Industrial Automation Software in 2019 with Qt

Webinar

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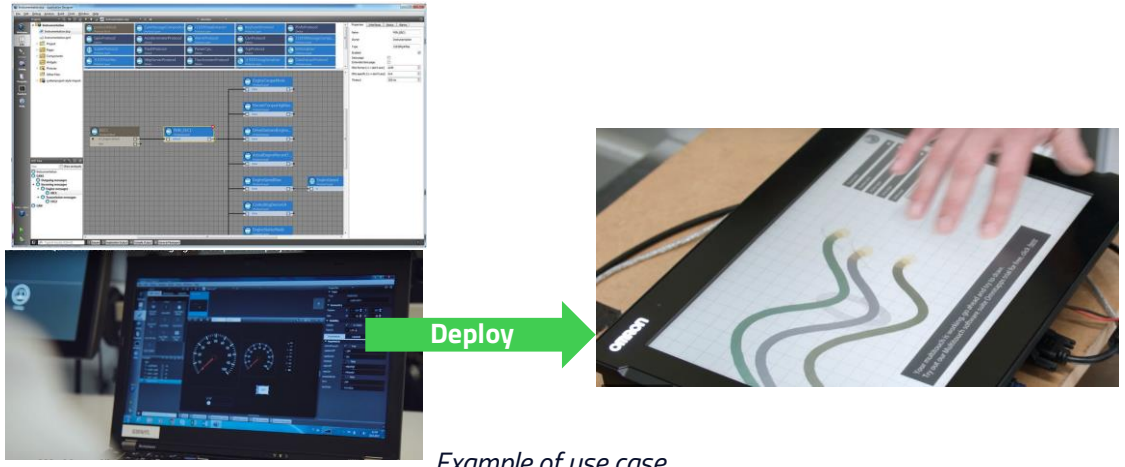
Industrial Touch Panel trend

Market need

- Customizable solution running on different hardware
- Fluent and interactive UI
- Tool for protocol configurator
- High level customization
- Zero installation on Builtime
- Footprint and BOM

Buildtime

Runtime



Example of use case

How Qt has been used

- Qt Creator SDK customized used as BuildTime software
- Runtime customizable via drag&drop elements
- Connectivity libraries
- Reusing Qt component to build Alarm table, Scheduling, Protocol configurators, Graphical elements.

Benefits

- Reducing **development time** by 60%
- New way to **create value** to their customers
- **One framework** for different product line and form factor
- **Performance** on the embedded device even on architecture without GPU
- Lowering the **maintainance cost** for backend and frontend part

Remote monitoring application (e.g. Headless devices)

Market need

- UI application on headless device
- Connectivity to IT / OT level
- One framework frontend and backend
- Memory footprint and HW constrain
- Security at factory level

Example of use case

How Qt has been used

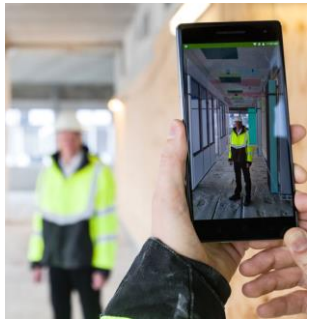
- Qt WebGL and Qt for Webassembly for UI on browser
- Qt Quick Control 2
- Integrated Connectivity
- SQL connection

Benefits

- **Zero installation** experience accessing to the application
- Code **reusability** on different platform
- **Remote UI** supported on web browser
- **Performance** on low end hardware

