

# Meet & Greet Welcome

Tracie Berardi

Director of Program Management



OBJECT MANAGEMENT GROUP<sup>®</sup>

# OMG is an IT Standards Development Organization

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The mission of the Object Management Group® (OMG ®) is to develop **technology standards** that provide **real-world value** for multiple vertical industries.

OMG brings together its international membership of enterprise end-users, vendors, government agencies, universities and research institutions to develop and revise these standards as technologies mature throughout the years.

The **value** in the OMG technology adoption process:

**Well-documented – Mature – Open – Fair**

# At-a-glance

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**1989**

founded

**245**

specifications

**275**

member  
organizations  
worldwide

**13**

specifications  
ratified as  
ISO standards

# Developing Standards in Vertical Markets

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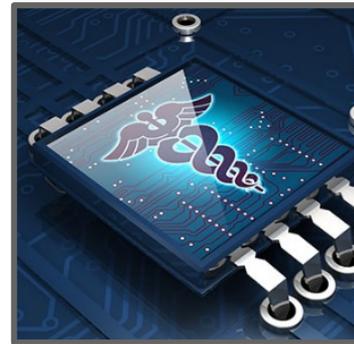
Finance



Government



Healthcare



Manufacturing



Military



Retail



Robotics



Space Exploration



# Best-Known Successes



Ubiquitous visual modelling language applicable to designing any software system



supports the specification, analysis, design, and verification and validation of a broad range of complex systems



provides businesses with the capability of understanding their internal business procedures



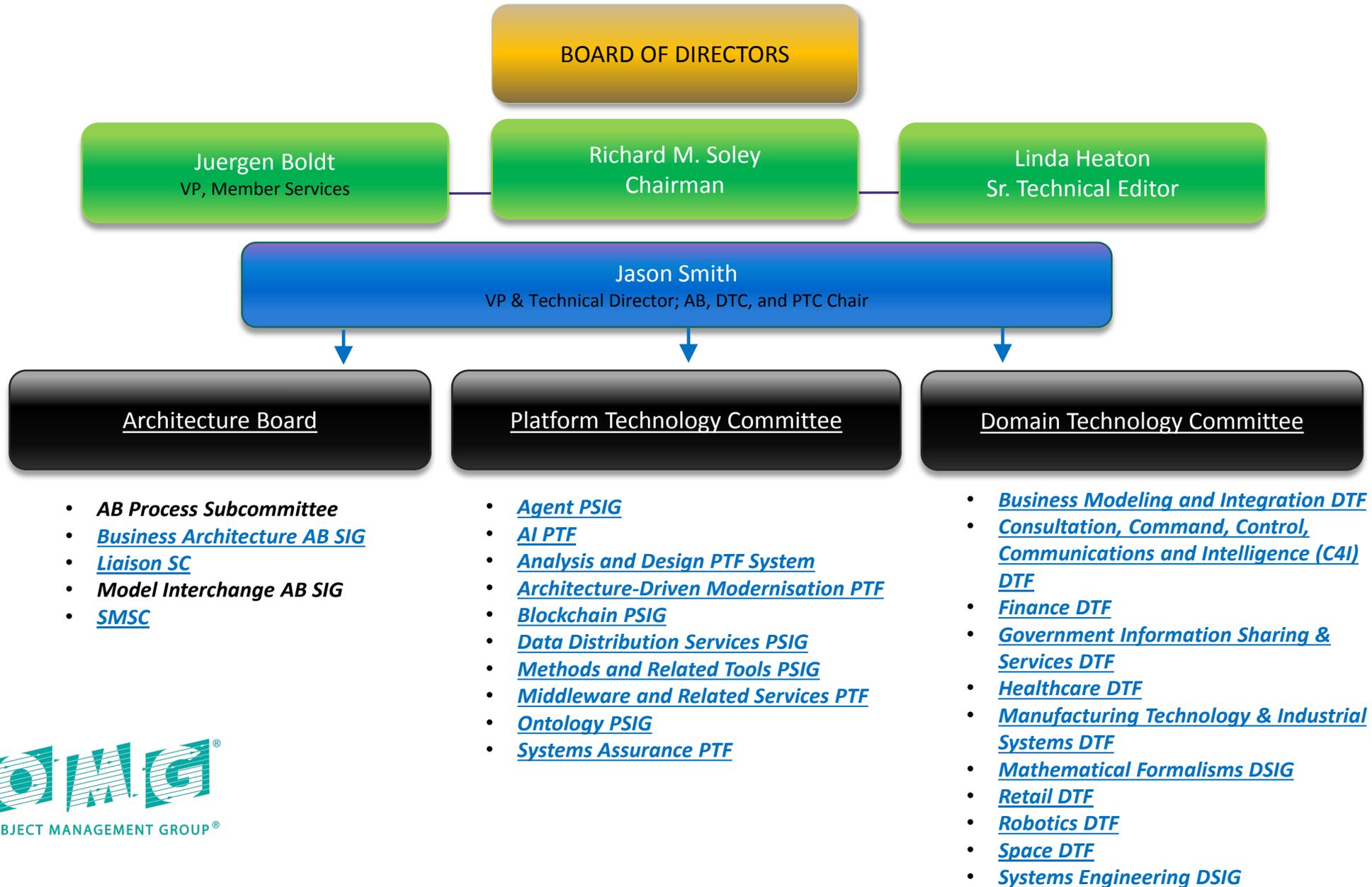
An object-based language- and platform-neutral interoperability standard



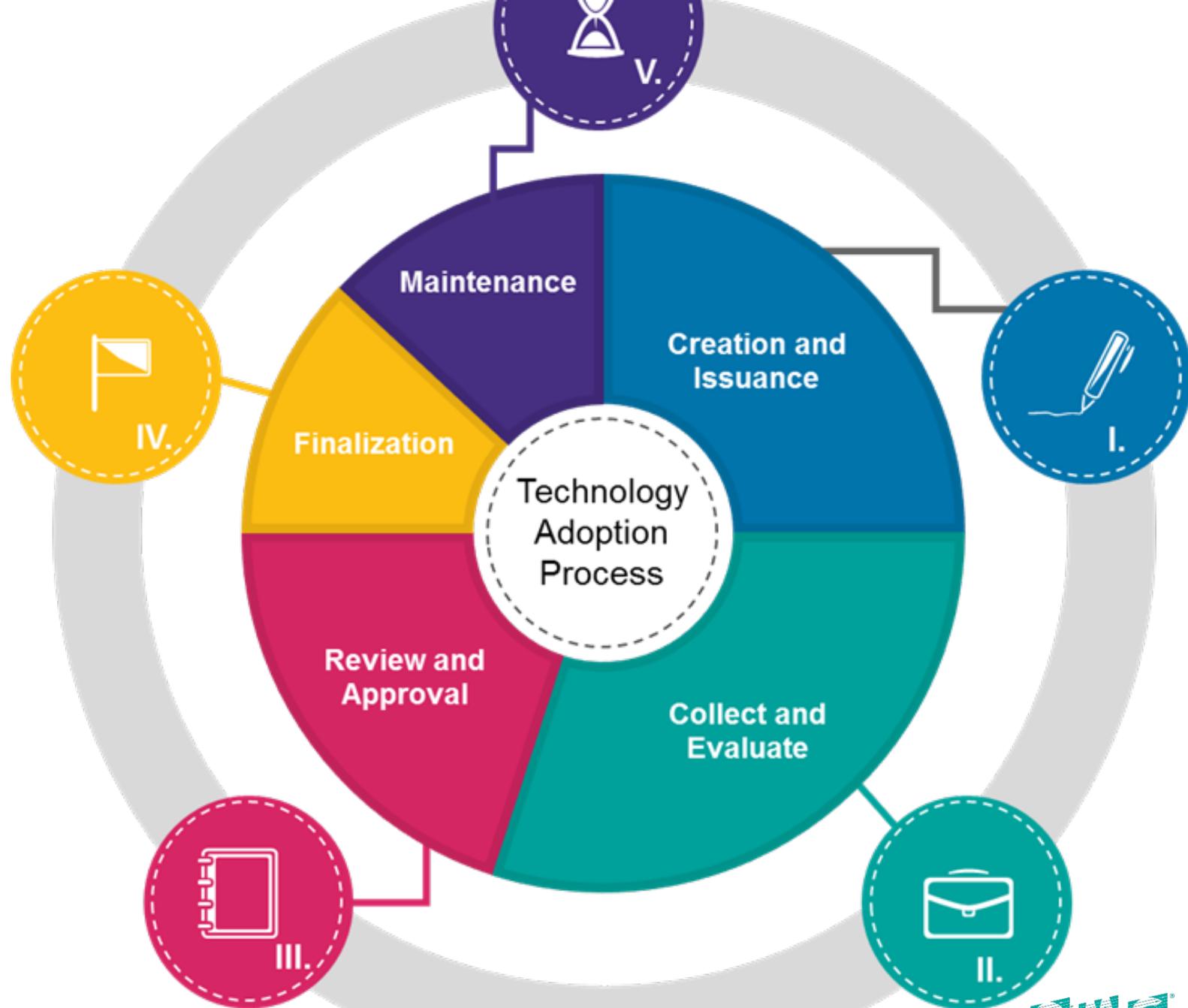
a real-time, data-centric, publish-subscribe OMG specification for data distribution



