



# **ISMAR 2021: T1 - Introduction to Augmented Reality Interoperability and International Standards**

**Building interoperability for AR systems**  
**ETSI Industry Specification Group ARF**  
Muriel Deschanel, ISG ARF chair, b<>com



**ISMAR 2021**  
OCTOBER 4-8 BARI - ITALY



**IEEE  
COMPUTER  
SOCIETY**

**IEEE**  
Advancing Technology  
for Humanity

# ETSI and Industry Specification Group ARF

---

- ✔ ETSI supports the timely development, ratification and testing of globally applicable standards for ICT-enabled systems, applications and services.
  - ✔ 900+ member organizations, drawn from 65 countries and five continents.
  - ✔ one of only three bodies officially recognized by the EU as a European Standards Organization
- ✔ ISG ARF is defining a **framework for the interoperability** of AR components, systems and services with the view to reduce market fragmentation and enable providers to offer components of complete AR solutions
  - ✔ Publication of a **modular functional reference architecture** for AR solutions with interoperability provided at the interfaces between building blocks, a first step towards greater interoperability for AR (and more generally XR)
  - ✔ Working to encourage a healthy XR ecosystem with a diverse range of providers

# ISG ARF membership – October 2021



**BOSCH**

Invented for life

**BasinLogic**



**ERICSSON**



**FSCOM**



GEORG-AUGUST-UNIVERSITÄT  
GÖTTINGEN



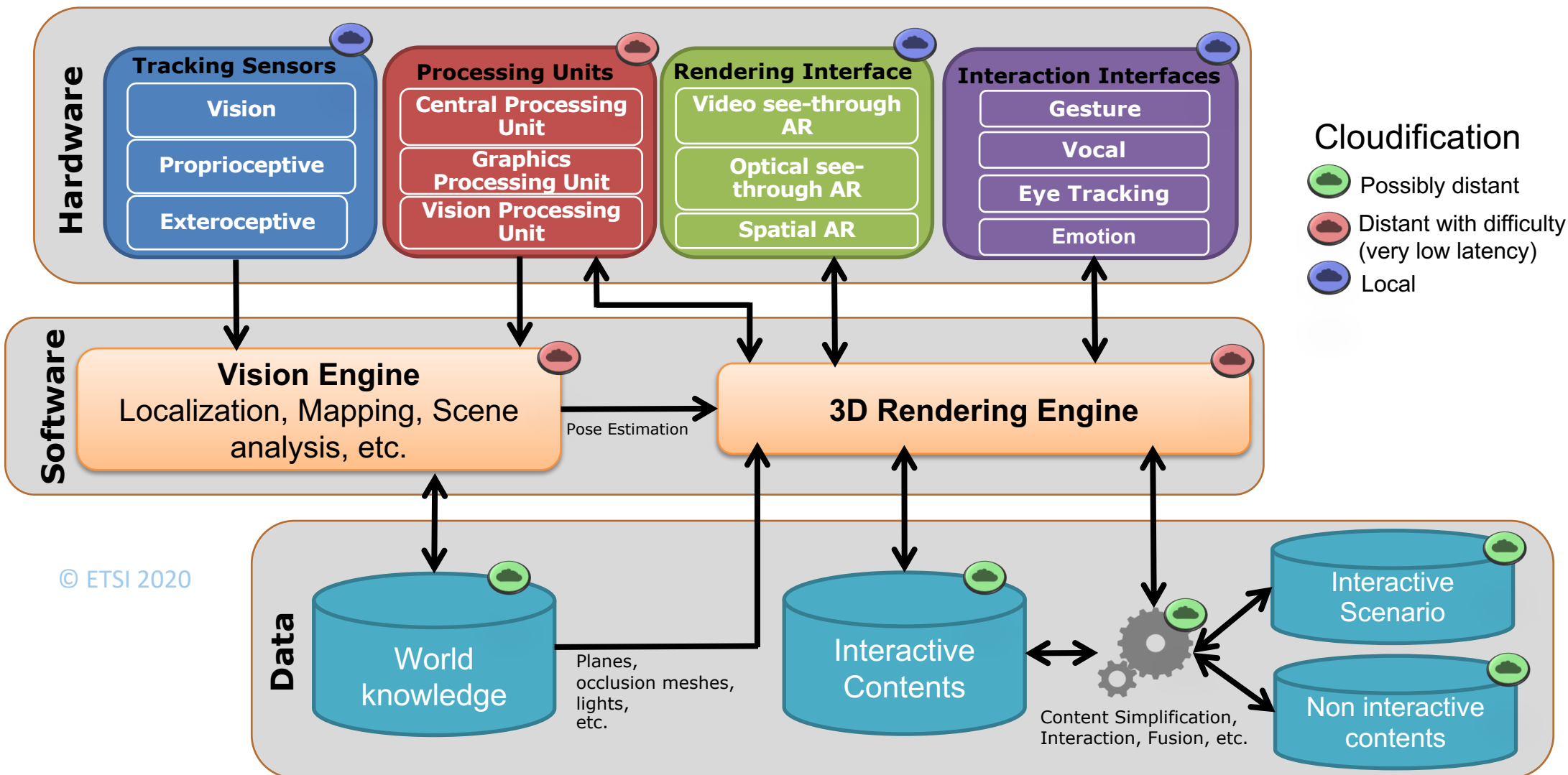