Which are the challenges today for Automation players

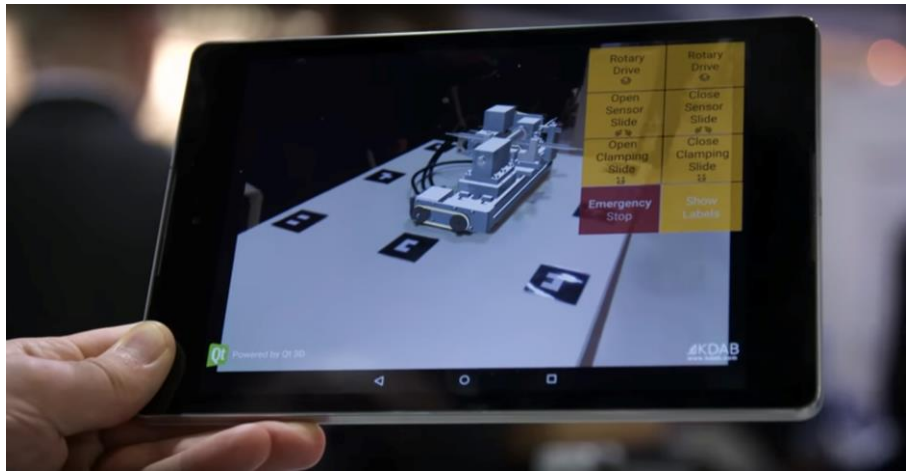
Virtualization / Simulation



Virtualization 2D and 3D scenario

Embedded / Mobile

- Safety
- Commissioning
- Time to recover from a failure



Desktop / Web

- Remote control
- Planning
- Time to Market

2D / 3D Design Tool

Qt Design Studio → **Unified Tool** ← Qt 3D Studio

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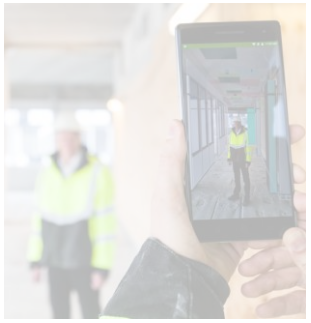
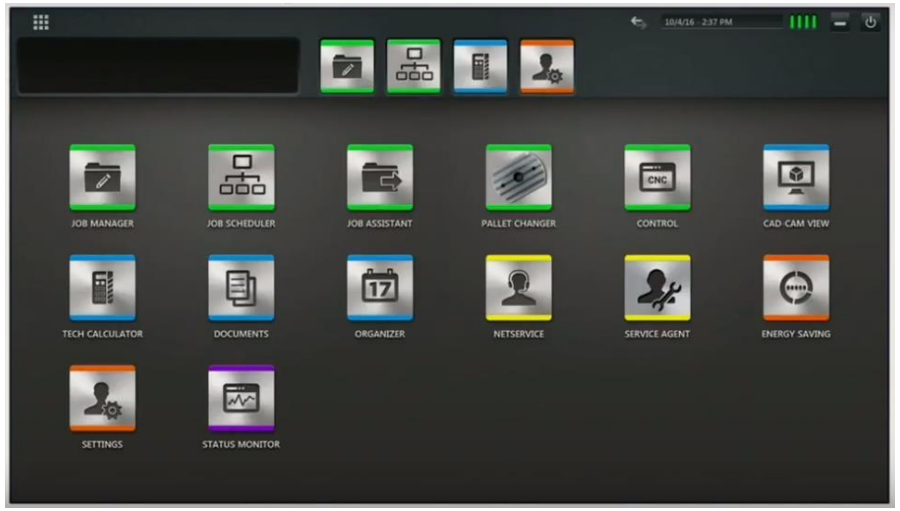


Business model from Product to Service

From product to services
Enabling a B2B ecosystem via application based approach

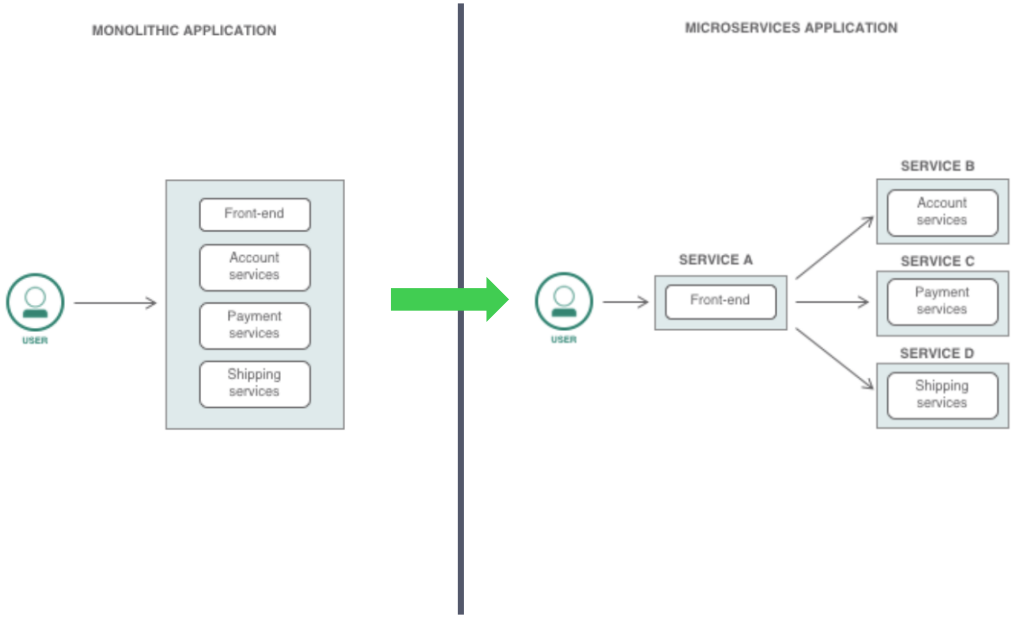
- Multiple applications grouped in categories such each with a single concise scope
- Enabling community and partners to expand or creating a **new business model**
- Looking to provide an ecosystem through a **marketplace** in a connected scenario



Microservice and Container approach

https://blog.qt.io/blog/2019/03/05/using-docker-test-qt-webassembly/

- Usage for application development
- Resources can be controlled
- Again, sandboxing / security related items
- Cloud features like App Deployment management, OTA, etc…



https://developer.ibm.com/articles/why-should-we-use-microservices-and-containers/

