



e-Navigation
underway 2014
North America



Making Everything Work Together Building the Maritime Internet of Things

April 4 2014, Vallejo, CA



Geir Fagerhus
Director MARSEC-XL International
Malta – Norway – USA

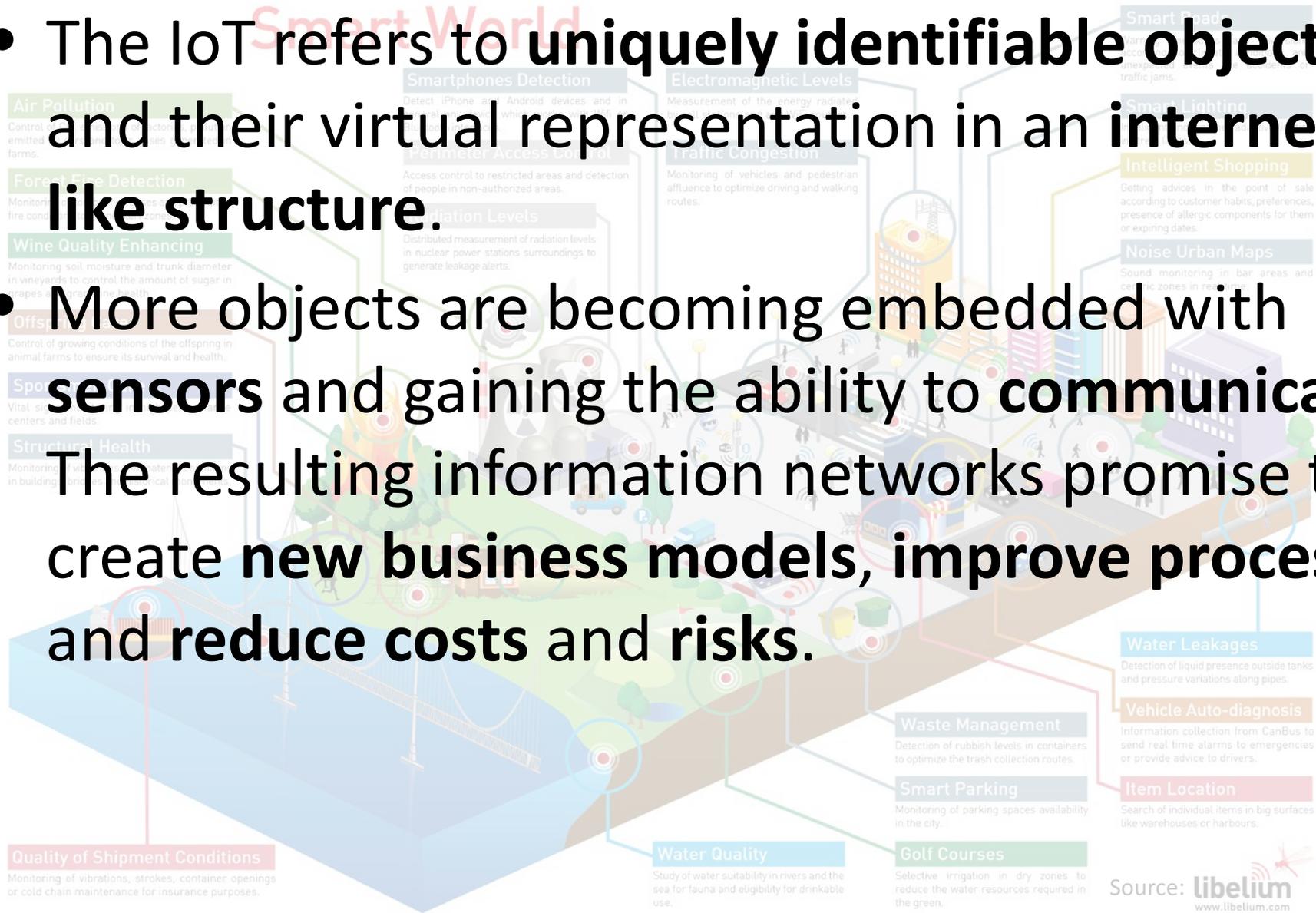
Who is this guy?

- Co-Founder & CEO @ MARSEC-XL
- MARSSA initiator & co-creator
- Open Source proponent
- Mariner - Commercially licensed, High speed vessels (Chalmers University of Technology)
- Diver (PADI)
- Career-long work with software dependency
 - Maritime, Automotive, Aeronautics, Defense, Telecom.
- Previously: Managing Director @ Carnegie Mellon Software Engineering Institute Europe
- Founder & CEO of Q-Labs.