**NOKIA**



**SIEMENS**

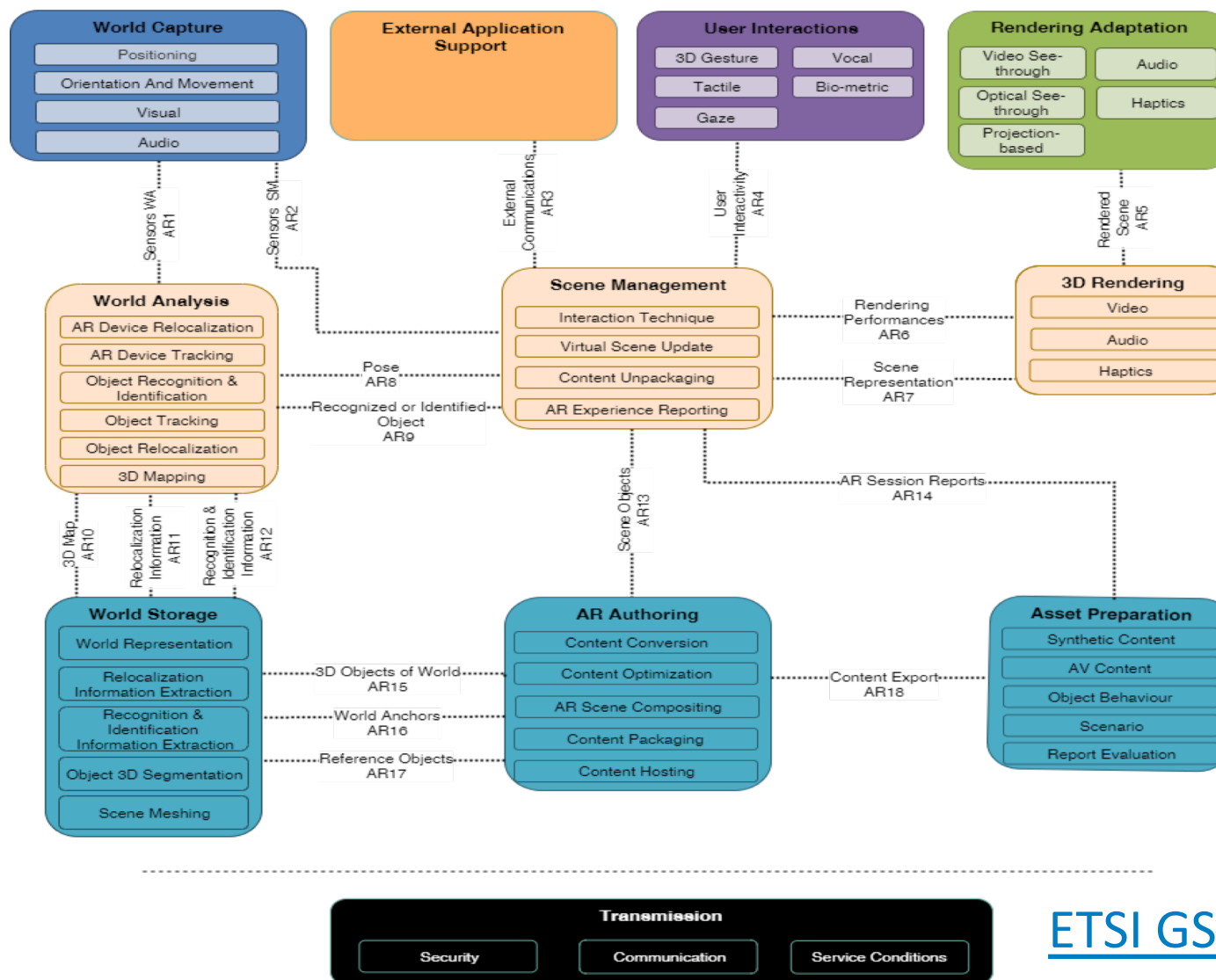


# Global overview of the architecture of an AR system

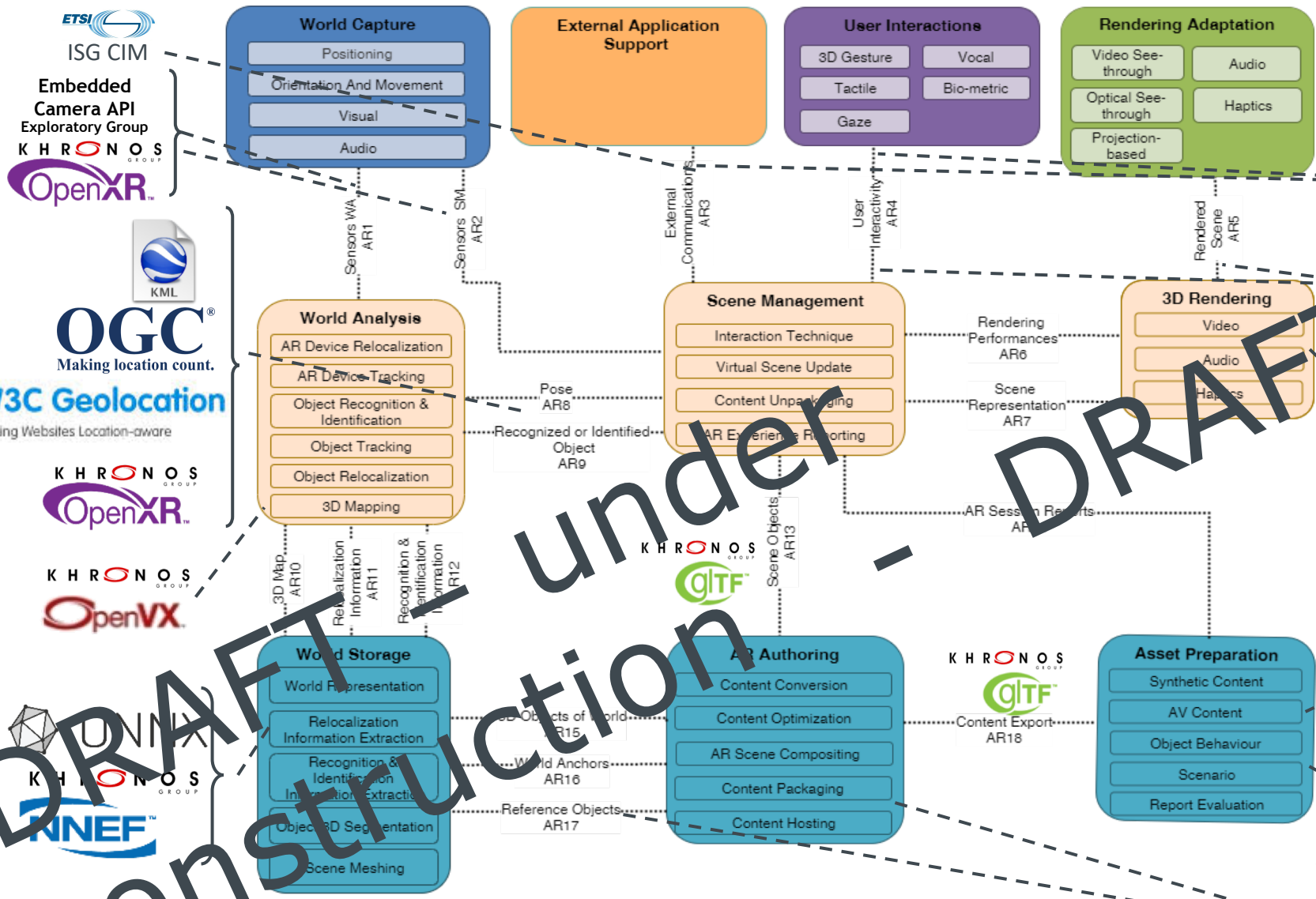


© ETSI 2020

# ISG ARF functional reference architecture



# A constellation of standards



DRAFT - under construction

- MPEG-V
  - OpenXR
  - Vulkan
  - OpenGL
  - WebGL
  - Microsoft DirectX
  - COLLADA
  - FBX
  - OBJ
  - 3DS
  - OGC
  - MPEG-4
  - MPEG-I
  - MPEG-4
  - MPEG-I
- And more than 100 other file formats with dedicated meta-data