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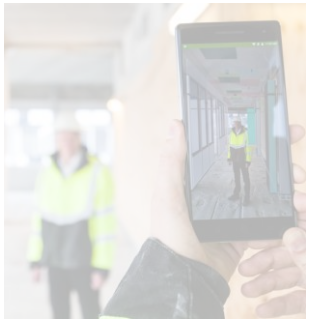


Business model from Product to Service

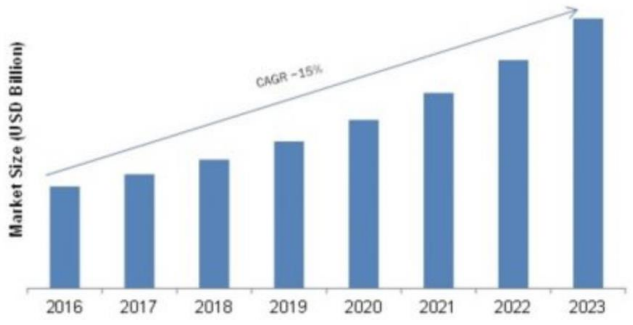
Cybersecurity

Critical Infrastructure Cybersecurity

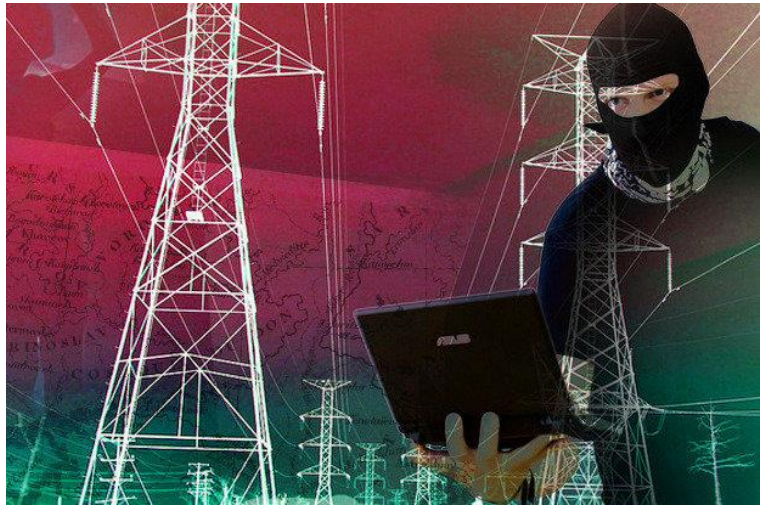
Presidential Policy Directive 21, Critical Infrastructure Security and Resilience, identifies 16 critical infrastructure sectors

1. Energy sector
2. The Nuclear Reactors, Materials, and Waste Sector
3. The Food and Agriculture Sector
4. The Water and Wastewater Systems Sector
5. The Transportation Systems Sector
6. The Chemical Sector
7. The Critical Manufacturing Sector