a repository standard



# Technology Adoption Process



# Quarterly Technical Meetings

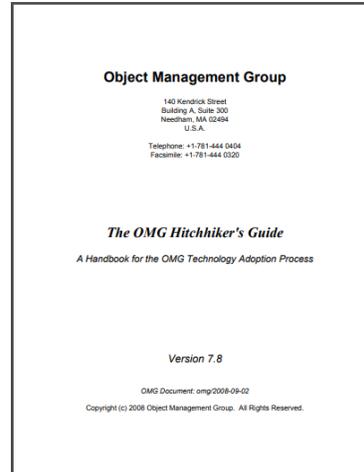
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- **Q4:** December 9-13, 2019 in Long Beach, California
- **Q1:** March 20-23, 2020 in Reston, Virginia

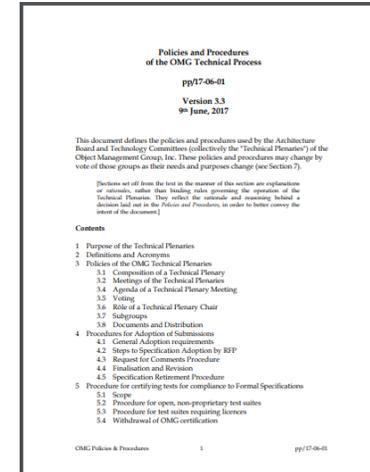
View the calendar and register at <https://www.omg.org/events/index.htm>

Registration is open to members and non-members

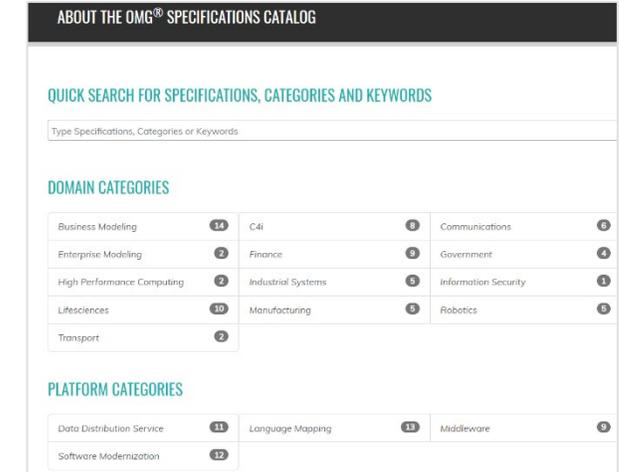
# Resources



**Hitchhiker's Guide**  
<http://doc.omg.org/hh>

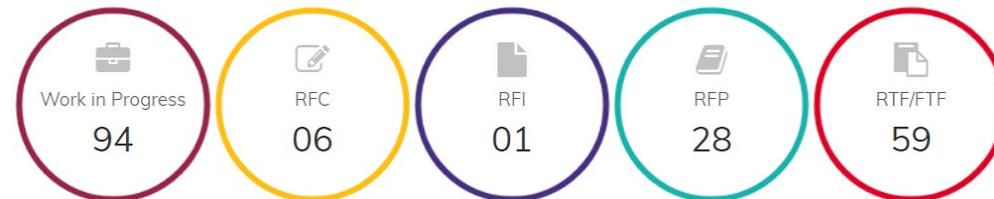


**Policies & Procedures**  
<http://doc.omg.org/pp>



**Specifications Catalog**  
<https://www.omg.org/spec/>

Work in Progress – open RFPs  
[https://www.omg.org/public\\_schedule/](https://www.omg.org/public_schedule/)



# Communities Launched by OMG



Accelerating the adoption of the Industrial Internet of Things (IIoT)



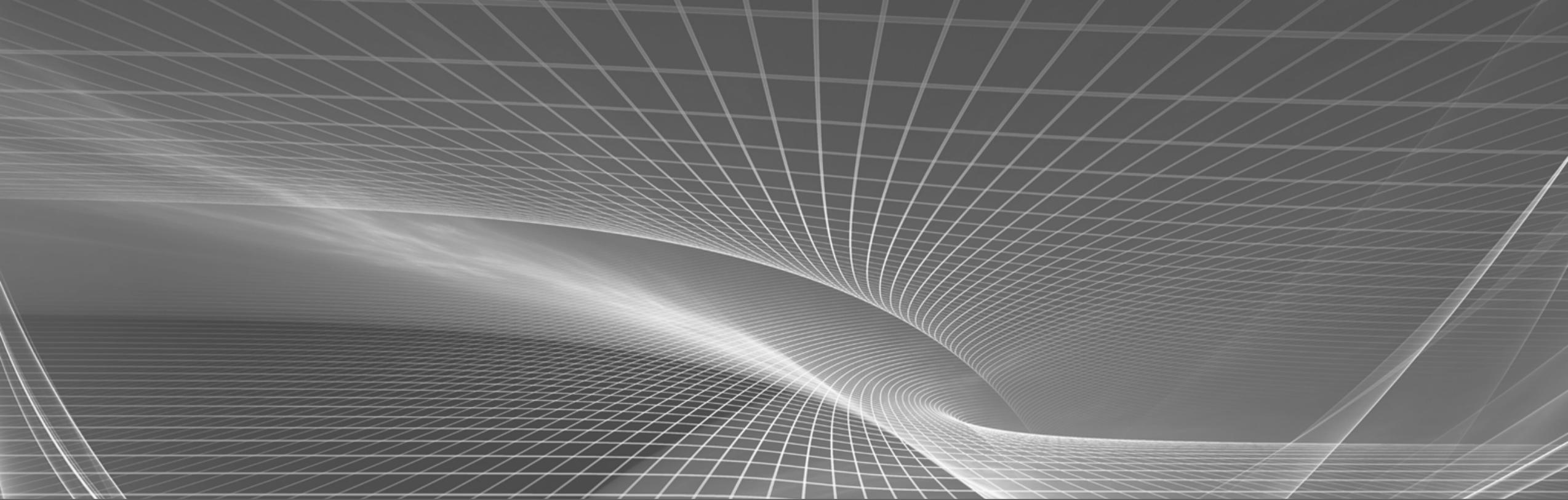
Developing standards to automate software quality measurement



Developing and piloting standards-driven healthcare automation techniques



Driving the adoption, interoperability and success of the Data-Distribution Service™ standard



# What's New at OMG

Claude R. Baudoin

Co-chair, Business Modeling & Integration Task Force

Co-chair, AI Task Force

Co-chair, Cloud Working Group



# Some Key Focus Areas

BPM+ Health Community

Business Architecture Metamodel

Cloud Computing Guides

Blockchain standards

New AI initiative

...and more

# What's Going On in... Business Modeling & Integration

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- The Healthcare community is adopting our “triple crown” of workflow-related specifications to model and exchange *clinical pathways*:
  - Business Process Model & Notation (BPMN)
  - Case Management Model & Notation (CMMN)
  - Decision Modeling Notation (DMN)
- Critical “maturity” effort by organizations such as the Veterans Administration to improve the standard of care
- Led to the formation of a “BPM+ Health Community”

# What's Going On in... Business Modeling & Integration

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- Submitters are working on a Business Architecture Core Metamodel (BACM)
  - Centered on the concept of *business capabilities*
  - Connects the various concepts modeled using other BMI standards
- Standard Business Report Model
  - Semantics of elements of a business report
    - XBRL is just a report format standard
- We just issued two RFIs
  - Risk Management
    - What are the types of risks that need to be documented, reported and interchanged?
    - What standards exist and which ones are missing?
  - Requirements Management
    - (ditto)

# What's Going On in... Cloud Computing

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- The *Cloud Standards Customer Council (CSCC)* became the *OMG Cloud Working Group* in 2019
  - Maintaining and expanding our library of ~30 Practical Guides and Discussion Papers
  - Worked recently on governance and on cloud service agreements
  - Planning a paper on *Cloud Adoption in Retail* with the Retail DTF
- Our community is broader than OMG members
  - 500+ people on mailing list
  - 730+ people in LinkedIn group