- WebRTC
- MPEG-4
- MPEG-I
- GLTF
- HTML5

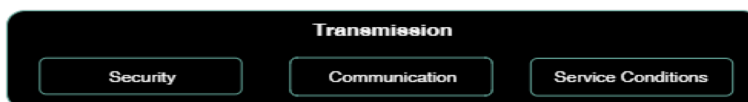
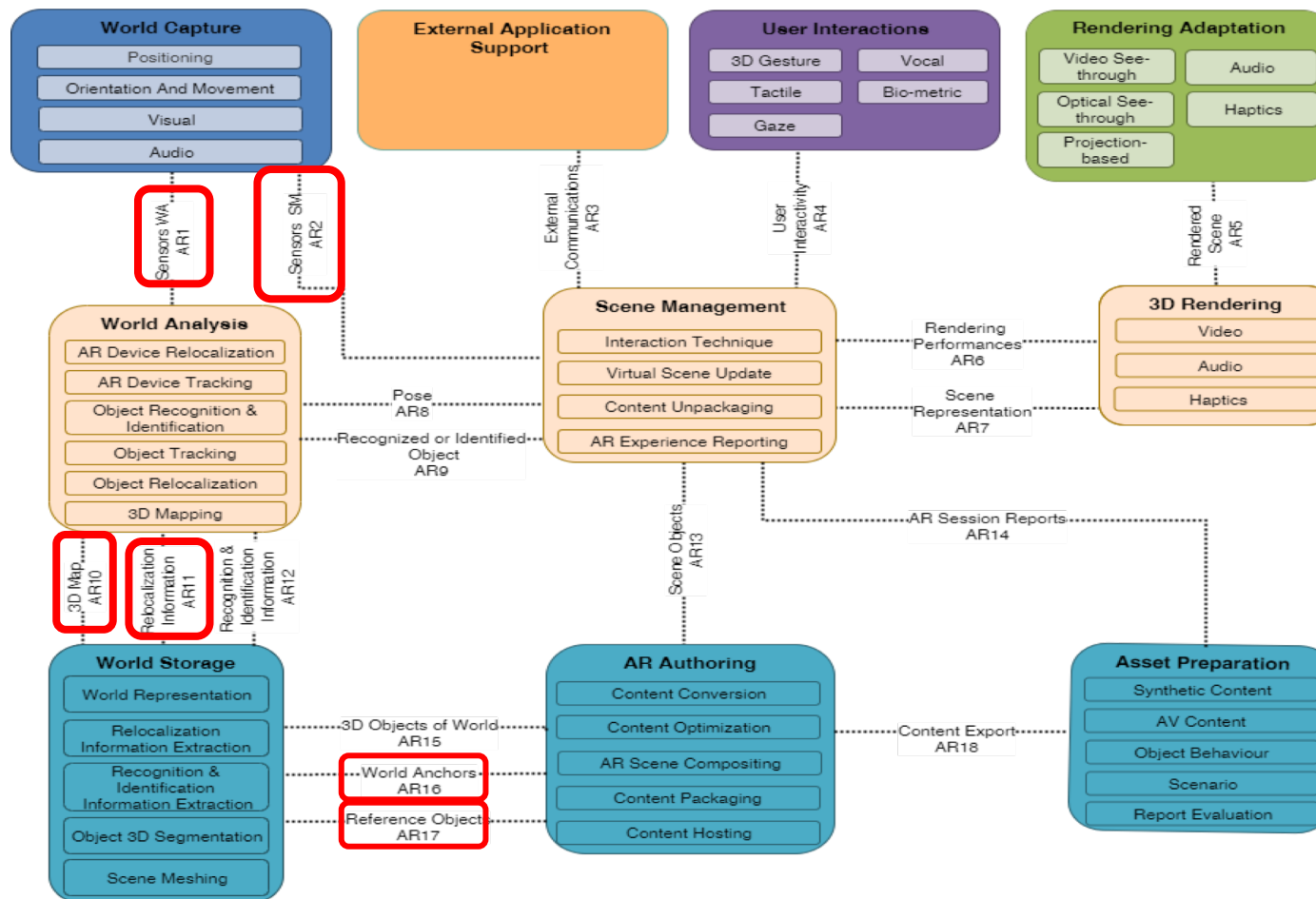
**Transmission**