Infrastructure protection market revenue estimated USD 220 billion by 2023



https://www.reuters.com/brandfeatures/venture-capital/article?id=121490



Importance of a trusted framework

1. Networking

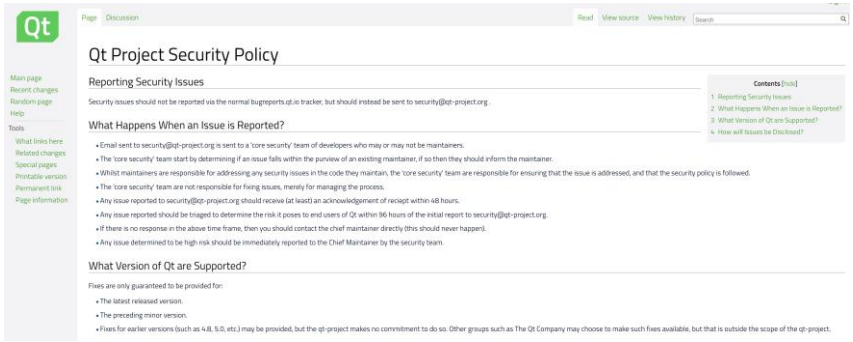
Support Secure Sockets Layer

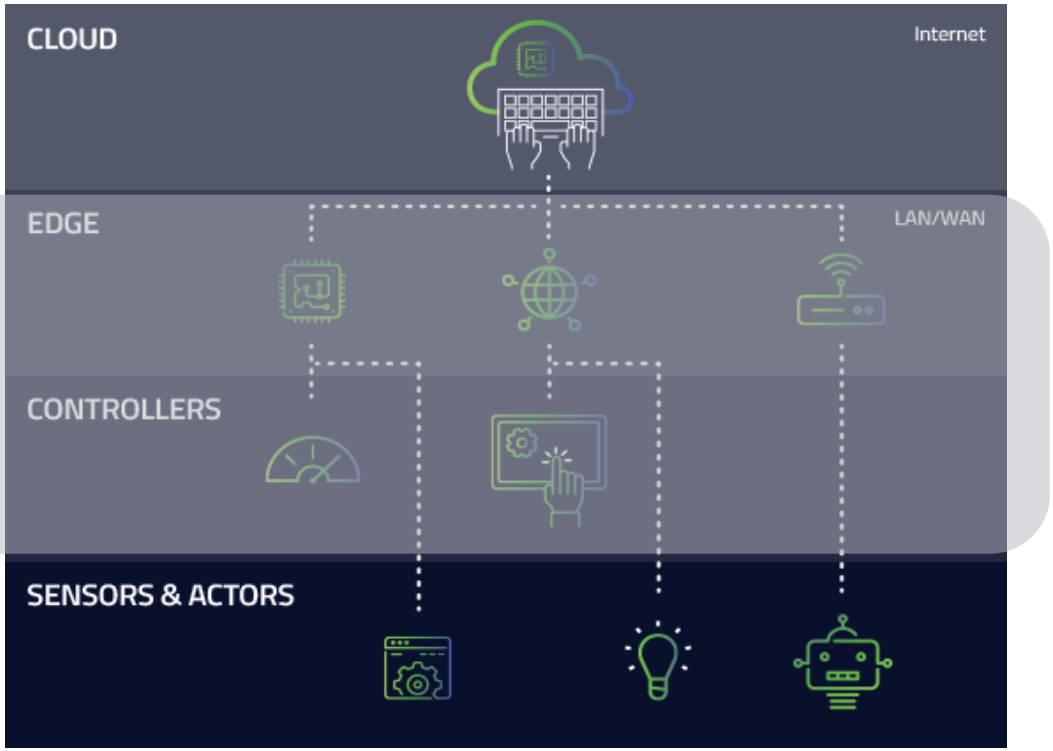
(https://doc.qt.io/qt-5/ssl.html)

- OpenSSL 1.0.0 or later
- Datagram Transport Layer Security (DTLS)
- Qt MQTT v5 QMqttAuthenticationProperties
- OPC UA secure connection: https://resources.qt.io/videos/secure-connections-with-qt-opc-ua-on-demand-webinar

2. Security Policy

https://wiki.qt.io/Qt_Project_Security_Policy





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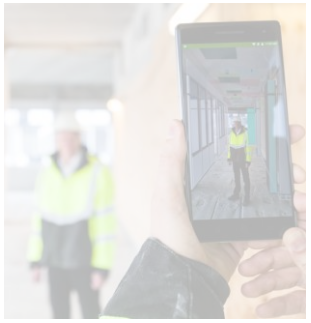


Business model from Product to Service

Cybersecurity

Integration

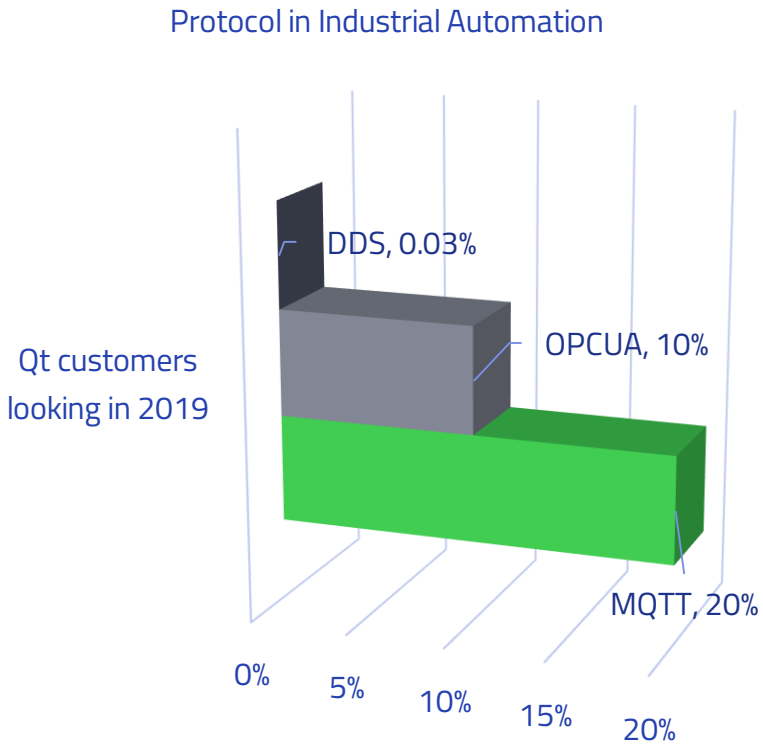
Industrial integration looking even more to the cloud

When you build a device or a product line you need to think the ecosystem that is going to use that device, and the need of that ecosystem

- **OPC UA** (Open Platform Communications Unified Architecture) is a service-oriented machine-to-machine communication protocol mainly used in industrial automation and defined in the IEC 62541 specification. OPC UA Pub/Sub released, already start being adopted by industrial vendors

