



Part I: Building intelligent, low power, connected 'things' at a low cost

- Introductions
- Market trends - edge/fog
- Global connectivity – connectivity challenges & options
- Connecting the edge & the options
- Device MVP blueprint
- Reference design and how the SDK/app works with NXP MCU
- Summary
- Q&A



THINGSTREAM

Learn how to develop & deploy Low Power, Low Cost Wireless Sensor Networks with LPC MCUs & Thingstream technologies; a 2 part Webinar Series

Presenters

Part I: Building intelligent, low power, connected “things” at a low cost. May 10th 2018

Develop and deploy intelligent, low power, connected networks globally, while removing regional wireless standard barriers - all at a low cost. We'll share market trends, connectivity challenges and how to securely connect to the edge.

Part II: How to create, manage & deploy low power IoT devices, 29th May

Manage, monitor and control wireless networks via a simple cloud software platform - bringing value-added services to end customers. We'll dive deeper into the IoT device control and deployment, addressing technical requirements and include demos as we explore the platforms and tools available to help reduce the complexity of IoT deployments.



Neil Hamilton
VP Business Development
Thingstream

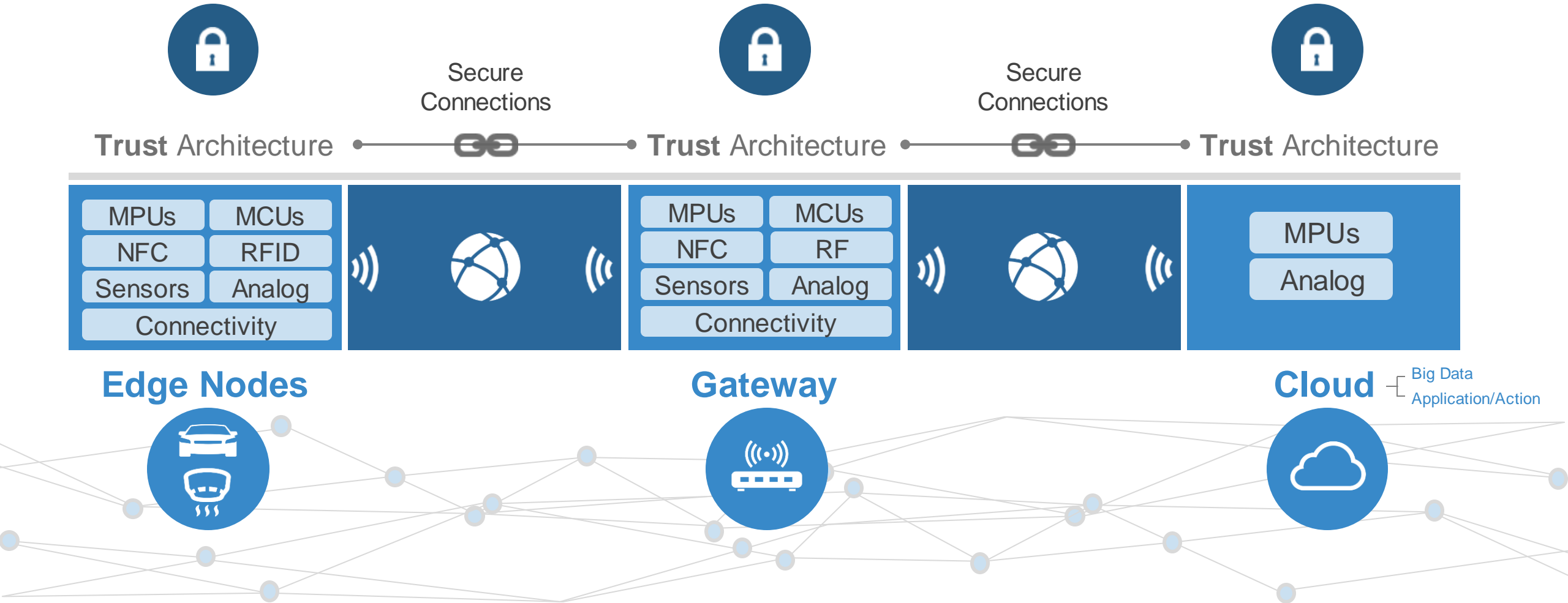


Bruce Jackson
Chief Technology Officer
Thingstream



Gordon Padkin
Regional Marketing
NXP Semiconductors

NXP is focused to deliver secure connections for a smarter world



Industry-Trusted Secure Scalable Solutions

Microcontrollers



ARM

Kinetis and LPC Microcontrollers

- #1 MCU Supplier, offering ARM Cortex-M0+, M3, M4 and M7 MCUs
- **Kinetis & LPC** for consumer and industrial markets

Application Processors



ARM

i.MX Applications Processors

- HMI, Display, Multimedia, Image Processing Leader
- **i.MT RT Crossover Processors:** highest performance embedded processor based on Cortex-M7
- Power efficiency, battery operation