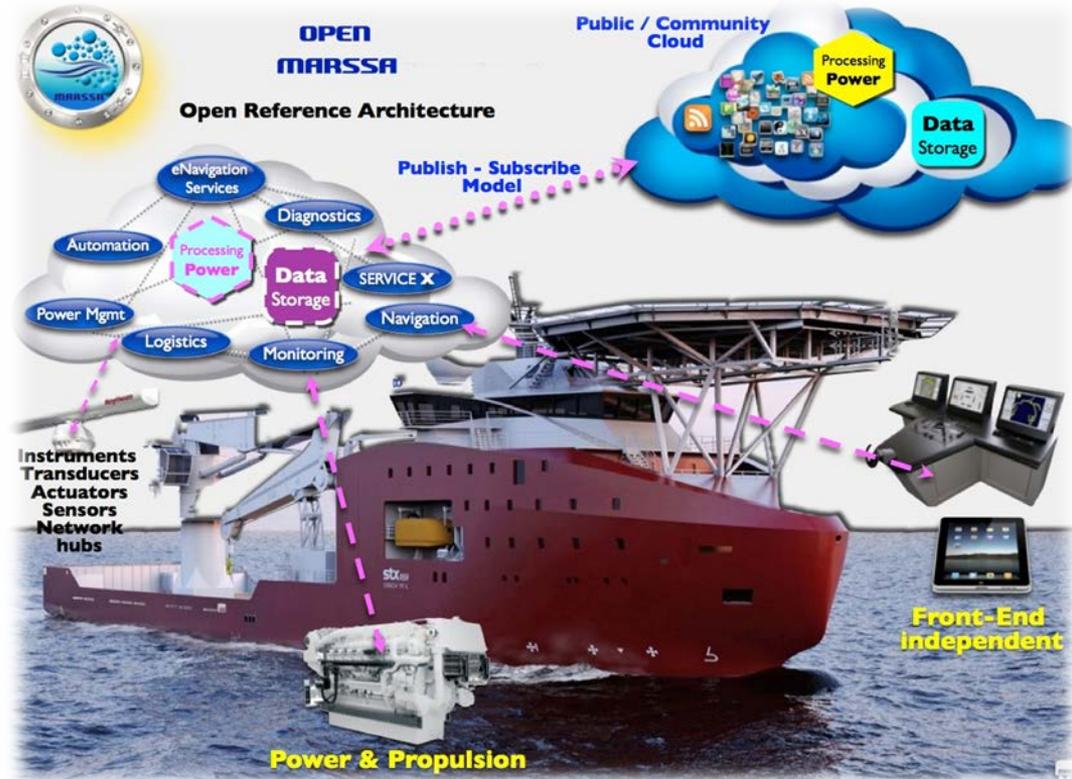
What is the Internet of Things (IoT)?

- The IoT refers to **uniquely identifiable objects** and their virtual representation in an **internet-like structure**.
- More objects are becoming embedded with **sensors** and gaining the ability to **communicate**. The resulting information networks promise to create **new business models**, **improve processes** and **reduce costs and risks**.



What does the IoT do?