# What's Going on in... Blockchain

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- The Finance Domain Task Force has been looking at distributed ledger technology
  - For smart contracts and similar needs, not cryptocurrencies or ICOs
- Discussion paper
  - “Distributed Immutable Data Objects” Reference Architecture
    - Neutral name to avoid the specific tech references (blockchain, etc.)
- Tangles
  - Planning to create a standard for tangle technology (IOTA foundation)

# What's Going on in... Engineering and Manufacturing

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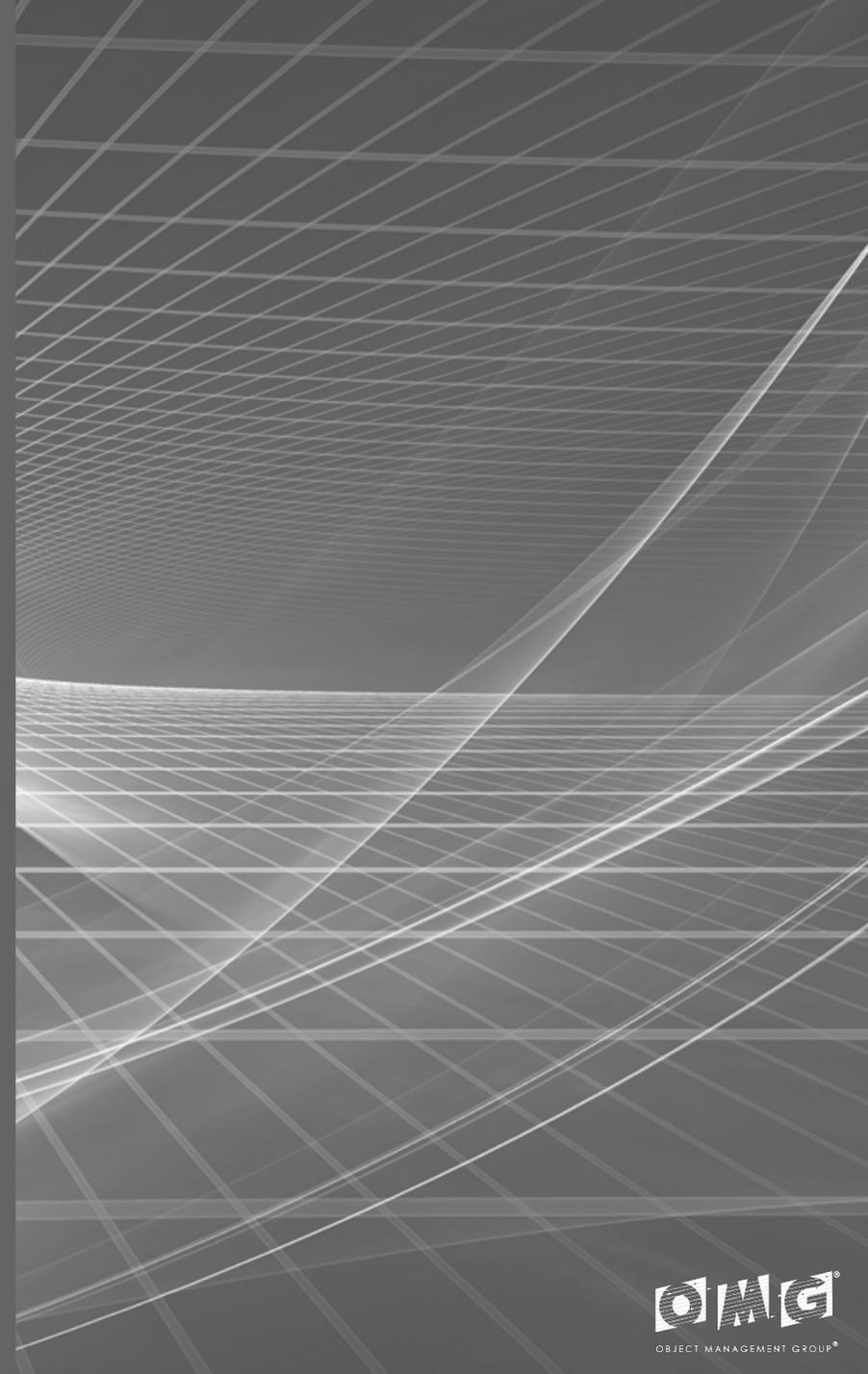
- Systems Engineering
  - Working on two complementary standards for the *Systems Modeling Language v2*
  - Discussions with the MIMOSA standards group (interchange of documentation on large assets, such as oil platforms)
- Manufacturing Technology and Information Systems (ManTIS)
  - RFI on a “Product Knowledge Framework”
  - RFI on Production Logistics Modeling

# What's Going on in... the Industrial Internet of Things

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- IloT activities are the focus of the *Industrial Internet Consortium*
  - An OMG managed program
  - Not a standards development organization
  - Separate membership
  - Quarterly meetings – some are synchronized with OMG meetings
- Impact on OMG work
  - Influences the evolution of the Data Distribution Service (DDS)
  - Caused the emergence of a DDS/OPC-UA gateway standard
  - Requested a *Simple Electronic Notation for Sensor Reporting (SENSR)*

# OMG's Artificial Intelligence Initiative



# AI at OMG

## Response to NIST RFI on AI Standards (June 2019)



June 10, 2019

**Subject: RFI: Developing a Federal AI Standards Engagement Plan**

The Object Management Group (OMG) appreciates the opportunity and is pleased to respond to the National Institute of Standards and Technology Request for Information, dated May 1, 2019, on the above subject matter.

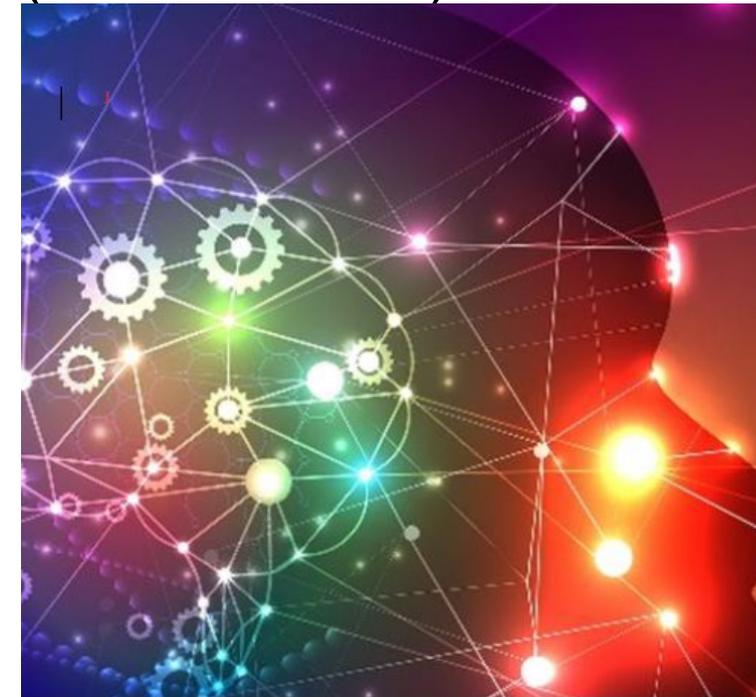
Our response consists of two main parts:

1. A reminder of OMG's history of developing international industry standards in a variety of areas. NIST is a member of OMG, and therefore many NIST experts are well aware of OMG's role and contributions; other readers of this response, however, may benefit from this background information.
2. Point-by-point responses to most of the eighteen items listed in the RFI, with the exception of those where OMG does not have a position -- in part because OMG is an internationally focused organization, not a US-specific one.

OMG has shown, over its 30 years of existence and 225+ produced specifications, its ability to advance modeling, integration and interoperability standards in many domains. We look forward to the opportunity to bring a similar impact to the AI domain, and in fact now have an AI Special Interest Group to focus such efforts.

Sincerely,  
October 25, 2019

## White Paper (October 2019)



### Artificial Intelligence and OMG Standards

Document omg/19-08-01  
26 August 2019

Claude R. Baudoin, cèbè IT & Knowledge Management  
Larry L. Johnson, Technical Director, OMG  
Pete Rivett, CTO, Adaptive Inc.