ARM

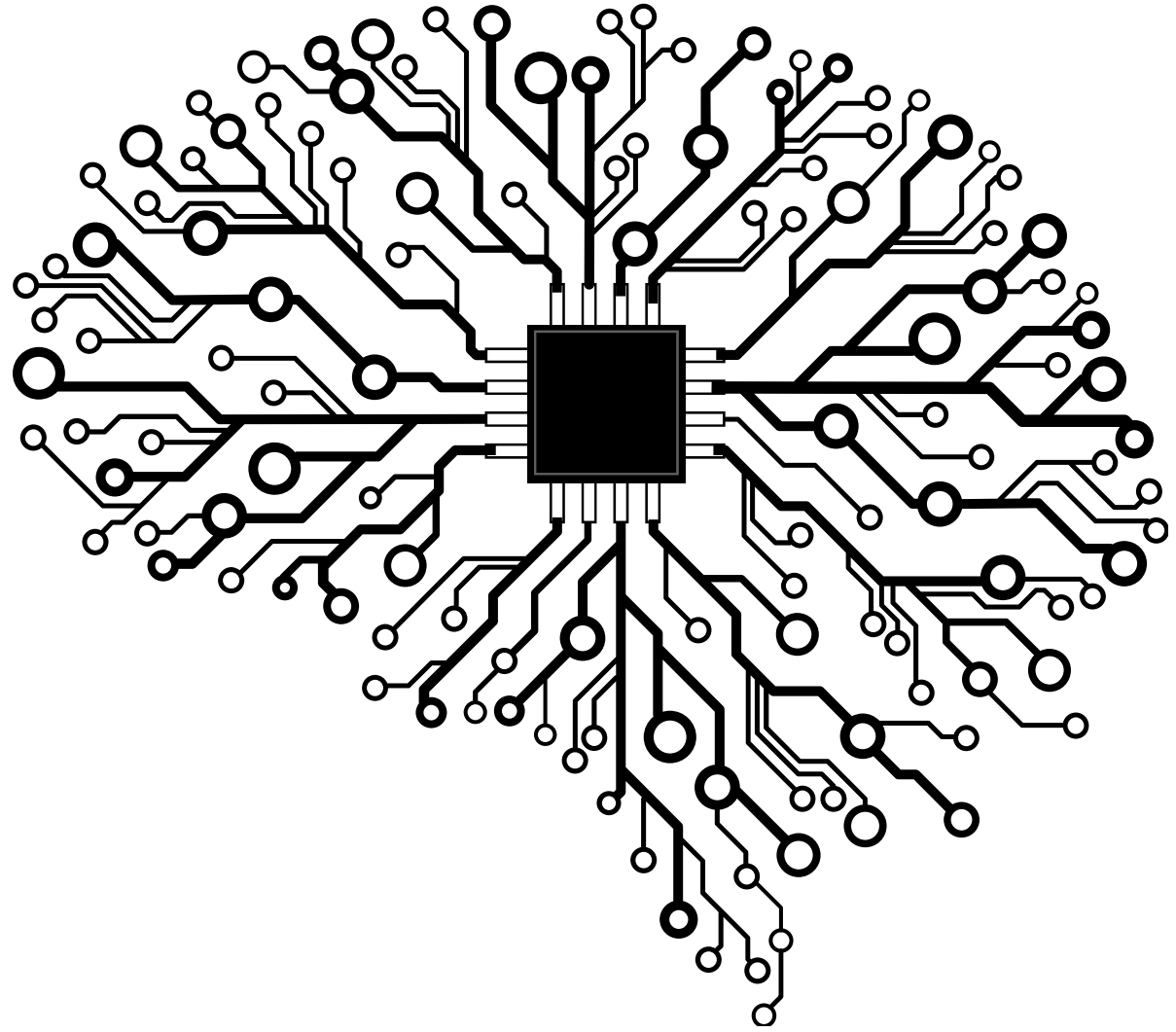
QorIQ Layerscape Multicore Processors

- 1 to 24 cores, 1-10 GB Ethernet
- Highest performance fanless operation
- Industry leading security and integration



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'Things' are evolving to be more intelligent



The DNA of a global smart 'Thing'

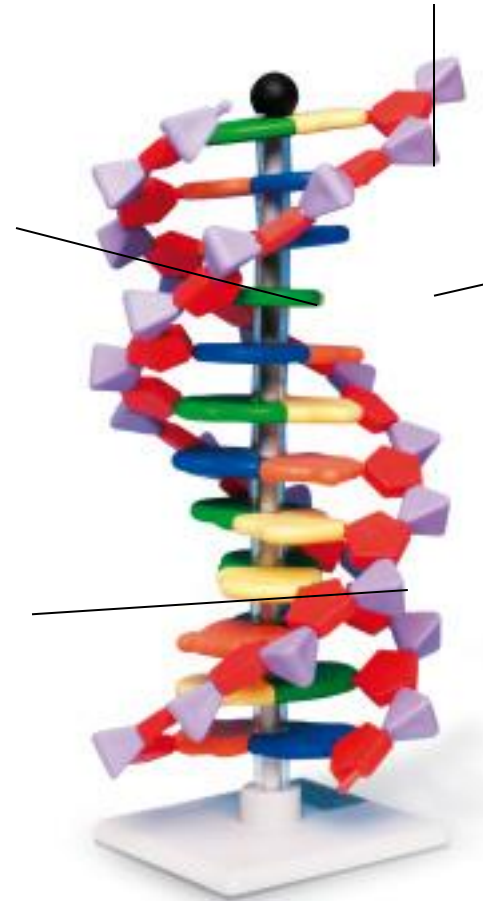
**Ubiquitous
connectivity**

**Programmable
control**

Secure

Low power

Low cost



Ubiquity - the low power, global connectivity challenge



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sigfox



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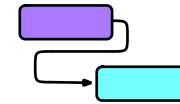
- **Global MQTT MVNO**