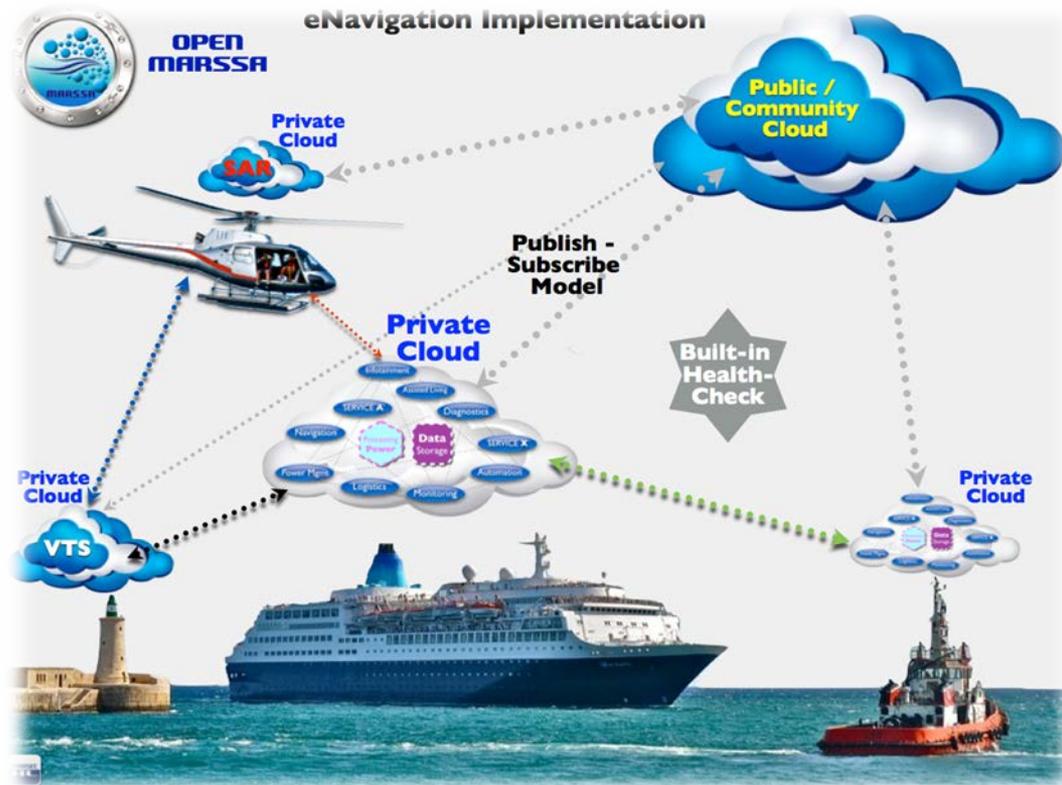
- In the IoT, **sensors** and **actuators** embedded in physical objects are **linked** through wired and wireless **networks**, often using the same **Internet Protocol (IP)** that connects the Internet.



- When objects can both **sense** the environment and **communicate**, they become **tools** for understanding complexity and **responding** to it swiftly.
 - They can work **without** human intervention.

What does the IoT do?

- The widespread adoption of IoT will take time but it's speeded up by **wireless technologies, Open Source Software, standardization, data collection (Big data!), cloud computing.**



- A first step toward the IoT is **converting** networks on proprietary protocols to **IP-based** networks.
- When objects can **sense** and **communicate**, it changes how and where **decisions** are made and **who** makes them.

What does the IoT do?

- When an object can **represent itself digitally**, it can be **controlled** and/or **monitored** from **anywhere**. This connectivity means **more data**, gathered from **more places**, with more ways to **increase efficiency** and **improve safety, security** and **situational awareness**.
- The **network** plays a critical role as the **connectivity platform** for control and operational systems, sensors, devices.
 - It must provide a **secure infrastructure with open standards** and **seamless integrated architecture**.

The Internet of Things in Maritime

- **Two groups of IoT applications are emerging:**
 - **1. Information & Analysis:**
 - Tracking behavior
 - Enhanced situational awareness
 - Sensor-driven decision analytics
 - **2. Automation & Control:**
 - Process optimization
 - Optimized resource consumption
 - Complex autonomous systems

Enabling the Internet of Things at Sea

- **IP protocol & Open Standards**
 - Data Sharing and Exchange
- **Open Source:**
 - **MARSSA** – Open Reference System Architecture
 - **OBP** – Open Bridge Platform – an instance of MARSSA
 - **Maritime Cloud** – a communication framework
- **Communications** – Global connectivity – Internet, (VDES?)
- **Community** driven approach:
 - **E-navigation**
 - **STM** – Sea Traffic Management
 - **E-Maritime**

What do we need to succeed?

Critical Success Factors for global e-Navigation adoption*:

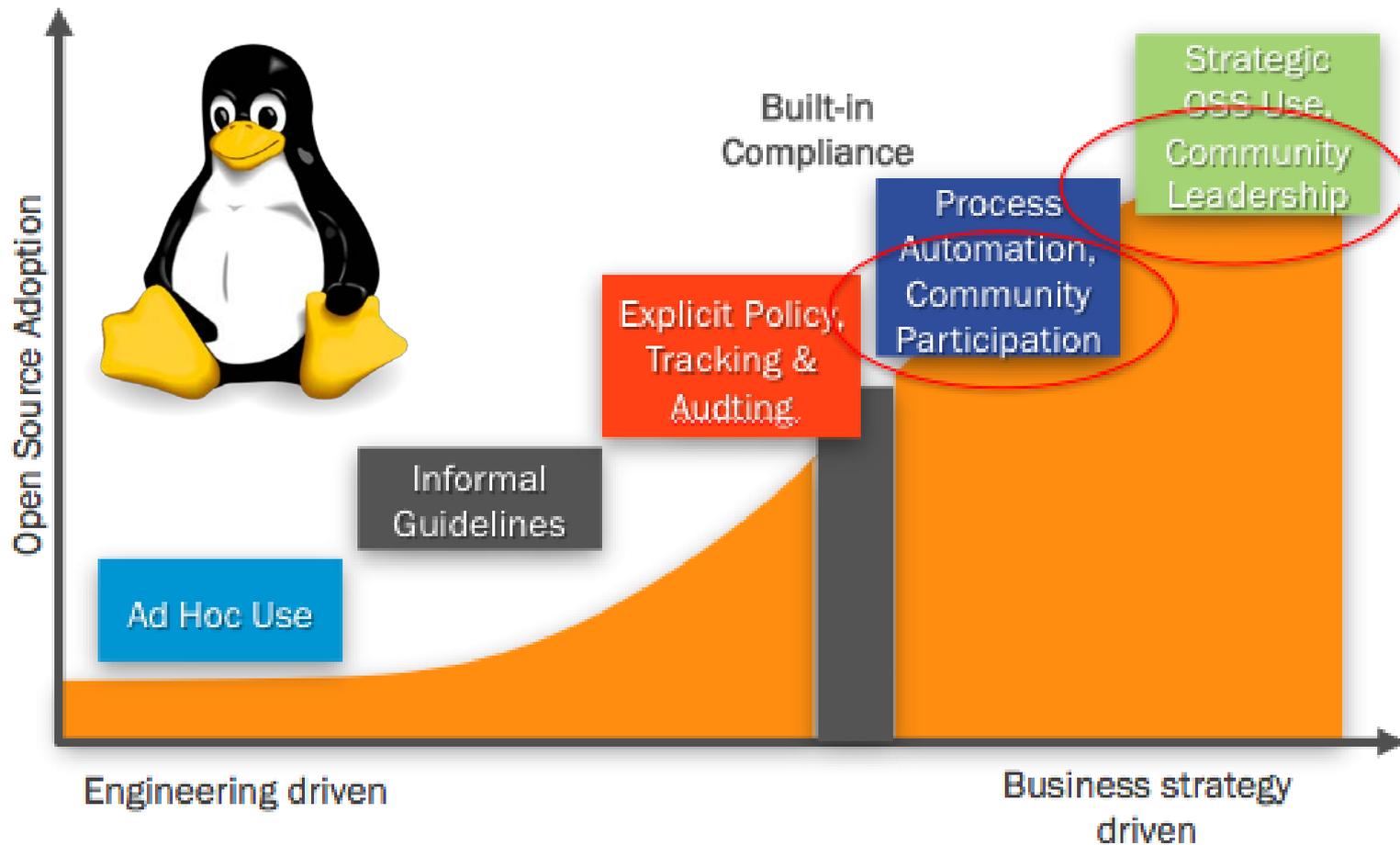
- High **quality** systems at **reduced cost**
- **Interoperability** in a **multi-vendor** environment (no vendor lock-in practices).
- **Future-proof** & Platform **Independent** (Maritime Cloud & MARSSA Open Reference Architecture)
- **Intuitive** usability with reduced training needs: less complex but more sophisticated solutions.
- **New** & Sustainable **Business Models** (Open Innovation)
- **Harmonized** infrastructure, Processes & Quality of Data
- Regulation & Standardization at the “right” abstraction level

Community driven approach

- Lessons learned from ICT & Open Source (OSS) Community:
 - Grass root vs top-down approach
- E-Navigation – perceived as a “disruptive” concept: evolution or revolution?:
 - New business models
 - Push for transformational innovation
 - End-User driven
 - Incubator for new (disruptive!) technologies.