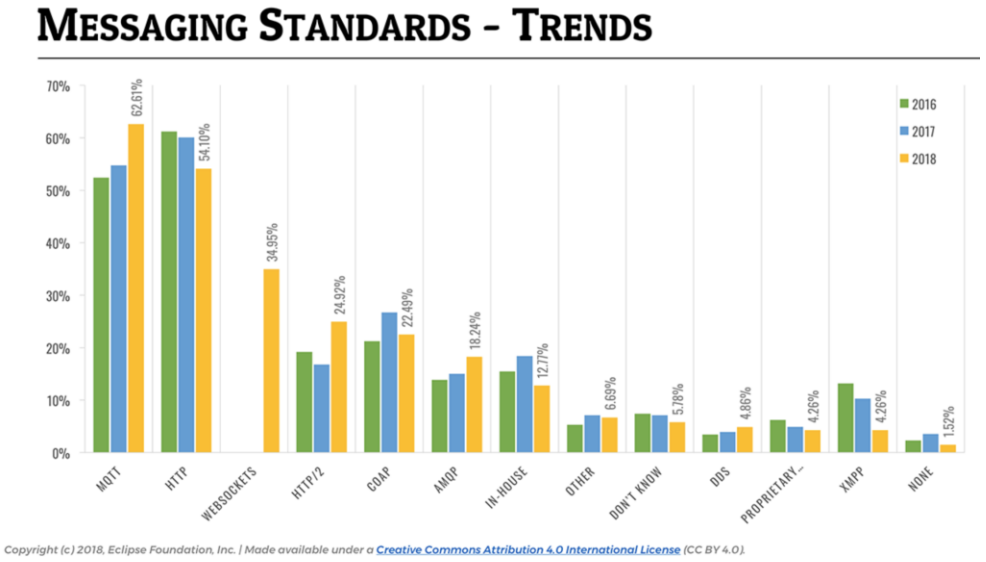
- **DDS** (Data Distribution Service) is a data-centric publish/subscribe middleware for highly dynamic distributed systems. It is standardized by the Object Management Group (OMG)2 . Compared to OPC UA, DDS is more data centric
  https://www.rti.com/developers/rti-labs/discover-data-in-cloud-services-with-cloud-discovery-service

- **MQTT** (Message Queuing Telemetry Transport) declares itself as an extremely lightweight publish/subscribe machine to-machine and Internet of Things connectivity protocol6 . It is an open message protocol which mainly focuses on a small code footprint and low network bandwidth usage, while handling high latency or bad network connections

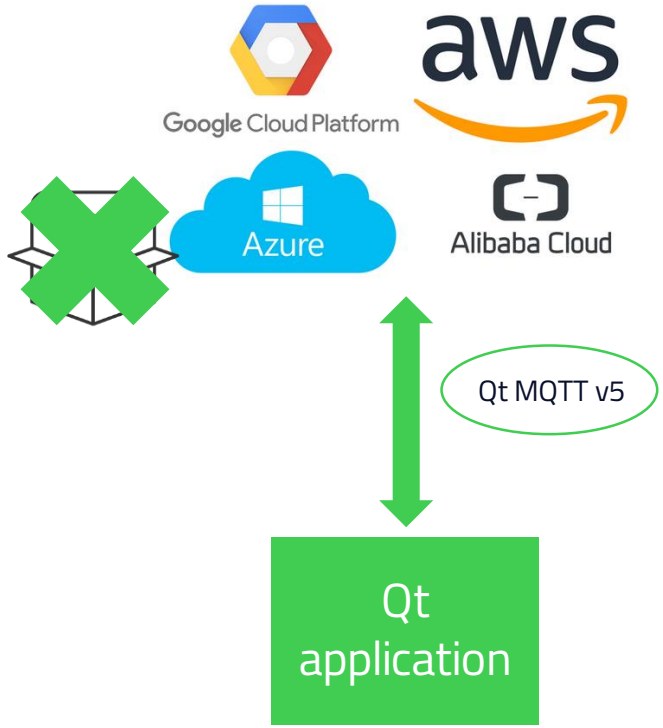


http://mediatum.ub.tum.de/doc/1470362/096544428163.pdf

Industrial IoT trend
Access to different cloud provider with no dependency



- Reducing the time to market for applications where MQTT is needed
- Standard approach across multiple Cloud providers
- No dependency and overhead



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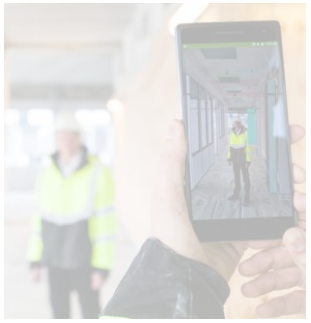