- Unique global MQTT SIM
- 627 networks, 190 countries
- Works over 2G/3G/LTE
- MQTT-SN over USSD protocol
- No cellular data needed
- Low power



- **Scalable resilient MQTT broker**

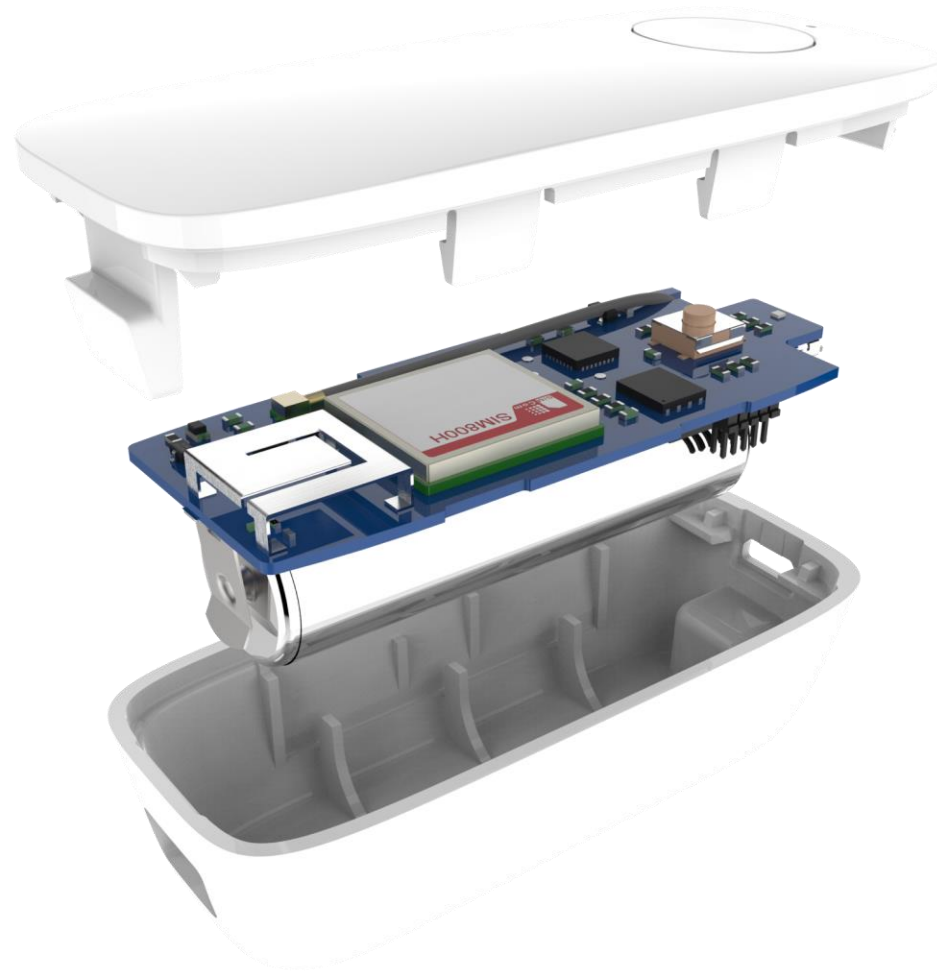
- Compliant with MQTT 3.1.1
- Scales to billions of messages
- Web UI for topic and device management
- Thingstream uses MQTT as the method to get data to and from devices



