

Samsung ARTIK Overview

Easy, interoperable, secure IoT



Samsung ARTIK™ IoT Platform

Enterprise-grade technology for your IoT business



End-to-end security

Integrated security features span ARTIK cloud, modules, and software



Reduces development time, costs, and risks

Integrated, fully-tested, production-ready, secure components speed time-to-market, minimize the need for in-house IoT expertise



Open and interoperable

No lock-in; ARTIK works with existing products and infrastructure to share information, orchestrate complex interactions, and support business growth



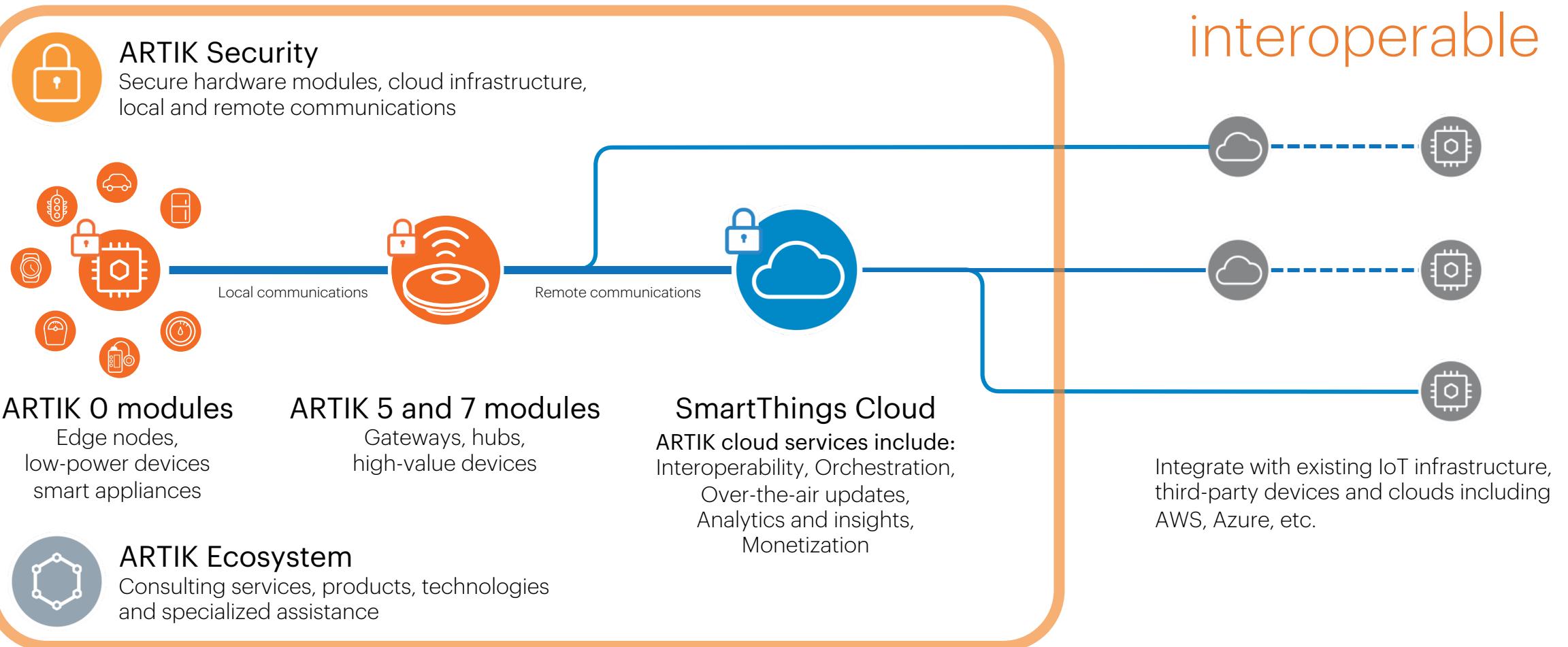
Serviceability

Provision, manage, and update devices and services over-the-air and on-the-fly throughout the product lifespan

Samsung ARTIK™ IoT Platform

End-to-end integration...

