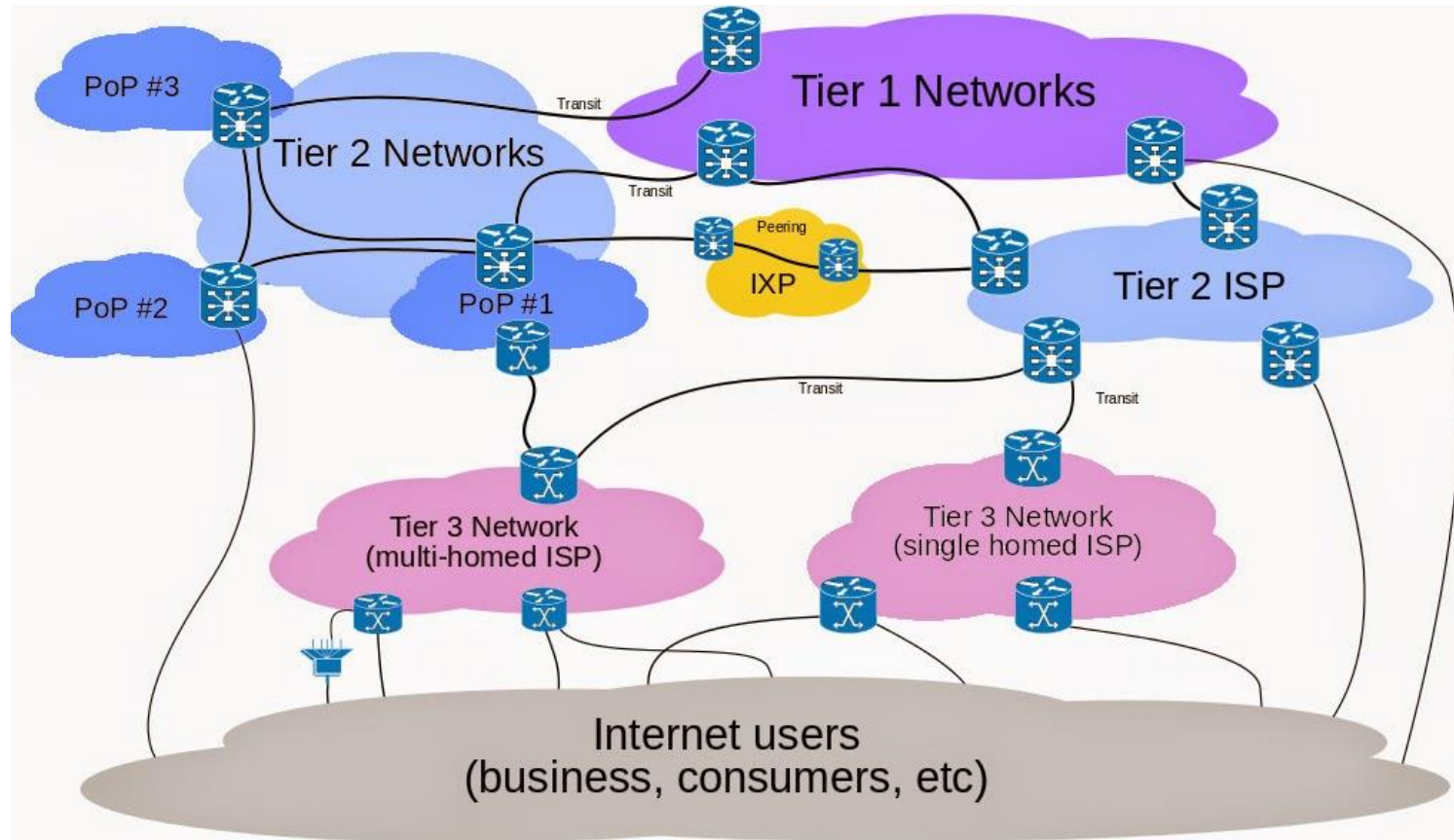
# LOGISTICS IS COMPOSED OF NUMEROUS INDEPENDENT NETWORKS LIKE THE MANY DIGITAL NETWORKS THAT MAKE UP THE INTERNET