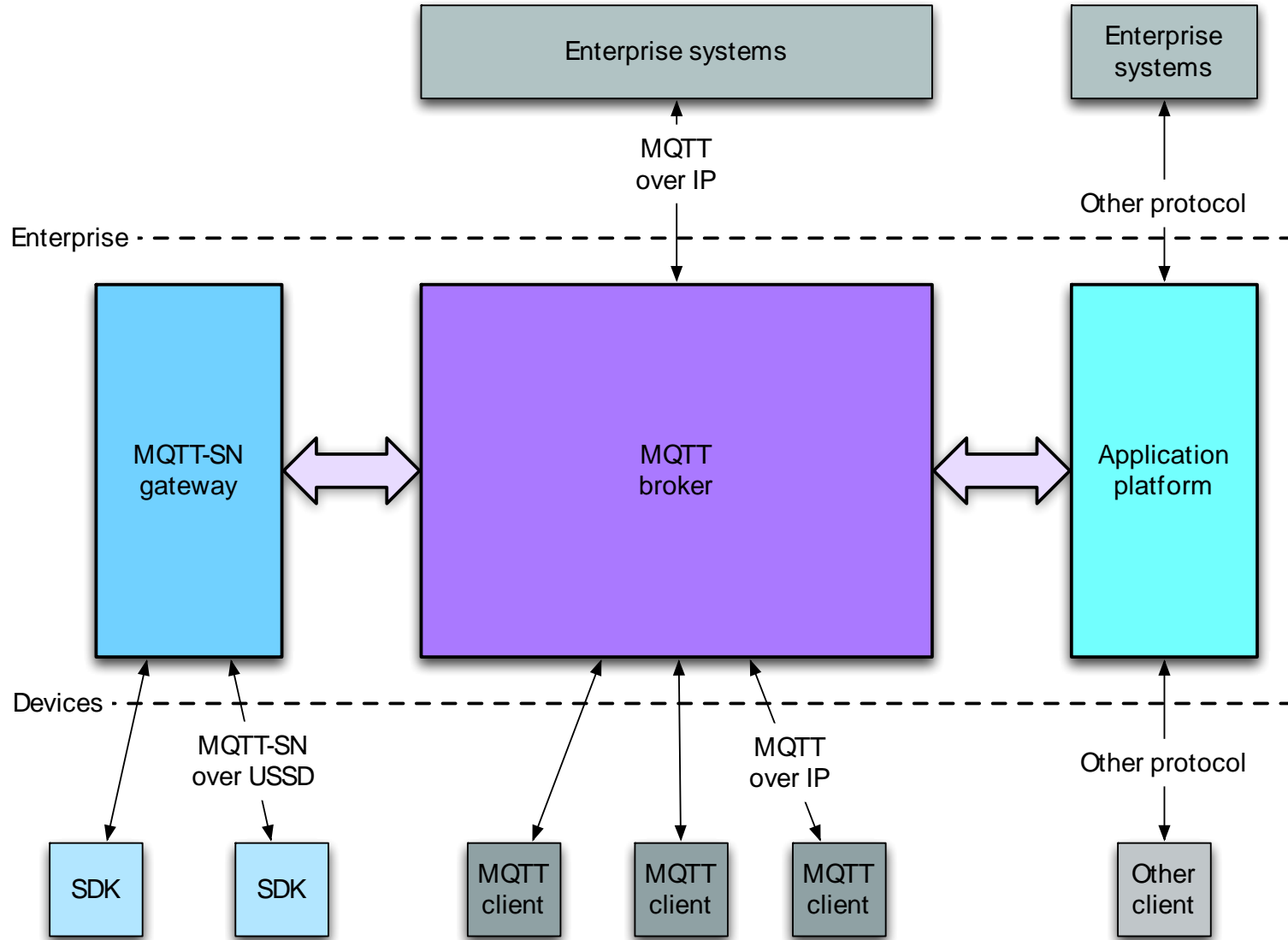
- **Application platform**

- Flow-based development environment
- Prototype to production
- Autoscaling runtime
- Version control & rollback

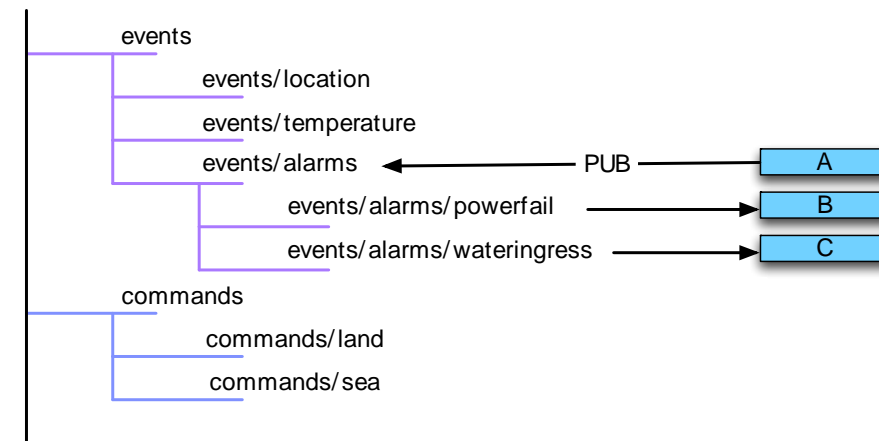
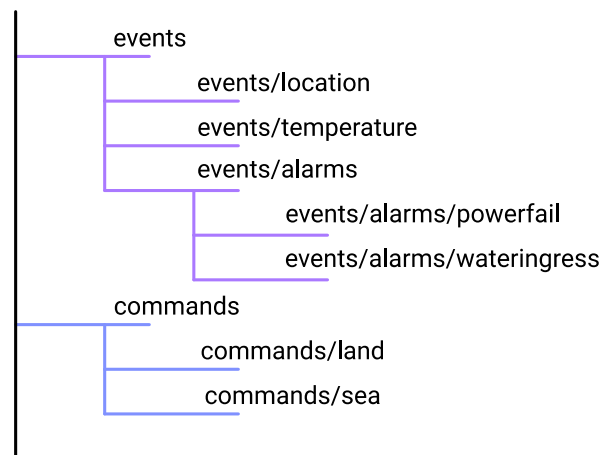
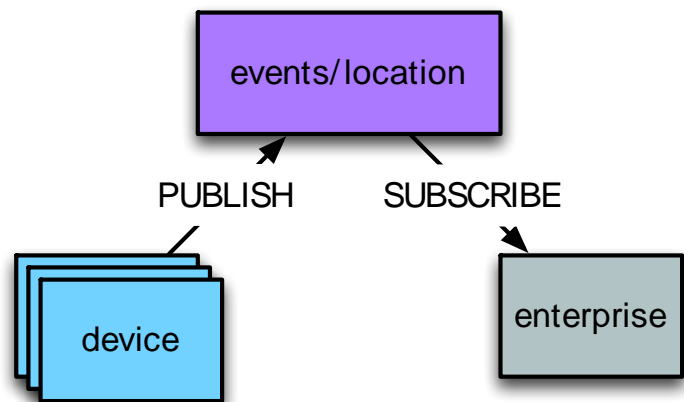
Simplifying IoT connectivity