Security

Communication

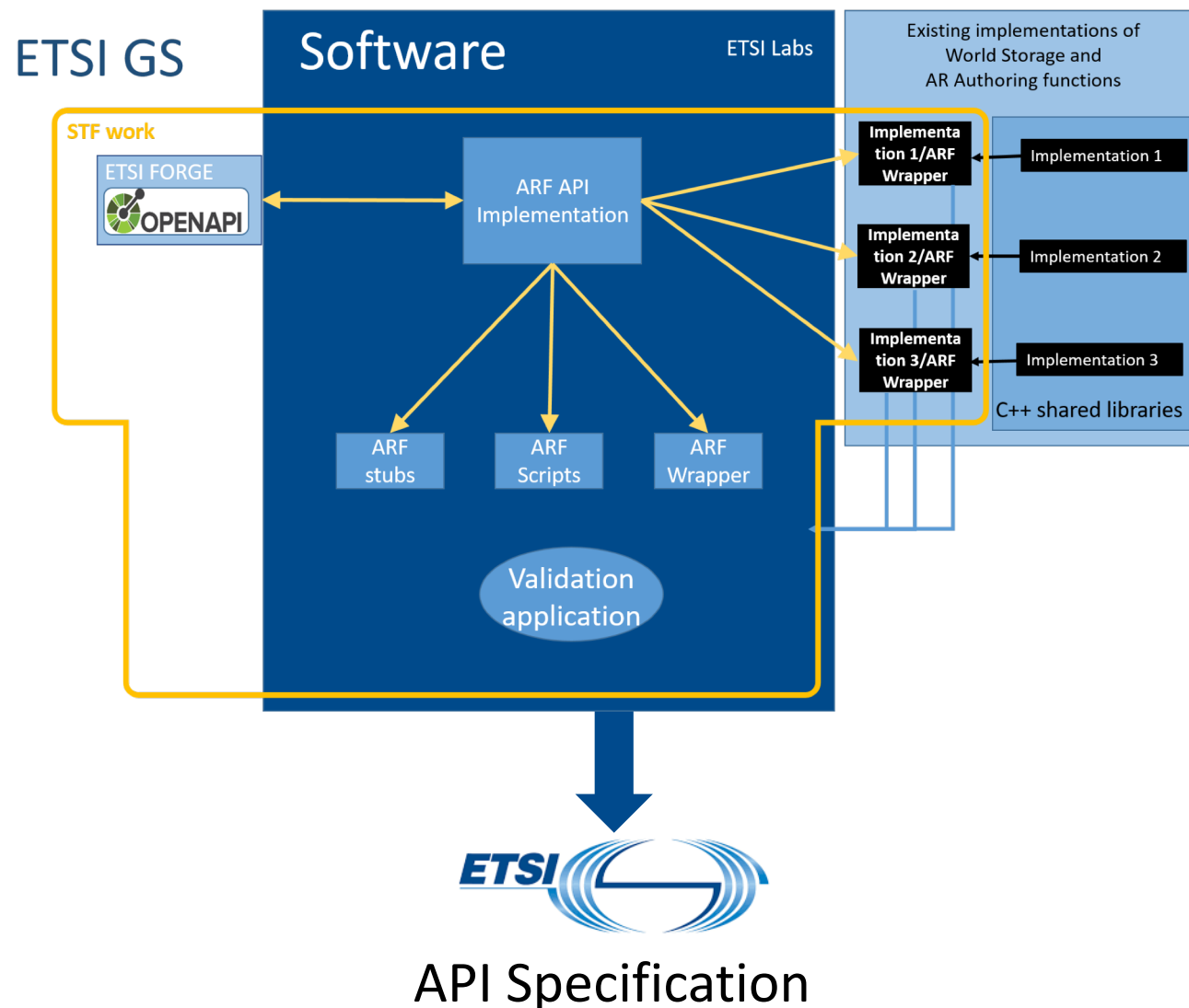
Service Conditions

# Development of interoperability requirements



# Implementation Driven Standards Development

- ✔ Iterative process
- ✔ Initial specification of the APIs
- ✔ Implementation of the APIs as Open Source
- ✔ Testing/validation on existing implementations through the development of dedicated wrappers
- ✔ Revision of specification as required
- ✔ Publication of implementation independent specification





# Coordination and collaboration are key

Partnering with a range of organisations to coordinate efforts for the benefit of the XR ecosystem



MoU in place



MoU in place



The Standards People



MoU in place



MoU in place

# Conclusions

---

Mature  
Technology

Spatial  
Computing

Open Source  
Projects

Challenges to achieve interoperability remain!

Edge  
Computing

Commercial  
Solutions

A constellation of  
Standards

# Do get involved!

---

- ✔ More information: <https://www.etsi.org/committee/1420-arf>
- ✔ ISG ToR : [Terms of Reference](#)
- ✔ If your company is an ETSI member, you can join the ISG ARF after signing the [ARF member agreement](#); no additional cost
- ✔ If your company is not an ETSI member, you can participate after signing the [ARF participant agreement](#)
  - ✔ Access to ISG ARF documentation, subscription to mailing list and participation to online conference calls are free
  - ✔ There is a small fee per day per plenary meeting (F2F/online participation)

---

THANK YOU