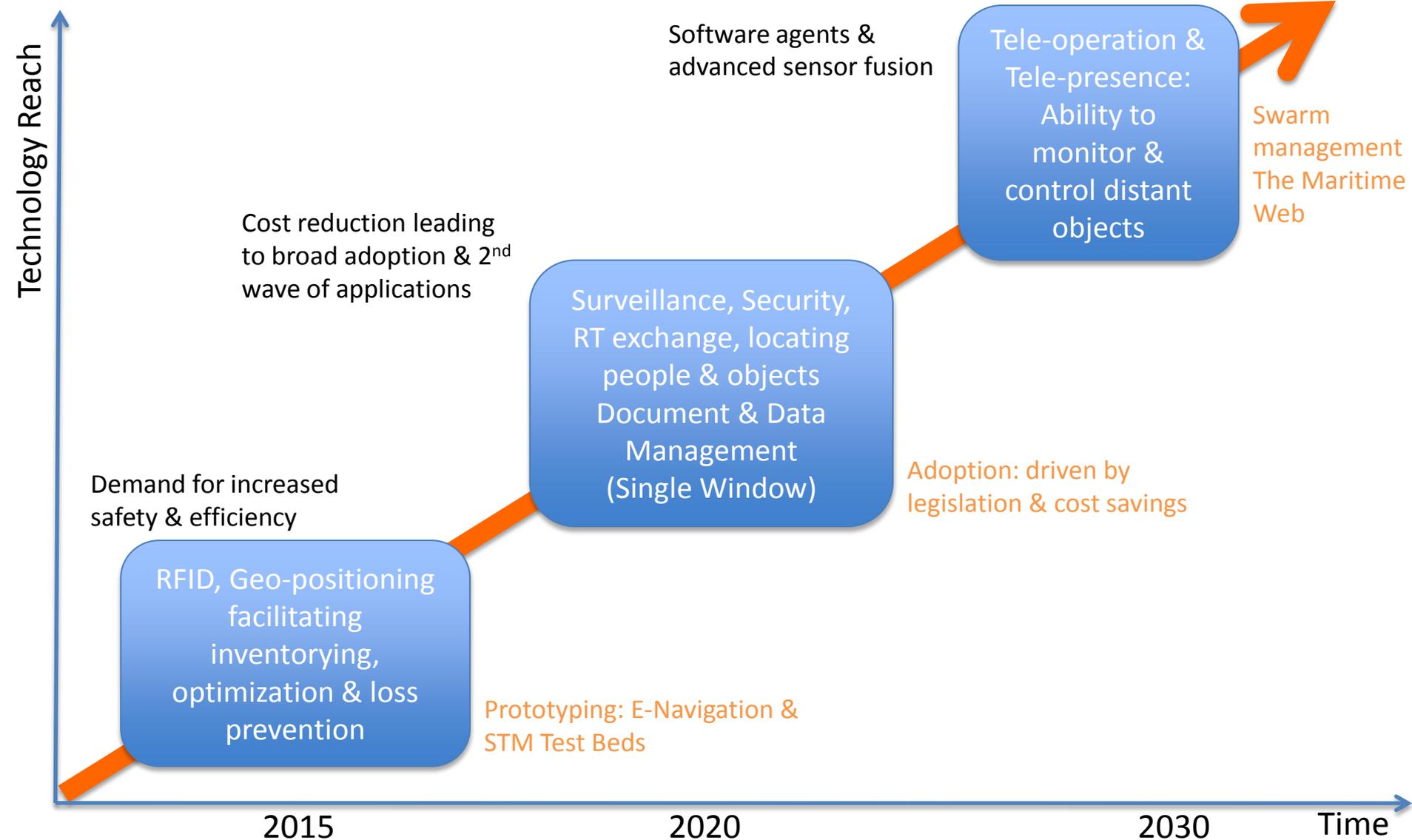


Giving back to the community: OSS vs Organizational Maturity



- An organization needs to be fairly **mature** in its views & practices wrt **Open Source** before it will be comfortable **giving back to the community**.

Technology Roadmap Maritime IoT



Key Take-Aways

- Success is not measured in market share but in **Adoption!**
- Wide e-Nav adoption dependent on **Affordability, Reliability & Seamless Interoperability** of Systems
 - Can be achieved with **OSS Components** & based on **Open Reference System Architecture** as a “blueprint”.
- **Community & Collaboration**: across various ongoing & upcoming Maritime IoT projects.
- **Early e-Nav Systems Prototyping & Test Beds.**

Thank You

geir@marsec-xl.org

www.marsec-xl.org

Twitter:

@MARSEC-XL

Maritime Innovation &
Technology Conference

16-17 October 2014

Malta

www.mit2014.com