## Artificial Intelligence Platform Task Force

Charter – 26 Sep 2019 – ai/2019-09-05

- OMG is establishing a presence in AI standards by forming an *Artificial Intelligence Platform Task Force*
- Formation meeting held on September 25 in Nashville
  - followed by a joint meeting on Augmented Reality requirements (joint with the manufacturing and systems engineering groups)
- Will meet to discuss our roadmap in Long Beach on December 10 or 11

OMG's Artificial Intelligence Platform Task Force (AIPTF) will promote the adoption of specifications that standardize foundational capabilities of artificial intelligence.

Among the goals of the AIPTF is freeing AI technology suppliers as well as end users from interoperability and interchange limitations with respect to models, languages and data, and to enable them to focus instead on development of advanced AI applications.

In the context of this charter, Artificial Intelligence is defined broadly and includes, but is not limited to:

- Modeling of AI artifacts
- Machine learning, deep learning and neural networks
- Image and sound recognition
- Virtual and augmented reality
- Autonomous systems and agents
- Knowledge representations
- Natural language processing (NLP)
- Security, privacy, social and other ethical aspects of AI

The purpose of the AIPTF includes development of foundational specifications that support AI in the above broad sense.

The AIPTF may, when appropriate, generate discussion papers, RFIs or RFPs or recommend technologies for adoption. It will also collaborate with other OMG subgroups to identify and document use cases and interoperability requirements for AI, and identify the need for AI-related additions or revisions to those groups' existing and emerging specifications. It will seek to identify external stakeholders, including other standards development organizations, and partner with them as needed.

# Rationale and Scope

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- Why work on AI standards ?
  - AI has matured and branched out to many domains
  - Needs have emerged – see NIST RFI and OMG response
  - OMG has a proven process
  - We have established foundations in knowledge representation and reasoning (ontologies, ODM, DOL, API4KP, etc.)

- Scope ✓
  - “Foundational” capabilities
    - Models of AI components
    - Interchange formats
    - Explanation of neural net decisions
    - Rule languages
    - etc.
- Out of scope 
  - AI applications – where there is competing and proprietary IP

# Potential Roadmap Items

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- Analyze the 97 other responses to the NIST RFI
  - Derive a sense of priorities
  - Derive a list of existing “standards” (mostly *de facto*)
- Review AAAI taxonomy of AI subjects (see OMG white paper appendix)
- Systematically “visit” the other Task Forces (over several successive meetings) to solicit requirements and offer a venue for any AI-related specs they may need
- Continue collaboration with Augmented Reality Enterprise Alliance (AREA) to define intersection of AI and AR
- Hold an “AI Forum” (or similar name) with NIST and others
  - Perhaps in Reston, Va., in March 2020 if we can

# Ontologies at OMG

Elisa F. Kendall

Co-chair, Ontology Definition Metamodel (ODM) 1.2 RTF / 2.0 RFC

Co-chair emeritus, Ontology PSIG

Member, Architecture Board, Board of Directors

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# Ontologies at OMG

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- OMG's Ontology Platform Special Interest Group (PSIG) has been an active, contributing working group for 15+ years
- Platform standards published:
  - ✓ Ontology Definition Metamodel (ODM) – ODM 2.0 planned for March 2020
  - ✓ Distributed Ontology, Model and Specification Language (DOL) – DOL 1.1 planned for December 2019
  - ✓ Languages, Countries and Codes (LCC)
- Platform standards in work:
  - ✓ APIs for Knowledge Platforms (API4KP) – revised submission planned for March 2020
  - ✓ Multiple Vocabulary Facility (MVF) – revised submission planned for March 2020

# Ontologies at OMG

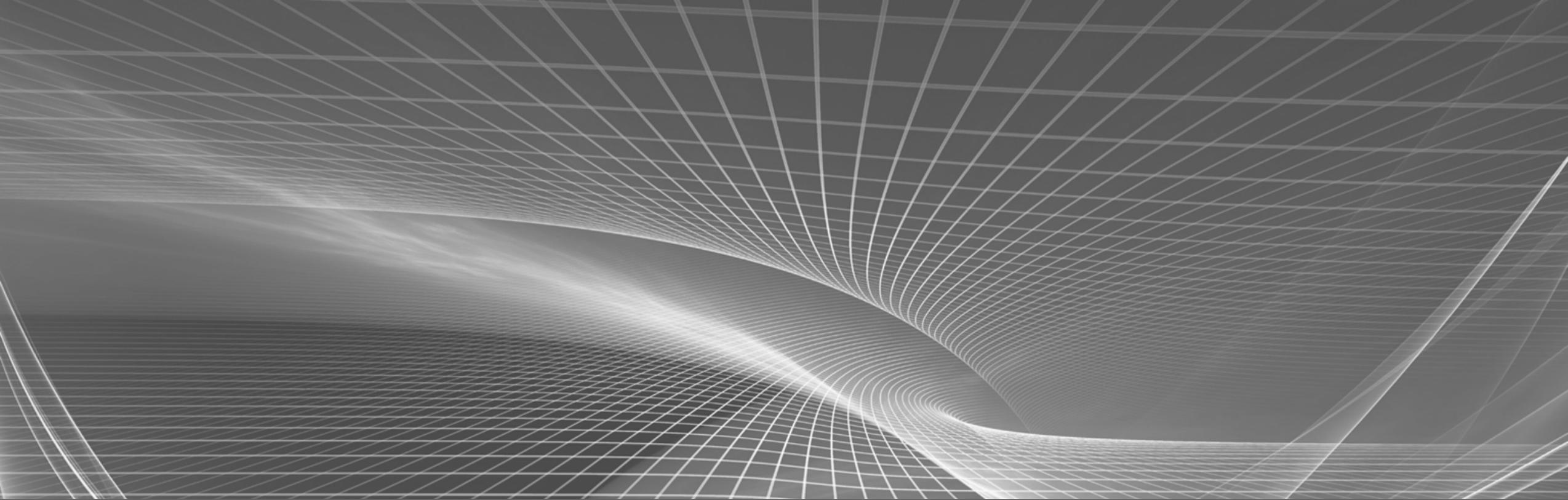
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- Domain standards published:
  - ✓ Financial Industry Business Ontology (FIBO) – FIBO 2.0 is planned for December 2019
  - ✓ Financial Instrument Global Identifier (FIGI) – FIGI 1.1 is planned for September 2020
  - ✓ Information Exchange Packaging Policy Vocabulary (IEPPV) – update planned for 2020
- Domain standards in work:
  - ✓ Robotic Service Ontology – planned for June 2020
  - ✓ Unified POS Fiscal API / Digital Receipt API – ontology to support both planned for June 2020

# Roadmap

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- RFC for the Architecture Board's Specification Metadata Ontology
  - ✓ Currently used by all OMG ontology standards
  - ✓ Also used in OMG Specification Catalog automation
  - ✓ RFC would include support for UML models & profiles, IDL
- Guidelines for ontology publication and maintenance at OMG
- Extensions to the ODM to support RDF\* / SPARQL\* (potentially)
- Continued support for any task force that wants to publish an ontology as an OMG standard
- Collaboration with the AI Task Force & migration from ADTF to AI for new platform standards publication as appropriate



# OMG and Industrial Internet (IIoT)

Gerardo Pardo-Castellote, Ph.D.