# IF THESE INDEPENDENT LOGISTICS NETWORKS COULD BE CONNECTED, THEN THERE WOULD EXIST A NETWORK OF LOGISTICS NETWORKS. . . . A PHYSICAL INTERNET

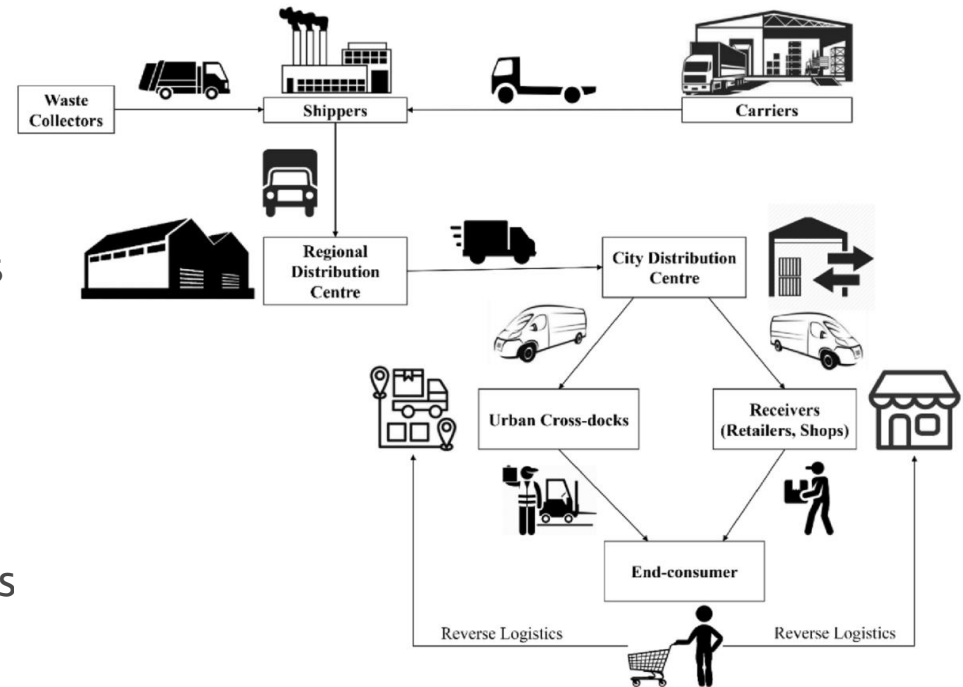


# THESE INTERCONNECTED NETWORK OPERATORS WOULD NOT HAVE TO ABANDON THEIR OWN NETWORKS



# REALIZING THE PHYSICAL INTERNET VISION COULD HELP ADDRESS THE NEED FOR GREATER EFFICIENCY IN TRANSPORTATION

- Greater efficiency through higher asset utilization
- Integrated / synchro-modal transport operations
- Better use of modern, more efficient transport technologies
- Greater use of low emission transport modes
- Easier integration of new technologies (autonomous vehicles, AI, modular containers automated material handling, etc.)