Platform architecture



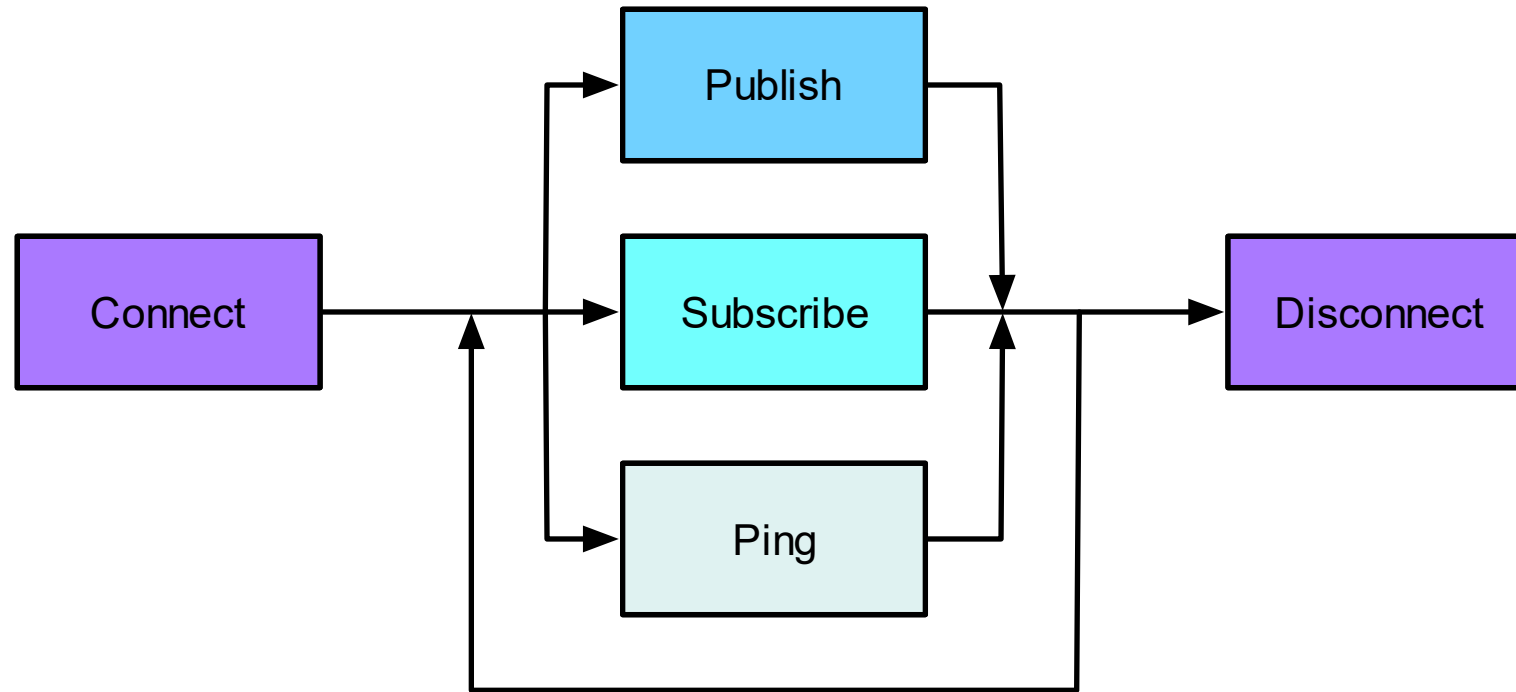
MQTT – Publish & Subscribe



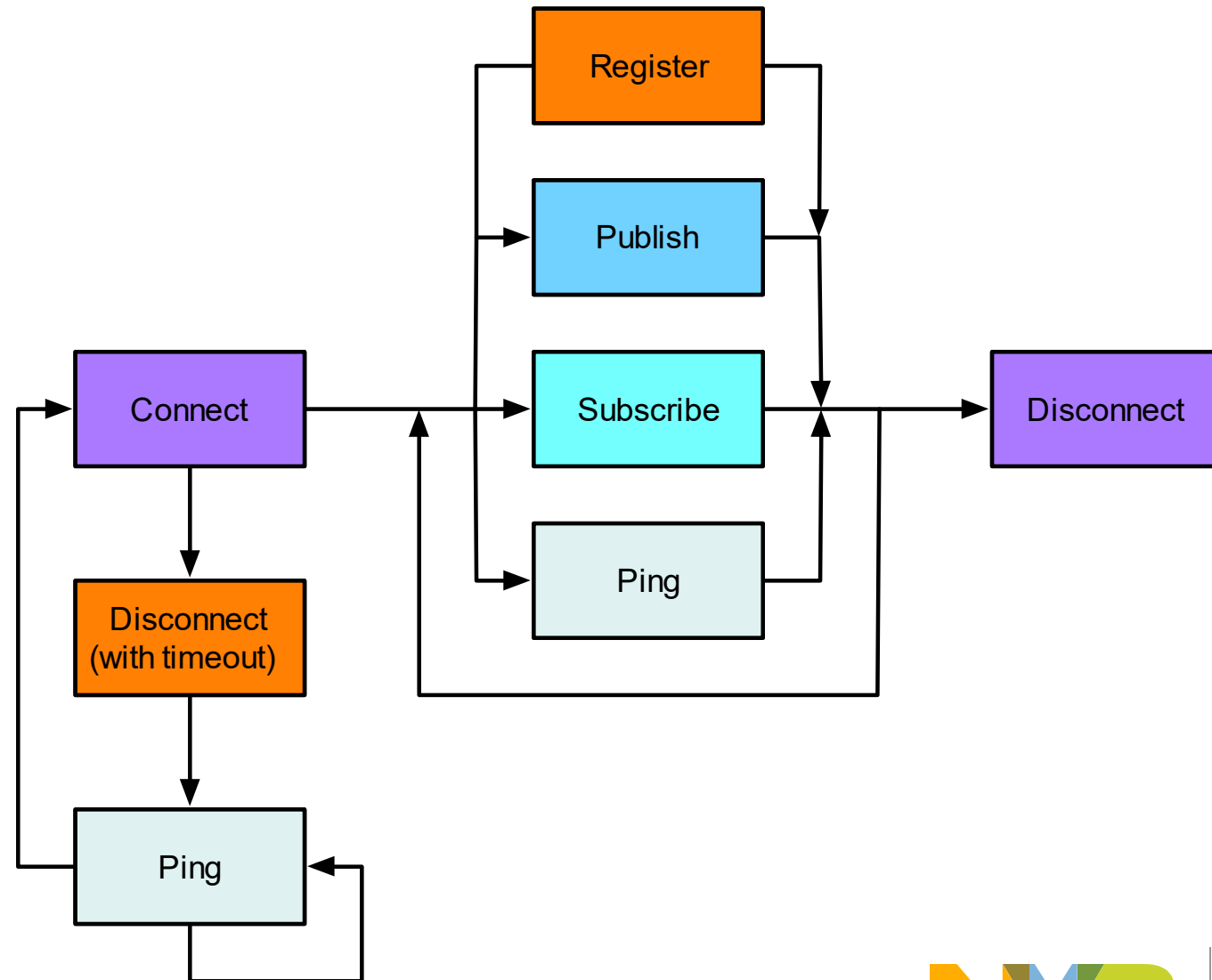
- Is a message-oriented protocol
- Can contain any type of payload
- Data is not sent from one thing to another
- Data is PUBLISHED to a 'topic'
- Things SUBSCRIBE to topics to receive messages
- Many things can publish or subscribe to the same topic

- Topics form a tree
- Publishing to a topic results in:
 - a message being sent to all subscribers to that topic
 - a message being sent to all subscribers to sub-topics