CTO, Real-Time Innovations

Co-Chair OMG DDS SIG

Member, OMG Board of Directors

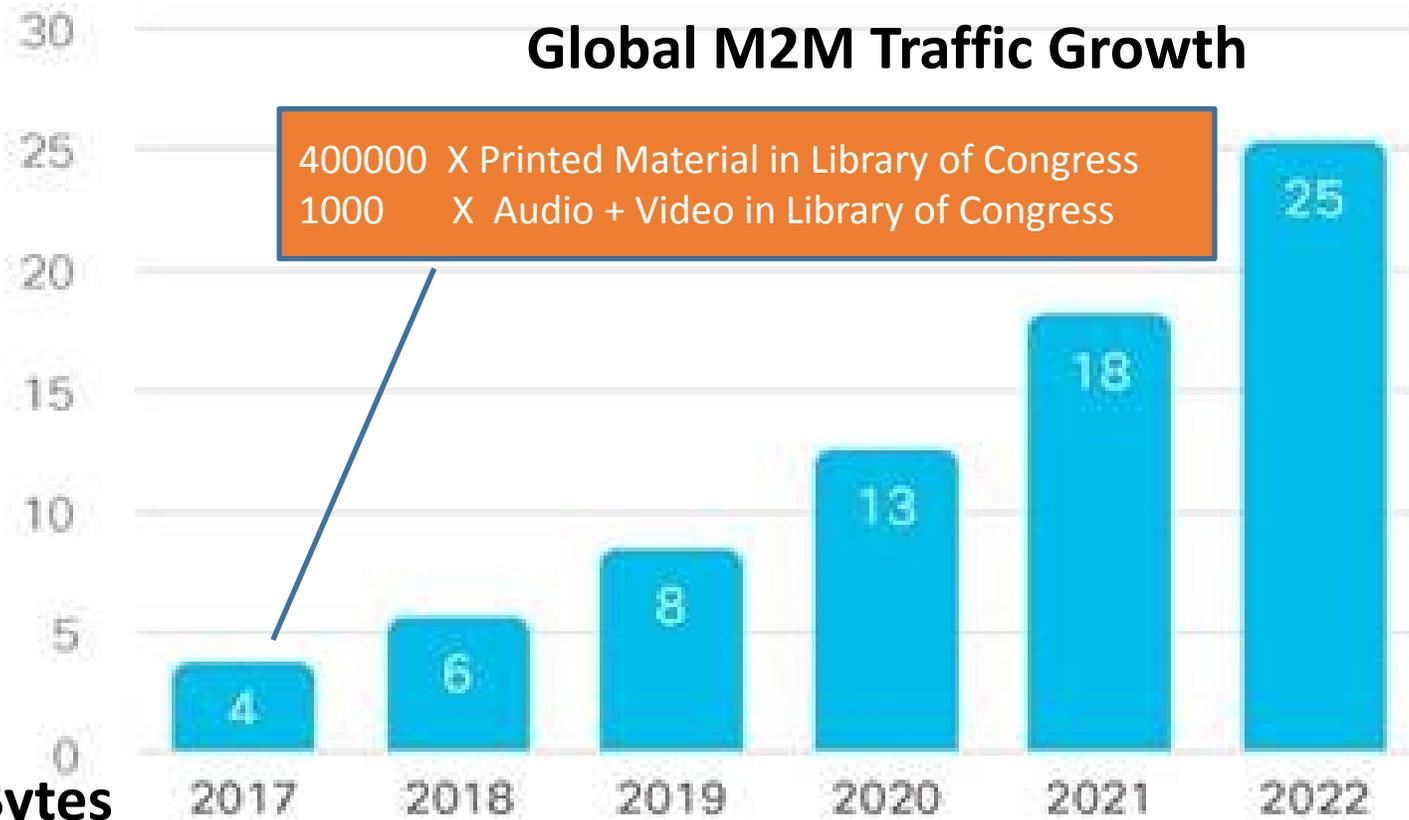


OBJECT MANAGEMENT GROUP<sup>®</sup>

# Increase in Machine to Machine traffic

**47% CAGR  
2017-2022**

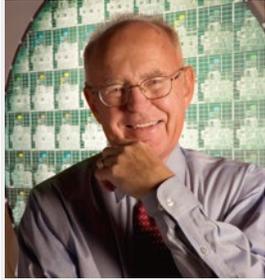
Exabytes  
per month



**1 ExaByte = 10<sup>18</sup> Bytes**  
**1 TeraByte = 10<sup>12</sup> Bytes**

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

# From computing to networking and autonomy



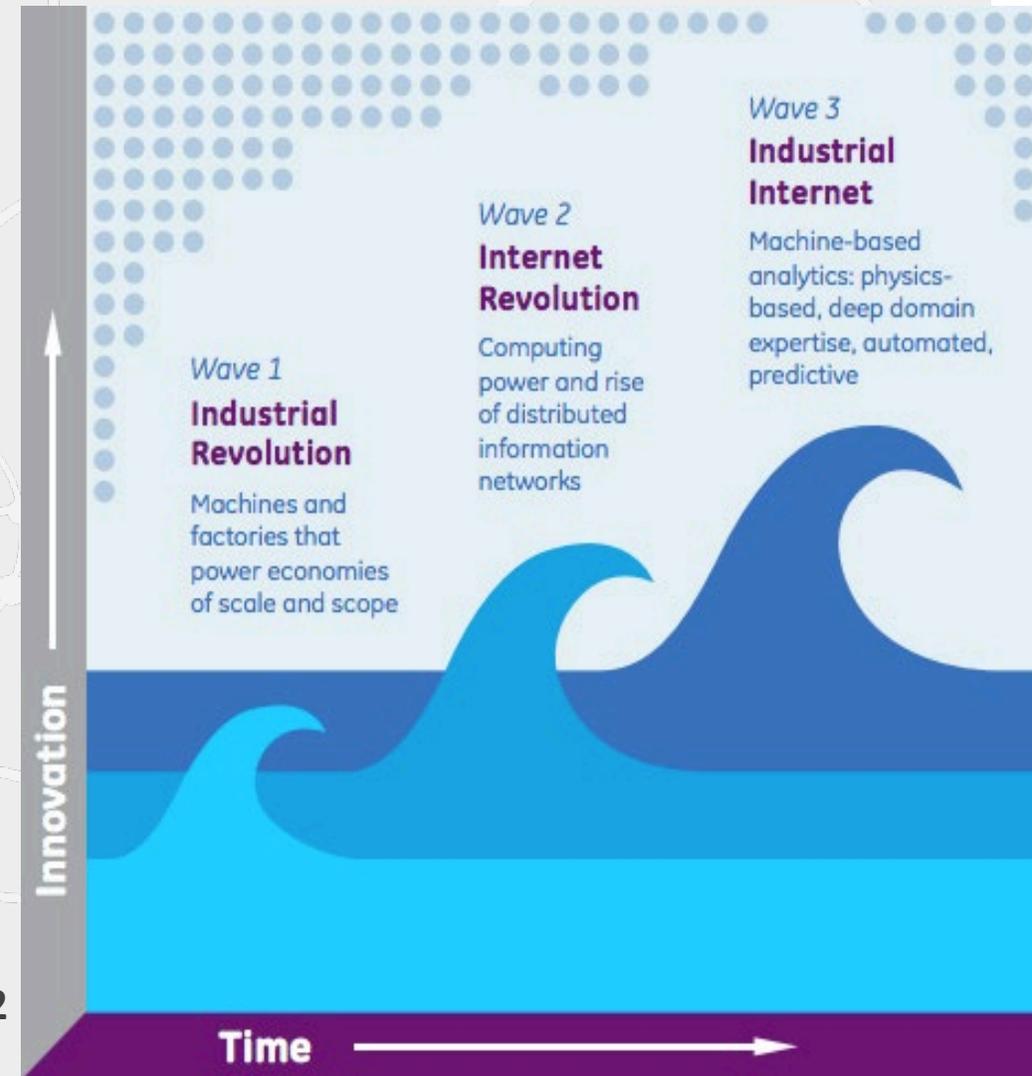
- Computing / Moore's Law:
  - The number of transistors doubles every 18 months



- Internet / Metcalf Law:
  - The value of a network grows as the SQUARE of (connected) nodes
  - #Nodes doubles every 2 years



- IIoT / Edge Autonomy Law
  - Value of Connected Platform =  $\text{NodeComplexity} * \text{ConnectedNodes}^2$