Business model from Product to Service

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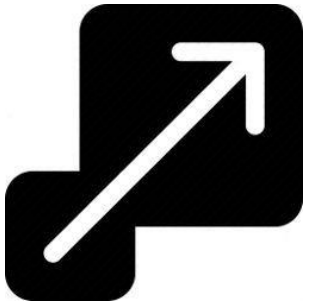
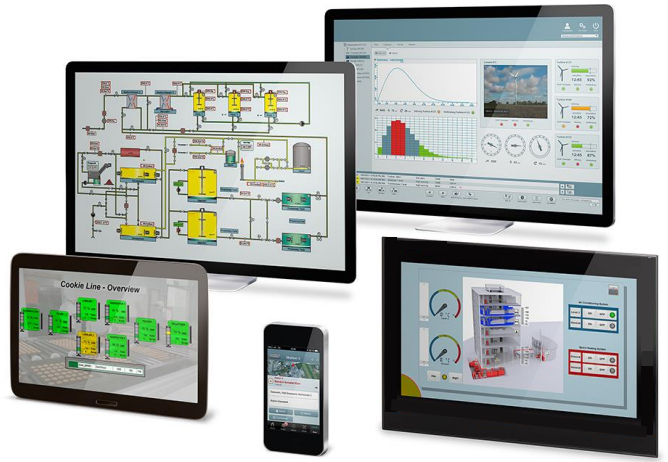
Scalability and UX Unification



Scaling with User Experience Unification

1. Industrial market is focusing on scaling application across many product line:
   - Web application
   - Mobile
   - Scada system
   - Touch panel HMI
   - Headless device



2. Focus on expanding the product line even to the lowest HW in the market.
   - Lowering the Bill of Material
   - Keep product quality high (performance, reliability, product lifecycle)

Vision Qt in Automation: Code once, deploy everywhere
End2End software solution for ALL Automation product lines

We help you enabling an unified user experience for your system integrators. One software for all your product line.

Built with Qt

Headless gateway running Qt for Automation and Qt for Webassembly

Industrial touch panel running Qt on Linux

Tablet running Qt on Android

Qt tooling fit for Buildtime system

Same user experience on MCU

Qt for MCU? Available now!

https://www.qt.io/qt-for-mcu

Webinar: Qt for MCUs

Ultimate Performance. Tiny Footprint.

Join our free webinar on 3 September and learn how to create fluid, high-performance user interfaces for your humble MCUs.

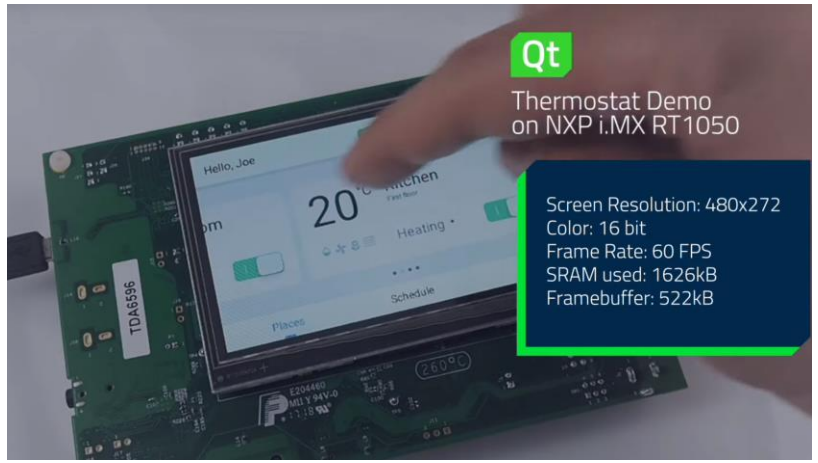
Sign up 10am CET | Sign up 10am PDT

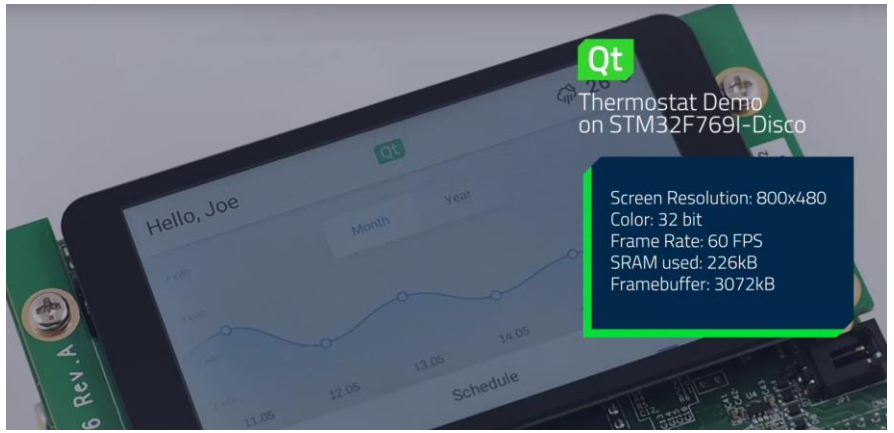
Try this at Home!