- MQTT supports QoS for message delivery
 - Thingstream also supports MQTT-SN QoS -1 (fire and forget)

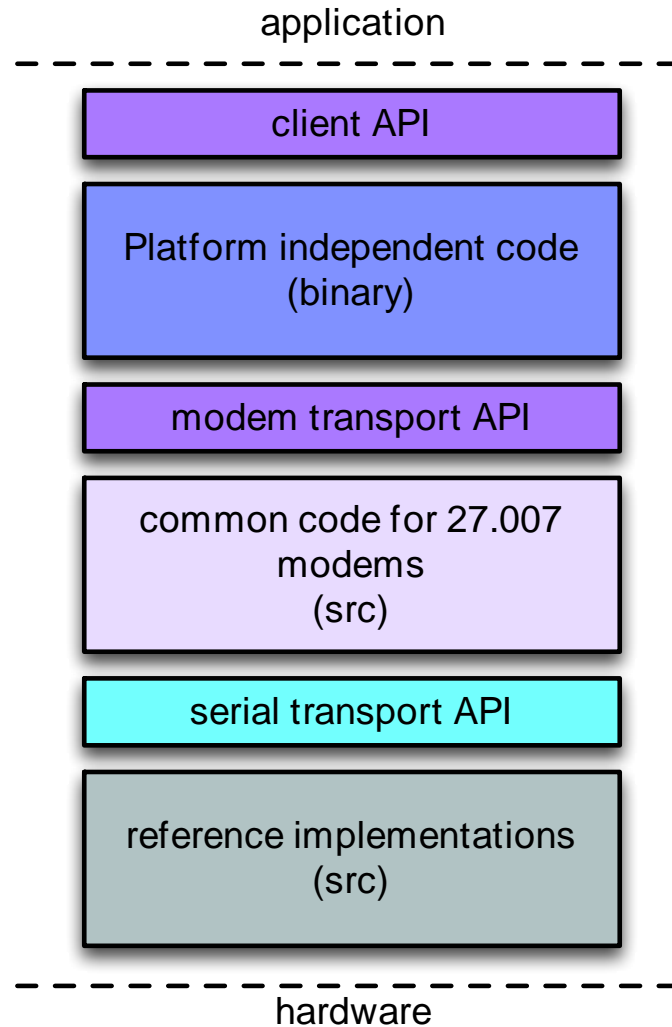
MQTT lifecycle



MQTT-SN lifecycle



Client SDK



- SDK is structured to allow for easy porting to different platforms
- Has platform independent component with API to MQTT-SN for applications
- Platform-specific code can be implemented in either `modem_transport` or `serial_transport`
- Example code provided in the SDK for multiple platforms/OS
- Example tracker application