# Easter Parades in New York City

Year 1900: One Motor Vehicle

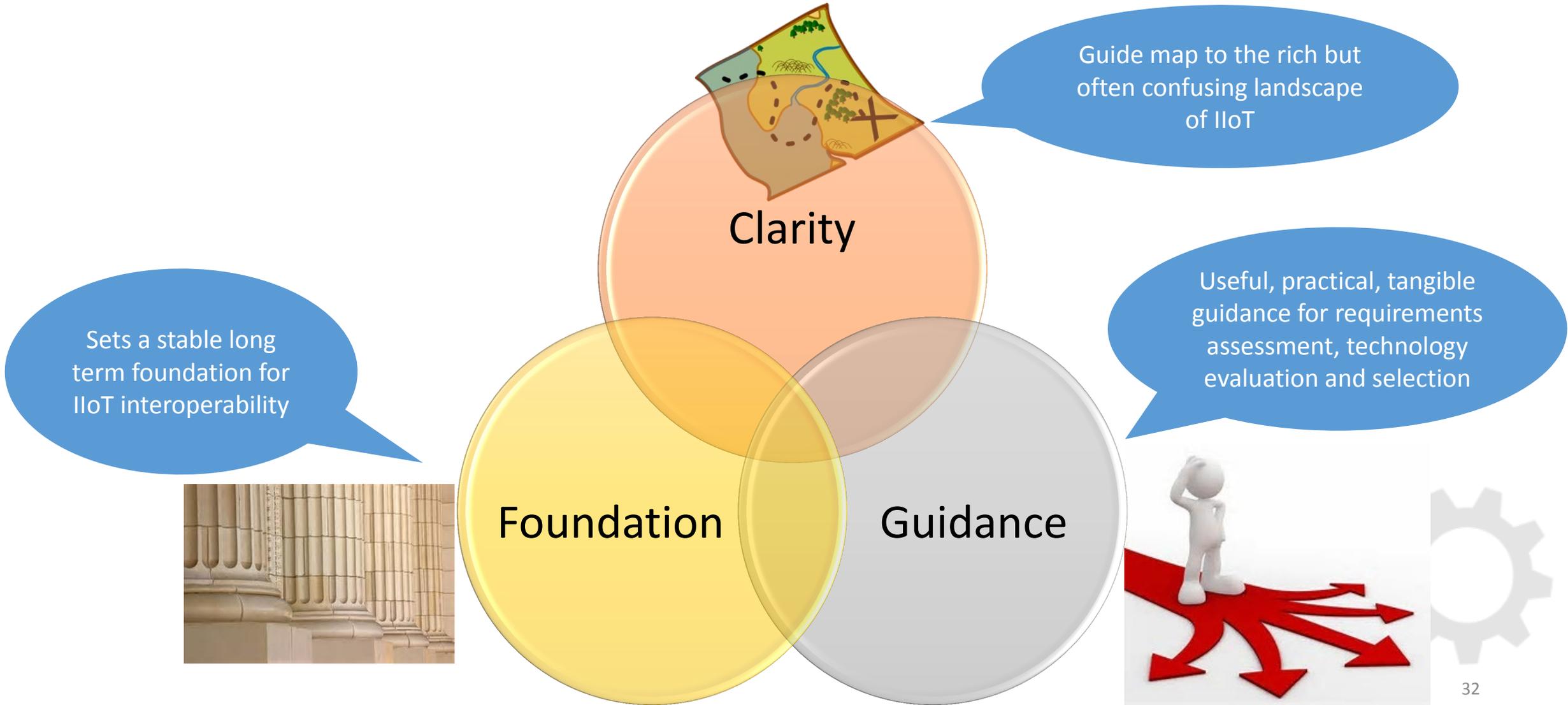
Year 1913: One Horse & Carriage





# Industrial Internet Guidance documents

*Accelerating IIoT*



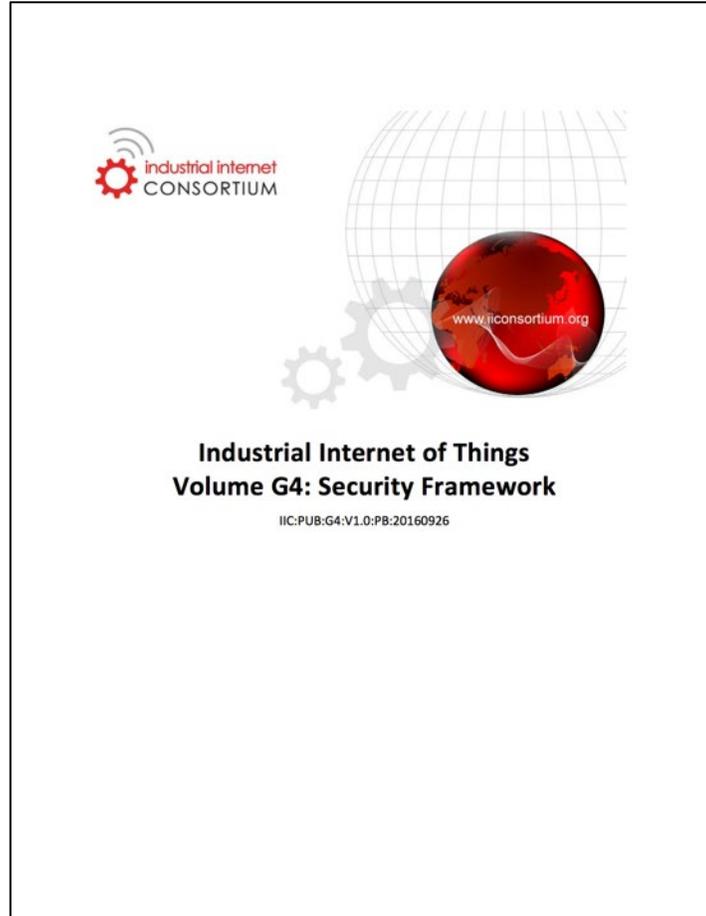


# Industrial Internet Guidance documents

*Accelerating IIoT*



<https://www.iiconsortium.org/IIRA.htm>

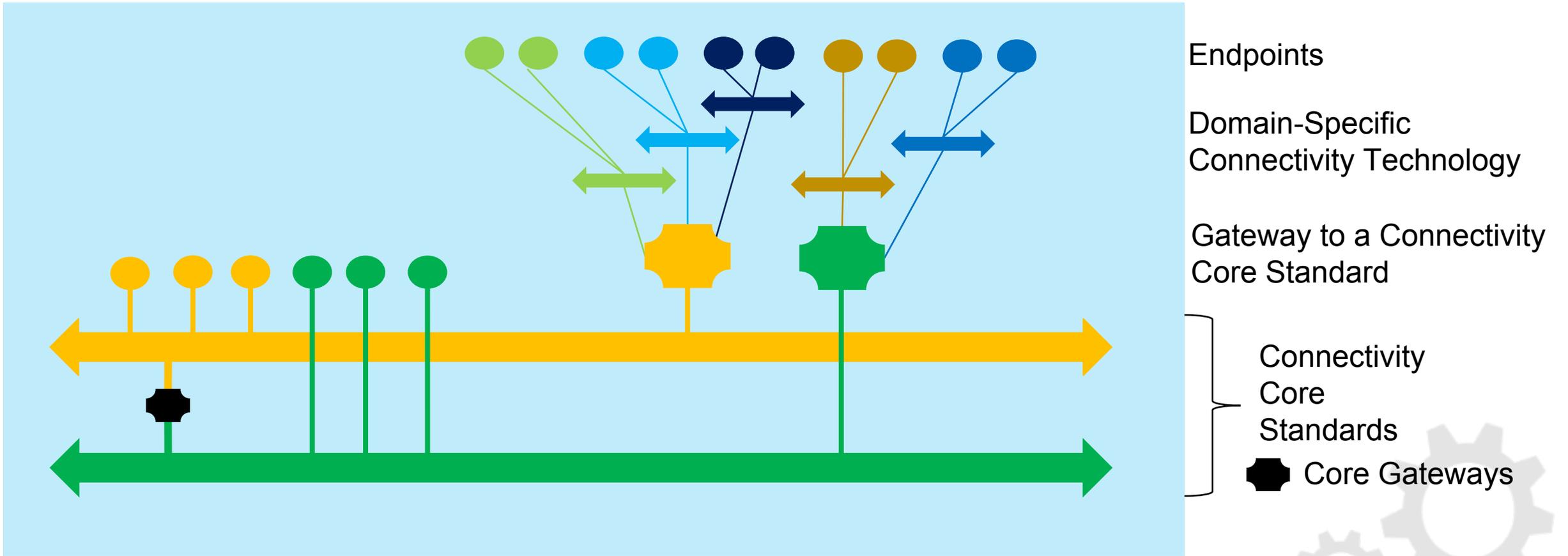


<https://www.iiconsortium.org/IISF.htm>



<https://www.iiconsortium.org/IICF.htm>

# IIC Core Connectivity Standards





# IIoT Core Connectivity Standards

...

Energy & Utilities

Healthcare

Manufacturing

Transportation

...