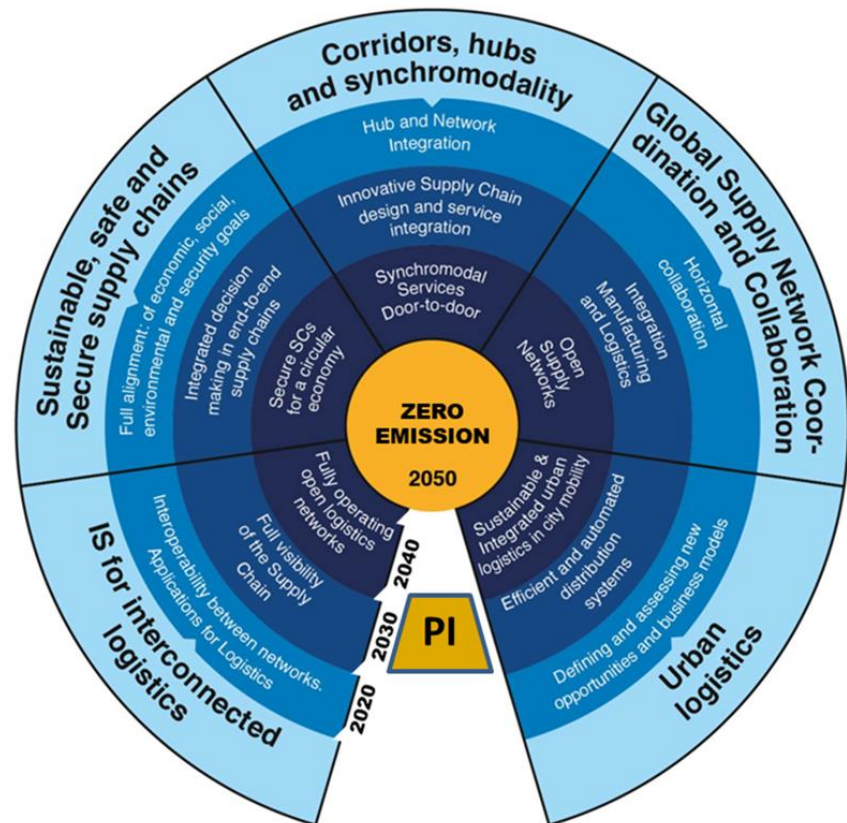
# MARKET, ENVIRONMENTAL, TECHNOLOGICAL AND REGULATORY ACTIONS ARE DRIVING LOGISTICS OPERATIONS IN AN EVOLUTIONARY MANNER TO A PI

- Autonomous vehicle development
- Smart infrastructures
- Congestion management systems
- Vehicle platooning systems
- Synchro-modality activities
- Multi-modal regulatory initiatives
- European/North American/Asian smart corridor initiatives
- Load optimization software
- Route optimization software
- Internet of Things instrumentation
- Environmental regulations
- A.I.
- Blockchain and smart contracts
- .....



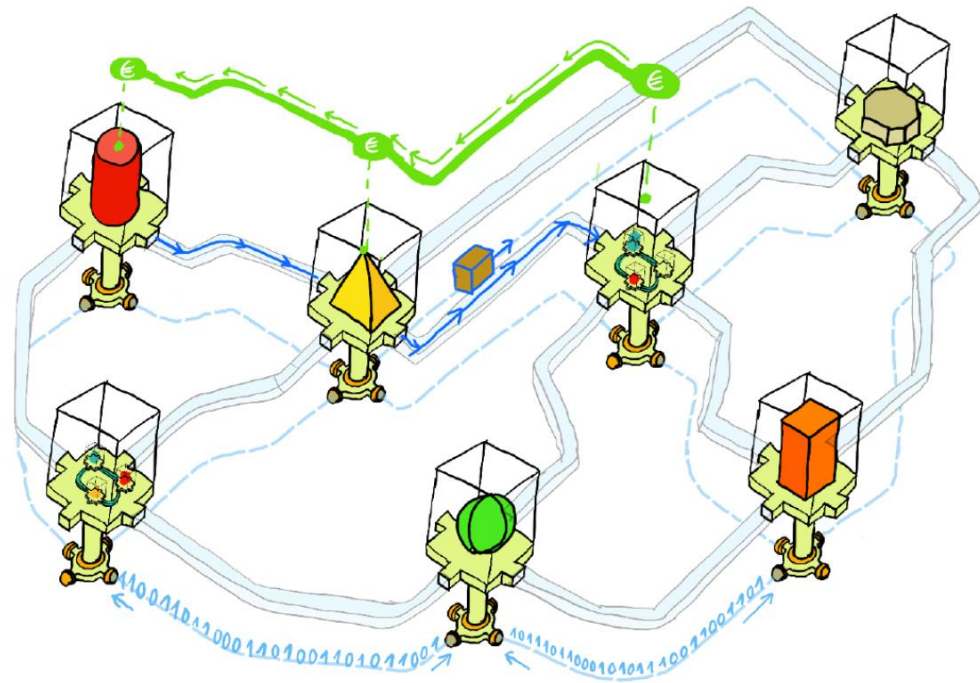
# THE PI VISION IS GAINING IMPORTANT SUPPORT AS A POTENTIAL ORGANIZATION CONCEPT FOR THIS EVOLUTION