...Open and
interoperable

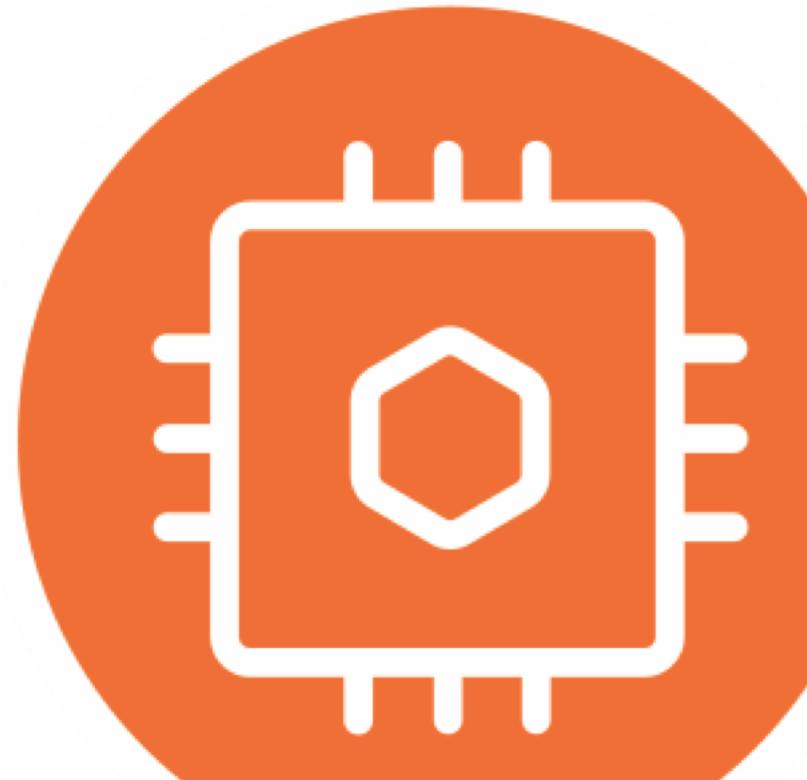


Samsung ARTIK™ Modules

Create intelligent, connected devices

Production-ready, secure edge nodes and system-on-modules tightly integrated with ARTIK cloud interoperability and serviceability services

- Scalable production volumes
- Pre-certified wireless functionality and protocols
- Pre-integrated, fully-tested OS and middleware
- Integrated hardware and software security (s-versions)
- Human support team



NEW

Samsung ARTIK™ Modules and Ubuntu OS

#1 Linux OS for development

Fully-integrated, long-term Linux support for product deployments

- ARTIK customization including ARTIK Platform software
- ARTIK IDE support
- 5-year extended life cycle with security updates
- Regular releases - every 6 months



NEW

Samsung ARTIK™ Fedora-to-Ubuntu transition



ubuntu

Fedora 24 distribution with
ARTIK customization +
ARTIK Platform Software +
ARTIK IDE

Ubuntu 16.04 distribution with
ARTIK customization +
ARTIK Platform Software +
ARTIK IDE

Product Life Cycle – 1 year

Product Life Cycle – 5 years

Security Updates – 1 year

Security Updates – 5 years

Releases – No update release

Releases – Update release every 6 months

Samsung ARTIK™ Edge-node Portfolio

	020	030	053	053s	055s
Processor	Cortex M4 @ 40MHz	Cortex M4 @ 40MHz	Cortex R4 @ 320MHz	Cortex R4 @ 320MHz	Cortex R4 @ 320MHz
Memory	RAM	32 KB	32 KB	1.4 MB	1.4 MB
	Flash	256 KB	256 KB	8 MB	8 MB
Connectivity	BLE 4.2	ZigBee / Thread	Wi-Fi 802.11 b/g/n	Wi-Fi 802.11 b/g/n	Wi-Fi 802.11 b/g/n
Security	Per device unique key & certificate		✓	✓	✓
	Key stored in HW secure element		✓	✓	✓
	PKI infrastructure		✓	✓	✓
	KMS, secure boot, secure JTAG			✓	✓
	Secure OS, Security Lib APIs, Secure Storage			✓	✓
Operating Voltage	3.3V	3.3V	5-12V	5-12V	3.3V
Temperature Range	-40° to 85°C Ambient	-40° to 85°C Ambient	-20° to 85°C Tcase	-20° to 85°C Tcase	-20° to 85°C Tcase
Size (mm)	15 x 12.9 x 2	15 x 12.9 x 2	15 x 40 x 3.9	15 x 40 x 3.9	15 x 26 x 3.9
Availability	Samples			Mid Sept	Mid Sept
	Production	Now	Now	Now	Nov. 30 th 2017
					Nov. 30 th 2017

Samsung ARTIK™ Gateway Portfolio

	520	530	710	305s	310s	530s	710s
Processor	CPU	Dual Cortex-A7 @ 1.0 GHz	Quad Cortex-A9 @ 1.2 GHz	Octa Cortex-A53 @ 1.4 GHz	Dual Cortex-A9 @ 1.0 GHz	Dual Cortex-A7 @ 1.0 GHz	Quad Cortex-A9 @ 1.2 GHz
	GPU	3D graphics accelerator	3D graphics accelerator	3D graphics accelerator			3D graphics accelerator
Memory	RAM	512 MB	512 MB	1 GB	512 MB	512 MB/1 GB	1 GB
	Flash	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB
	Wi-Fi	802.11 b/g/n/ac	802.11 b/g/n	802.11 a/b/g/n	802.11 b/g/n	802.11 b/g/n	802.11 a/b/g/n/ac
	Bluetooth	4.x	4.x	4.x	4.x	4.x	4.x
Connectivity	Zigbee, Thread	✓	✓	✓	✓	✓	✓
	Ethernet		1 channel (10/100/1000 x1)	1 channel (10/100/1000 x1)	1 channel (10/100/1000 x1)	2 channels (10/100/1000 x1 10/100 x1)	1 channel (10/100/1000 x1)
	CAN					Yes (2 channels)	
Temperature Range (T_J)	-25° to 85° C	-25° to 85° C	0° to 70° C	-25° to 85° C	-20 ° to 85° C	-25° to 85° C	0° to 70° C
Size (mm)	30 x 25 x 3.4	36 x 49 x 3.4	36 x 49 x 3.4	TBD	TBD	36 x 49 x 3.4	36 x 49 x 3.4
Availability	Samples			Mid-Oct	TBD	End Sept	Mid-Oct
	Production	Now	Now	Now	Nov. 30, 2017	Q2/Q3 2018	Nov. 30, 2017