Distributed Data Interoperability and Management

Framework

Transport

Network

Link

Physical

*Telecommunications Origin*

*Manufacturing Origin*

DDS

oneM2M

Web Services

OPC-UA

DDSI-RTPS

CoAP

MQTT

HTTP

OPC-UA Bin

TCP

UDP

TCP

Internet Protocol (IP)

TSN / Ethernet (802.1, 802.3)

Wireless PAN (802.15)

Wireless LAN (802.11 Wi-Fi)

Wireless 2G/3G/LTE (3GPP)

Wireless Wide Area (802.16)

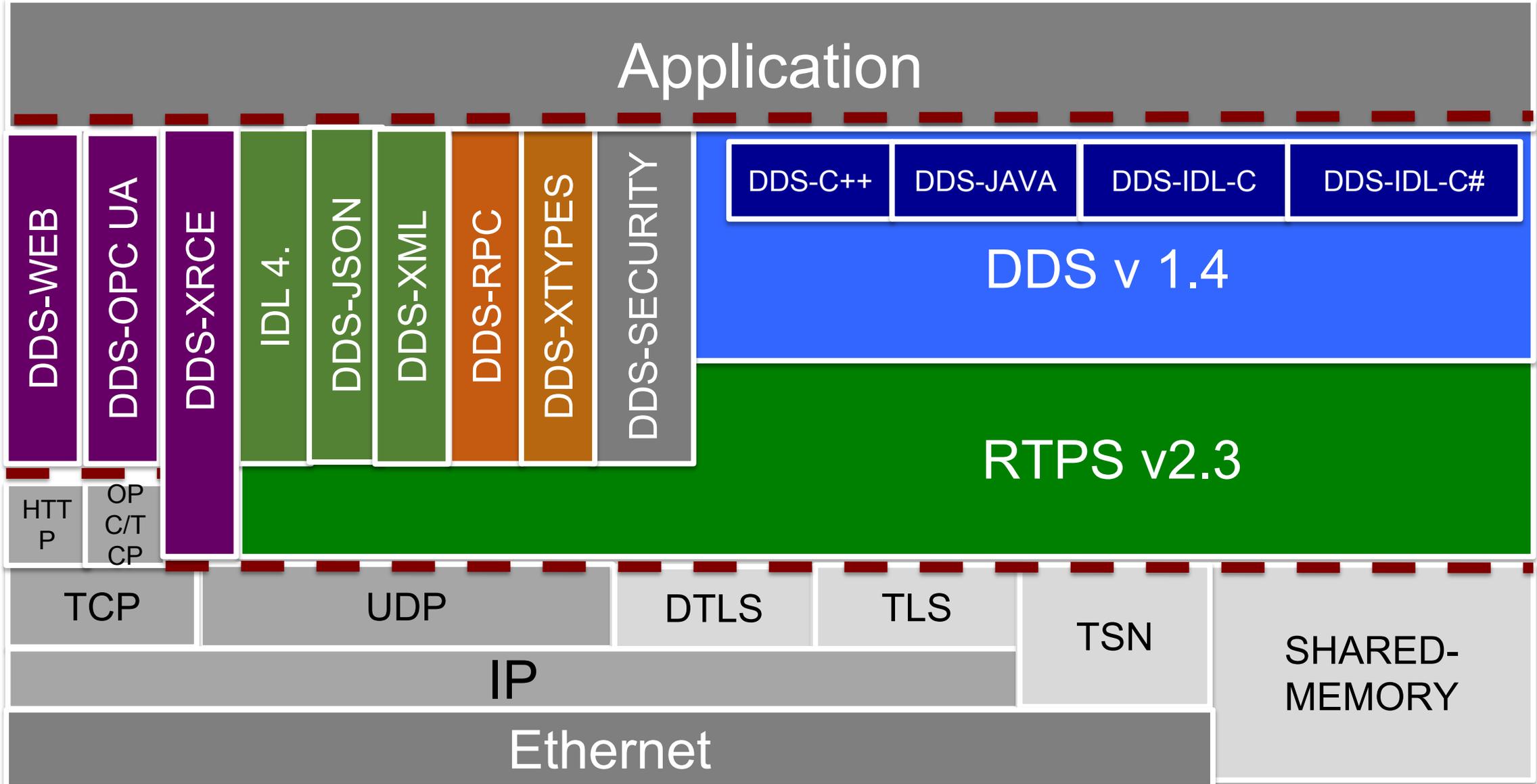


# Selection Criteria

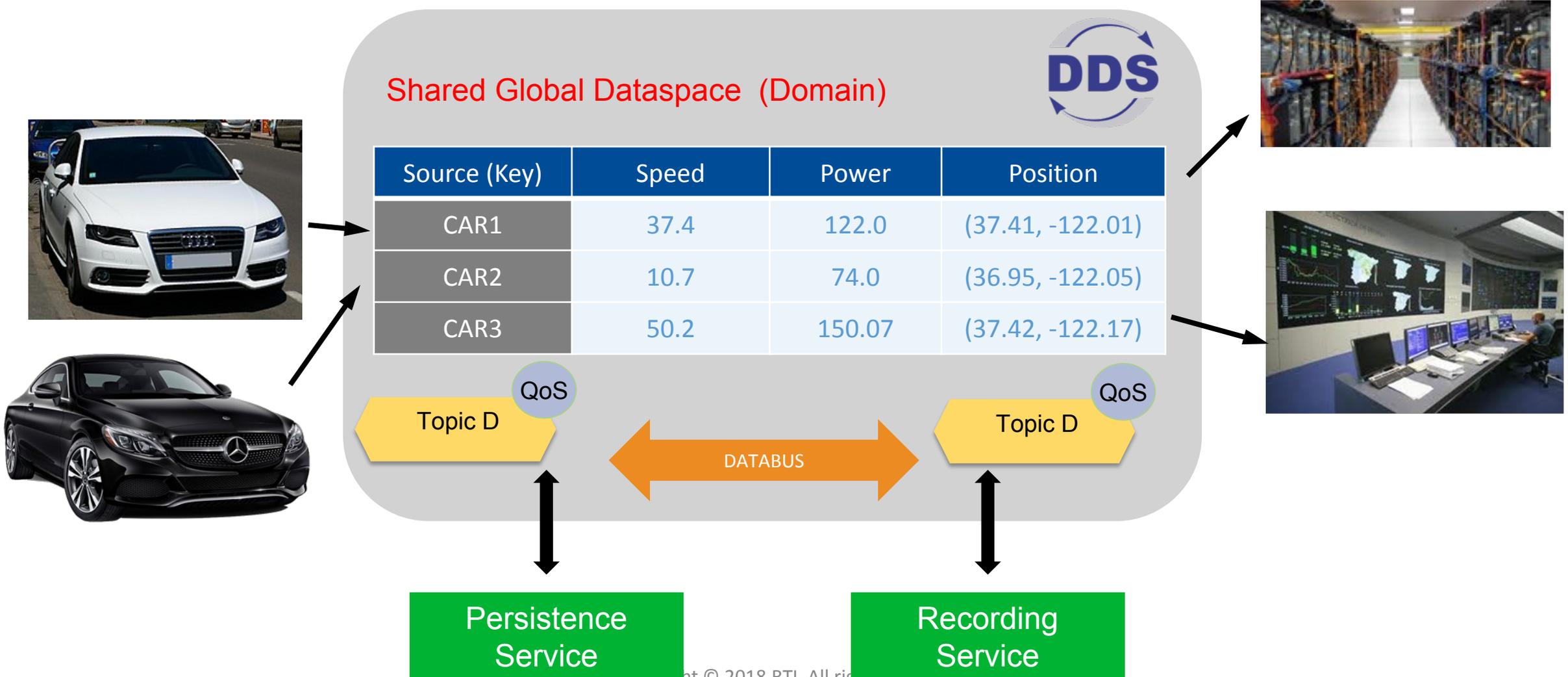
	Core Standard Criterion	DDS	Web Services	OPC-UA	oneM2M
1	Provide <b>syntactic interoperability</b>	✓	Need XML or JSON	✓	✓
2	Open standard with strong <b>independent, international</b> governance	✓	✓	✓	✓
3	<b>Horizontal</b> and neutral in its applicability across industries	✓	✓	✓	✓
4	<b>Stable</b> and <b>proven</b> across multiple vertical industries	Software Integration & Autonomy	✓	Manufacturing	Smart City Pilots*
5	Have <b>standards-defined Core Gateways</b> to <i>all</i> other core connectivity standards	Web Services, OPC-UA, oneM2M*	DDS, OPC-UA, oneM2M	Web Services, DDS, oneM2M*	Web Services, DDS*
6	Meet the connectivity framework <b>functional</b> requirements	✓	X	Pub-Sub in development	
7	Meet <b>non-functional</b> requirements of performance, scalability, reliability, resilience	✓	X	Real-time in development	Reports not yet documented or public
8	Meet <b>security</b> and safety requirements	✓	✓	✓	✓
9	Not require any single component from any single vendor	✓	✓	✓	✓
10	Have readily-available SDKs both <b>commercial</b> and <b>open source</b>	✓	✓	✓	✓