Did you enjoy watching the demos? Download them and see how they run on your board! Demos are currently available for the followig boards:

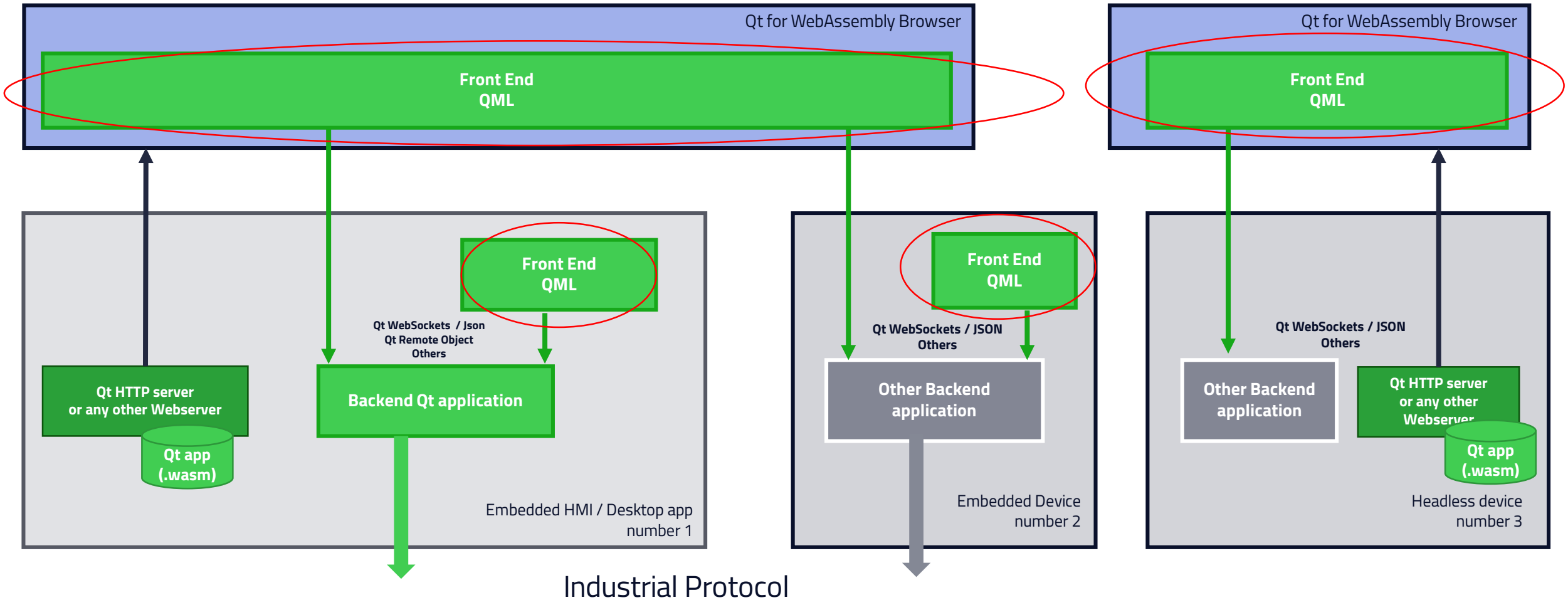
- STM32F769i-DISCO
- STM32F7508-DK
- I.MX RT1050-EVKB