DEVELOPING FOR THINGSTREAM WITH NXP MCUXPRESSO

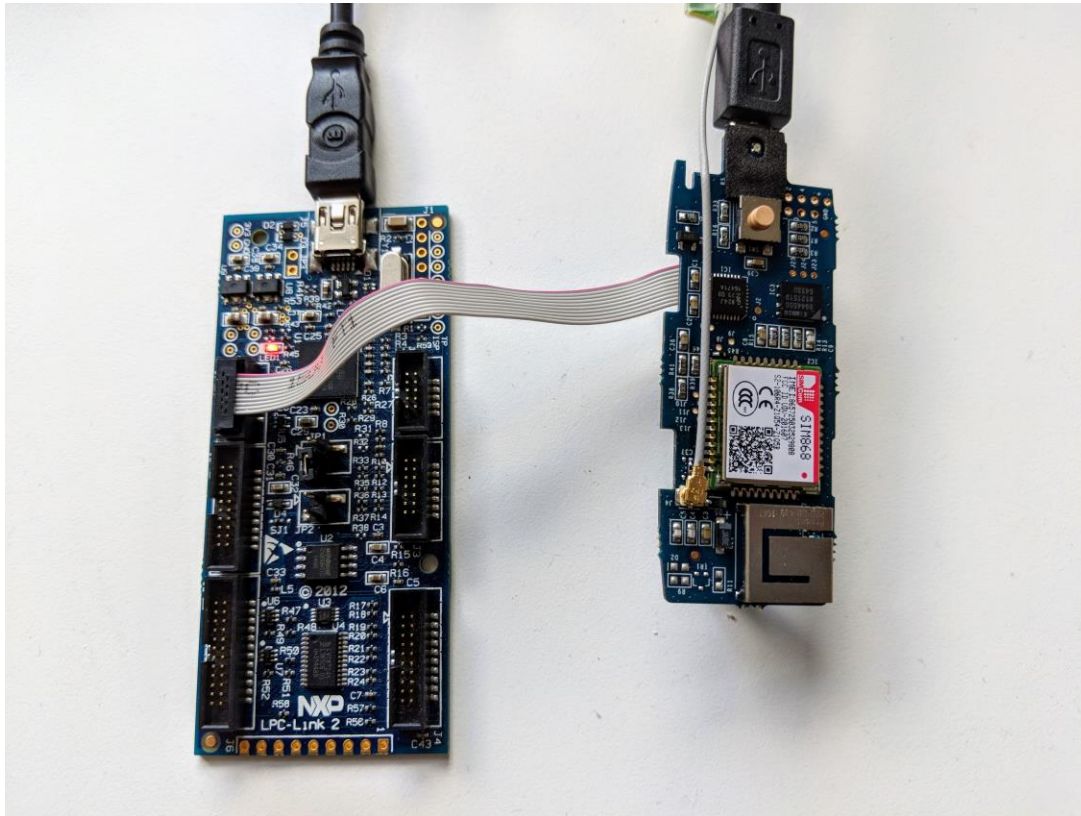


PUBLIC



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Development environment



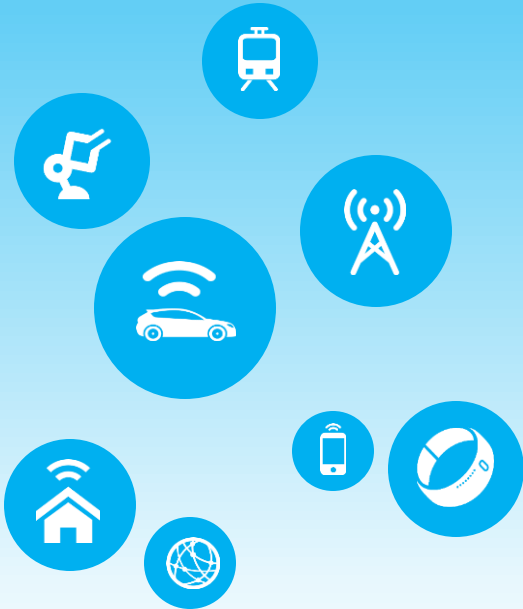
- NXP LPC-Link2
- NXP MCUXpresso 10.0.0
- Thingstream button and SDK 1.13

WRAP UP



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NXP



Customer Applications

Thingstream Connectivity Stack

NXP MCUXpresso SDK



Cloud Infrastructure
NXP & Partner Cloud
Software Platforms



Provisioning, Machine Learning, Storage etc.



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Part II - How to Create, Manage and Deploy Low-Power IoT Devices

29th May, 4pm British Summer Time

Synopsys

Manage, monitor and control wireless networks via a simple cloud software platform - bringing value-added services to end customers.

We'll dive deeper into the IoT device control and deployment, addressing technical requirements and include demos as we explore the platforms and tools available to help reduce the complexity of IoT deployments.

To register go to www.nxp.com under Support / Training & Events / Online
You will find our on-line list of webinars including the 2nd part of this webinar.