\* = work in progress , ✓ = supported, X = not supported

GREEN = Gating Criteria

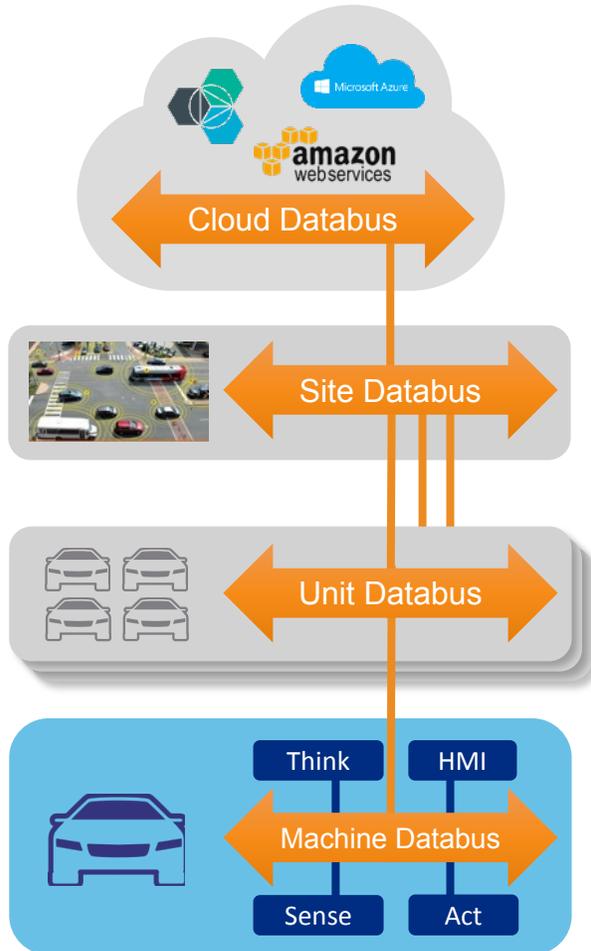


# DDS “virtual” Data-Centric Global Data Space



# Data-Distribution Service

**Real-Time  
Standards-Based Secure  
Databus Architecture**



**Widely deployed in IIoT and  
mission critical applications**

**AEGIS Combat System**



**NASA Launch  
Control**



**Canada ATC**



**GE Healthcare**



**Siemens Windpower**



**Autonomous Vehicles**



1. Are there severe consequences of failure for a few mins/secs/msecs?
2. Have you said “millisecond” or “microsecond” in the last 2 weeks?
3. Do you have more than 10 programmers?
4. Does your data have many destinations?
5. Are you building a next-generation IIoT design?



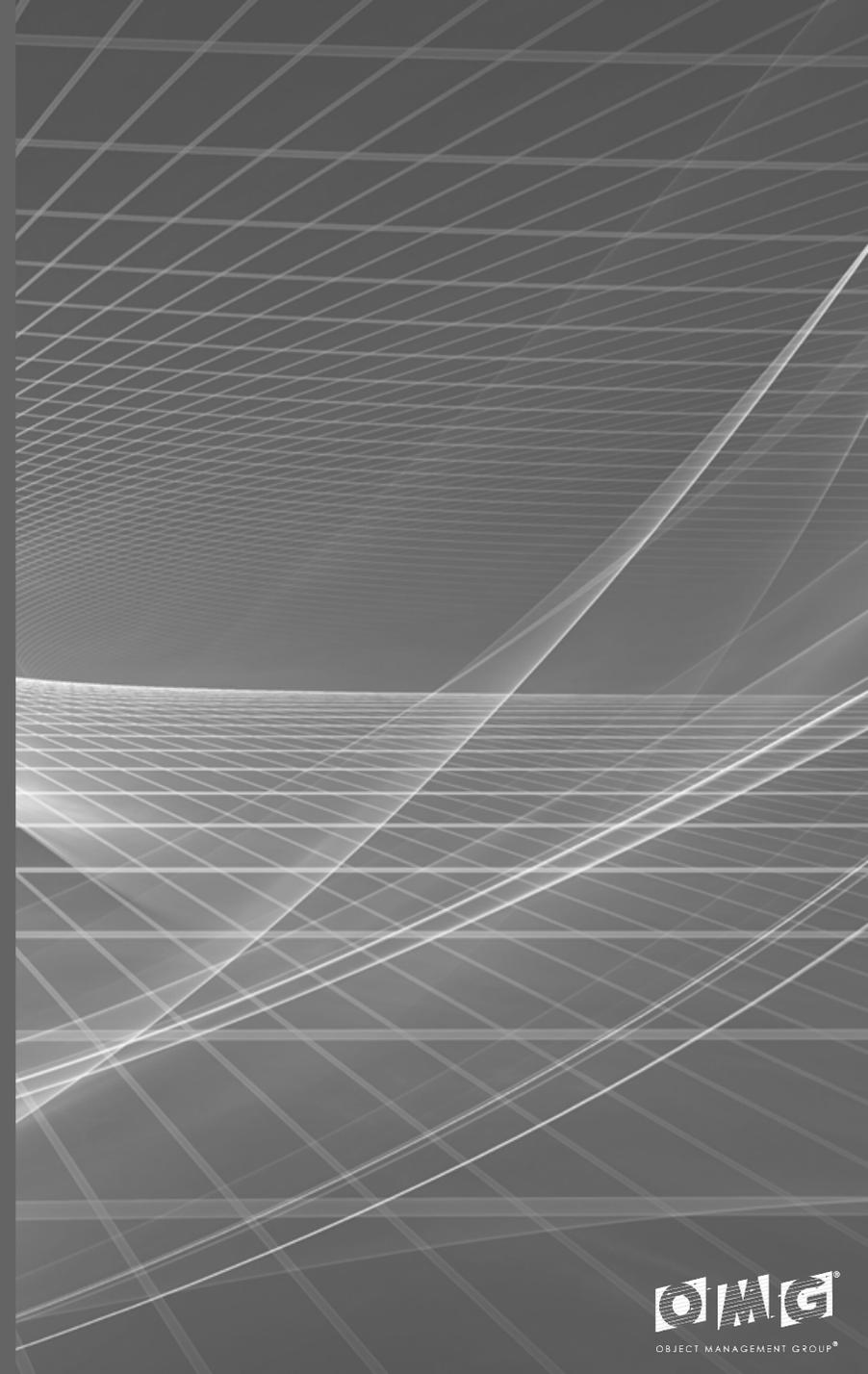
# Get involved: The DDS Foundation

- Vendor-neutral organization to collaborate in order to grow DDS usage
  - DDS Users, Government Institutions, Researchers, Universities, Vendors
- Promotes the adoption, interoperability, and success of DDS standards to a wider user community
- Works with the DDS technical Special Interest Group
- Focused areas of technology, interoperability, applications, ecosystems, marketing/communications
- **Open to all! Join us → [ddsfoundation@omg.org](mailto:ddsfoundation@omg.org)**

<https://www.dds-foundation.org/>



# Closing Remarks



# Invitation to Meet in Long Beach

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## OMG Technical Meeting

December 9 – 13, 2019 at the Hyatt Regency Long Beach



Enjoy complimentary registration for the AI Task Force Meet & Greet

<https://www.omg.org/events/index.htm>

# Subscribe for updates

The screenshot shows the footer of the OMG website. It is divided into three columns: 'CUSTOM LINKS', 'ABOUT US', and 'CONTACT US'. The 'CUSTOM LINKS' column contains a list of links: Board of Directors, Legal, Liaison Relations, Meet Our Staff, and Contact Us. The 'ABOUT US' column contains text about the organization and a 'JOIN OUR MAILING LIST' button. The 'CONTACT US' column contains address, phone, fax, and email information. A large teal arrow points from the 'Contact Us' link in the 'CUSTOM LINKS' column to the 'JOIN OUR MAILING LIST' button. The footer also includes a copyright notice and social media icons.

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https://www.omg.org

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- Legal
- Liaison Relations
- Meet Our Staff
- Contact Us

**ABOUT US**

The Object Management Group® (OMG®) is an international, open membership, not-for-profit technology standards consortium.

Founded in 1989, OMG standards are driven by vendors, end-users, academic institutions and government agencies. OMG Task Forces develop enterprise integration standards for a wide range of technologies and an even wider range of industries. » Read more.

**JOIN OUR MAILING LIST**

**CONTACT US**

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Connect with us

October 25, 2019

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# Open mailing lists

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- Artificial Intelligence
- BPM+ Health
- Business Process Management
- Blockchain
- Business Architecture
- Cloud
- Data Distribution Service
- Data Governance
- Finance
- Healthcare
- Internet of Things
- Manufacturing
- Ontologies
- Retail
- Robotics
- Security
- Space
- Systems Modeling Language (SysML)
- Unified Architecture Framework (UAF)
- Unified Modeling Language (UML)
- And more!

# About OMG



Founded 1989



International standards  
development organization



245 specifications



275 member companies



13 ISO specifications

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[www.omg.org](http://www.omg.org)

## Thank You!

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