Download Demo

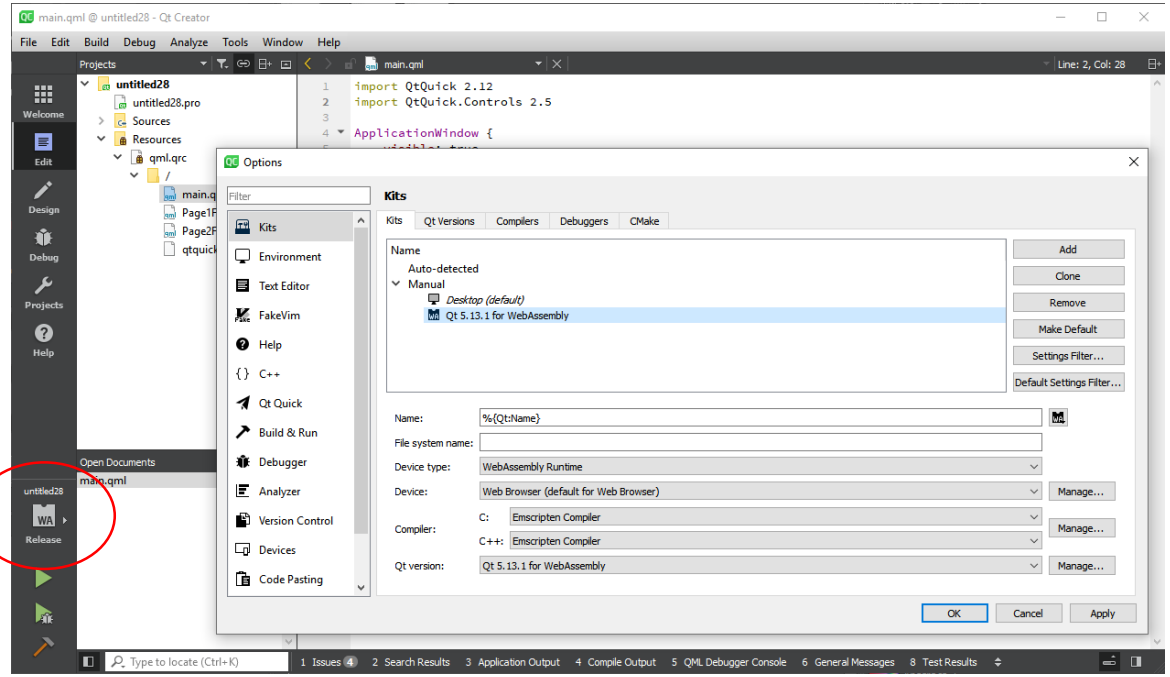


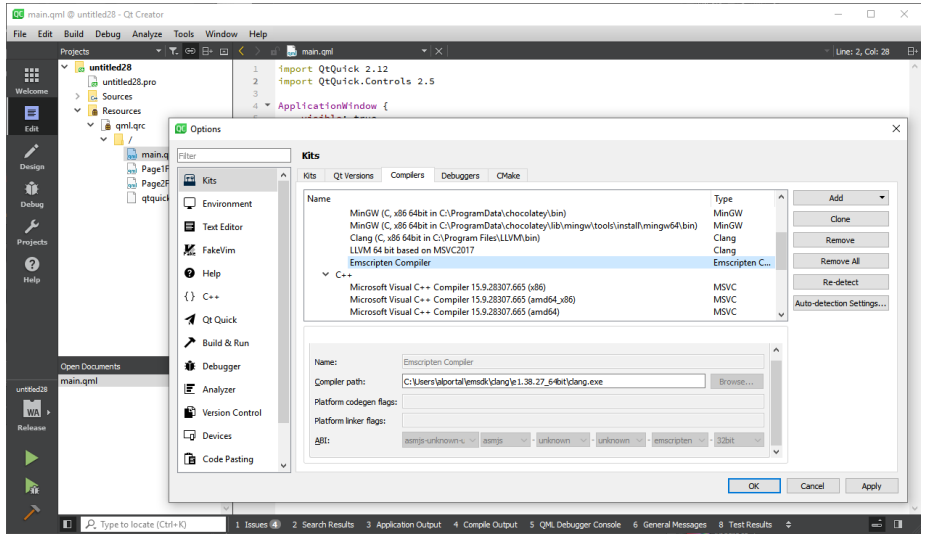


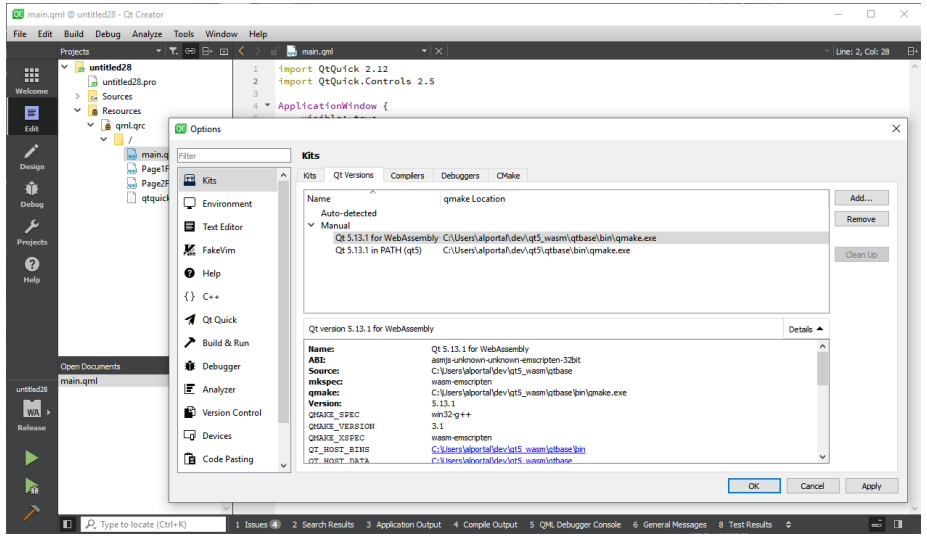
Scalable applications across all use cases



Qt for Webassembly as Kit in Qt Creator 4.11







Qt World Summit 2019

Check out the agenda that released a week ago and join us!
https://www.qt.io/qtws19/home

Berlin
4 November 2019 – Training Day
5-6 November 2019 – Conference Days

Tokyo
29 November – Conference Day

Note: Americas will be in May 2020.

Thank You!

Time for Q&A

Give it a try!
https://www.qt.io/qt-in-automation