Key Links for more information / Q&A

NXP

- nxp.com/lpc
- nxp.com/kinetis

Thingstream

- <http://thingstream.io>
- <http://press.to>

Contact Sales @ sales@thingstream.io



Neil Hamilton
VP Business Development
Thingstream



Bruce Jackson
Chief Technology Officer
Thingstream



Gordon Padkin
Regional Marketing
NXP Semiconductors





**SECURE CONNECTIONS
FOR A SMARTER WORLD**

LPC800 – Entry-Level Microcontroller

8-bit Simplicity, learn more @ [nxp.com/lpc800](https://www.nxp.com/lpc800)

Easy to Use

- The **ARM® Cortex®-M0+** handles 32-bit data more efficiently than an 8-bit processor by requiring less code, memory and 30% less dynamic power
- **Low pin count** allows for easily sharing system-critical pins and enabling hand-solder during assembly
- **Power profile APIs** for simple runtime power optimization
- Leverage **Sample Code Bundles & MCUXpresso** to jump-start your design

Design Flexibility

- **Switch matrix** () enables you to easily assign peripherals to any pin, allowing you to scale-up package size as requirements change
- **State configurable timer (SCT)** generates virtually any timing or PWM function found on popular 8-bit MCUs without requiring MCU intervention
- **Pattern match engine (PME)** allows you to generate different interrupts based on pin inputs
- **Expanded family** will provide more memory and greater analog and peripheral integration



NXPs Kinetis L series

Scalable Ultra-Low-Power M0+ MCUs

Learn more @ [nxp.com/kinetis](https://www.nxp.com/kinetis)



Ultra Low High, Highly Integrated M0+ MCUs

Architected for power efficiency, the Kinetis L series takes advantage of ARM's ultra low power Cortex-M0+ processor and features peripherals that help you optimize power consumption. Kinetis L series provide ultra low dynamic consumption, ultra low static consumption, rich low power modes and innovative low power peripherals.



Offering more performance per mm2

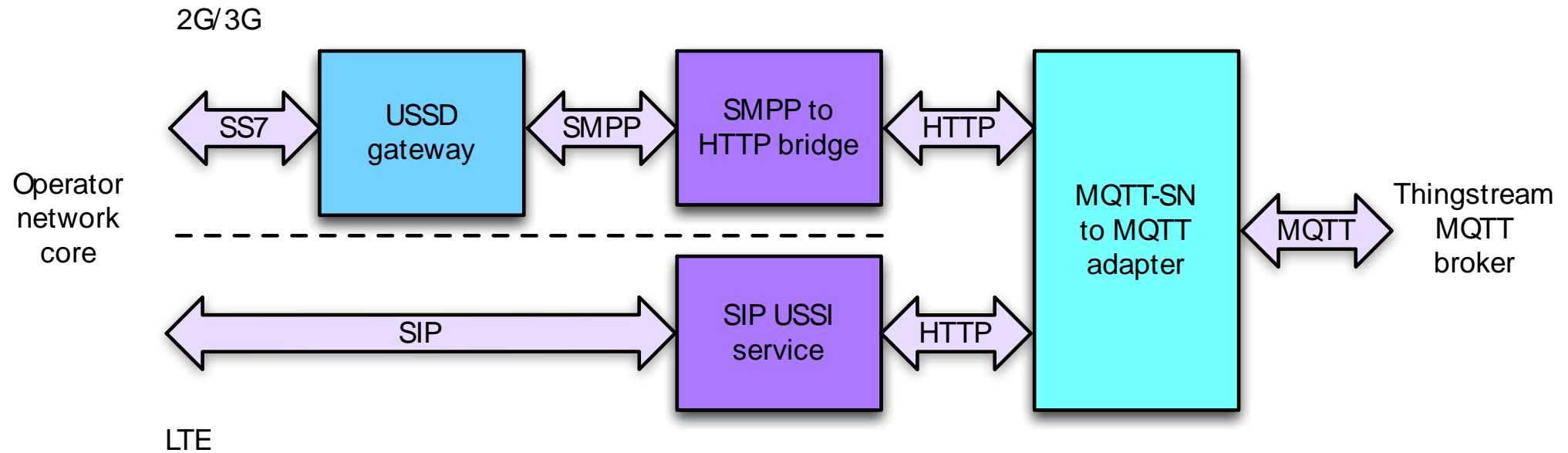
Built on NXP leading technology, Kinetis L series provide rich package options from 8x8mm² 121XFBGA, 10x10mm² 100LQFP all the way down to world's smallest KL03 20WLCSP with 1.6x2mm² ultra small scale device.



Offering Broad Scalability and Integration

Built on the ARM Cortex-M0+ core, the Kinetis L series simplifies development with an upward migration path to Kinetis K and X series. With a comprehensive enablement bundle including low cost Tower System and Freedom Tools, Kinetis Design Studio IDE, Kinetis Software Development Kit, MQX RTOS and the ARM support ecosystem, development is super simple. Expanding on well-known features of the Kinetis platform with leading scalability, best-in-class integration with rich analog features and low-power connectivity, the Kinetis L series redefines entry-level.

MQTT-SN gateway



- Thingstream uses MQTT-SN over USSD to transport data
- USSD is a core service on CS networks (2G/3G)
- USSI (USSD over IMS) is part of LTE 3GPP revision 11+
- Provides a session-based bi-directional data transport
- Flexible message transport
 - No limitations on when messages can be sent
 - Up to 1Mb/message
 - Sweet spot of < 4K