- The European Union has incorporated PI exploration actions into its Horizon research program
- The ALICE ETP has established the Physical Internet as an interim goal for achieving zero transport carbon emissions by 2050
- Significant university research is being conducted into how a Physical Internet might operate
- Research institutes are also looking into the idea
- Cities are looking into the concept to achieve green objectives
- And businesses are starting to warm up to the idea



# THE PHYSICAL INTERNET REQUIRES STANDARDS AND OPEN PROTOCOLS TO ENABLE EVERYONE TO PARTICIPATE

- Open “nodes” are accessible to any actor (producer, shipper, distributor, LSP, retailer, etc.)
- Open “nodes” define and publish their services, capacities, performance capabilities, etc.
- Open “nodes” are not dedicated to any one user
- Nodes operate as consolidation, mode switching and forwarding entities
- Lanes are assumed equally accessible with published capacities and service levels
- Transport and storage providers operate based on nodal demand requirements
- Network operations follows a “self organization” approach to ensure that goods are moved as efficiently and effectively as possible.





# SHIPPERS, CONSUMERS AND GOVERNMENTS WILL ULTIMATELY DRIVE COLLABORATION

- Rapid delivery, environmental sustainability, congestion management, local impact reductions, low cost – all will drive shippers to look for ways to eliminate wastes in their supply chains
- Pressure to eliminate waste will drive shippers to collaborate with one another in shipping their goods to gain greater economies of scale
- Pressure by governments to lower congestion, improve the environment, and reduce city/neighborhood impacts will force service providers to work together to comply with regulations
- Technological improvements will facilitate the sharing of loads and the allocation of costs making asset sharing an attractive option



LSPs – Between a rock and a hard place

# THERE ARE MANY CHALLENGES THAT WILL NEED TO BE OVERCOME BEFORE THE PI VISION CAN BE REALIZED....

- How will the PI be governed?
- How will goods be routed over the PI?
- What are the roles of all participants?
- How will organizations be incented to use/operate the PI?
- How will the PI impact current logistics service providers?
- How will service providers be paid?
- What controls will be required?
- How will access be granted?
- How will costs be allocated?
- Etc, etc, etc.....



# ...BUT IT IS A LOGICAL END POINT FOR MUCH OF THE ACTIVITY CURRENTLY TAKING PLACE IN IMPROVING TRANSPORT AND LOGISTICS OPERATIONS

- Work will continue the current portfolio of independent technical and operational advances in the industry
- Increasing governmental interest in the PI will facilitate the development of better models of how it might operate
- Advances in cost and benefit sharing processes will facilitate new interest in collaborative operations
- Pressures from society, government and customers will drive shippers and asset owners to look to sharing opportunities to improve performance
- It is truly time to “go where no man has gone before”



# THANK YOU FOR YOUR ATTENTION



As long as I live, I'll hear waterfalls and birds and winds sing. I'll interpret the rocks, learn the language of flood, storm, and the avalanche. I'll acquaint myself with the glaciers and wild gardens, and get as near the heart of the world as I can.

John Muir