Samsung ARTIK™ cloud services on SmartThings cloud

Connect devices, connect clouds, put them all to work

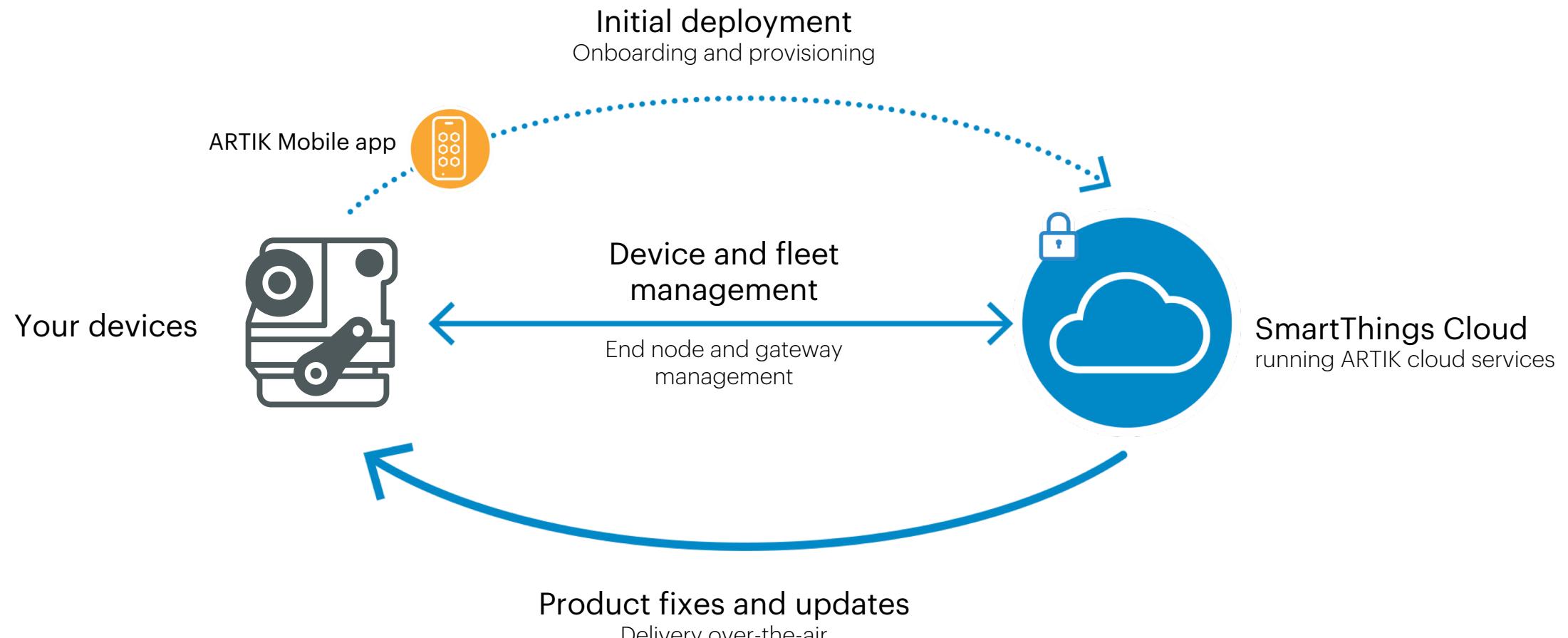
Serviceability features and unparalleled interoperability for ARTIK modules and third-party devices and clouds

- Device provisioning, account management, and over-the-air updates
- Data management, normalization, analytics, and visualization
- Access Samsung consumer ecosystem; 50+ built-in and verified Samsung cloud connectors, 100's available from ARTIK community
- Sophisticated orchestration engine to define one-to-many or many-to-many actions between connected devices and data sources



Samsung ARTIK™ cloud services: Serviceability

Onboard, manage, and service devices in the field



Samsung ARTIK™ cloud connectors

Expanded IoT solutions

- Connect to Samsung and third-party devices, clouds, and apps
- 50+ built-in and verified by Samsung
- Open technology: 100's available from ARTIK community



NEW

Samsung ARTIK™ Cloud Data Monetization

Accelerate the path to IoT profitability

Businesses can create service plans that generate revenue directly from the interactions of devices and services

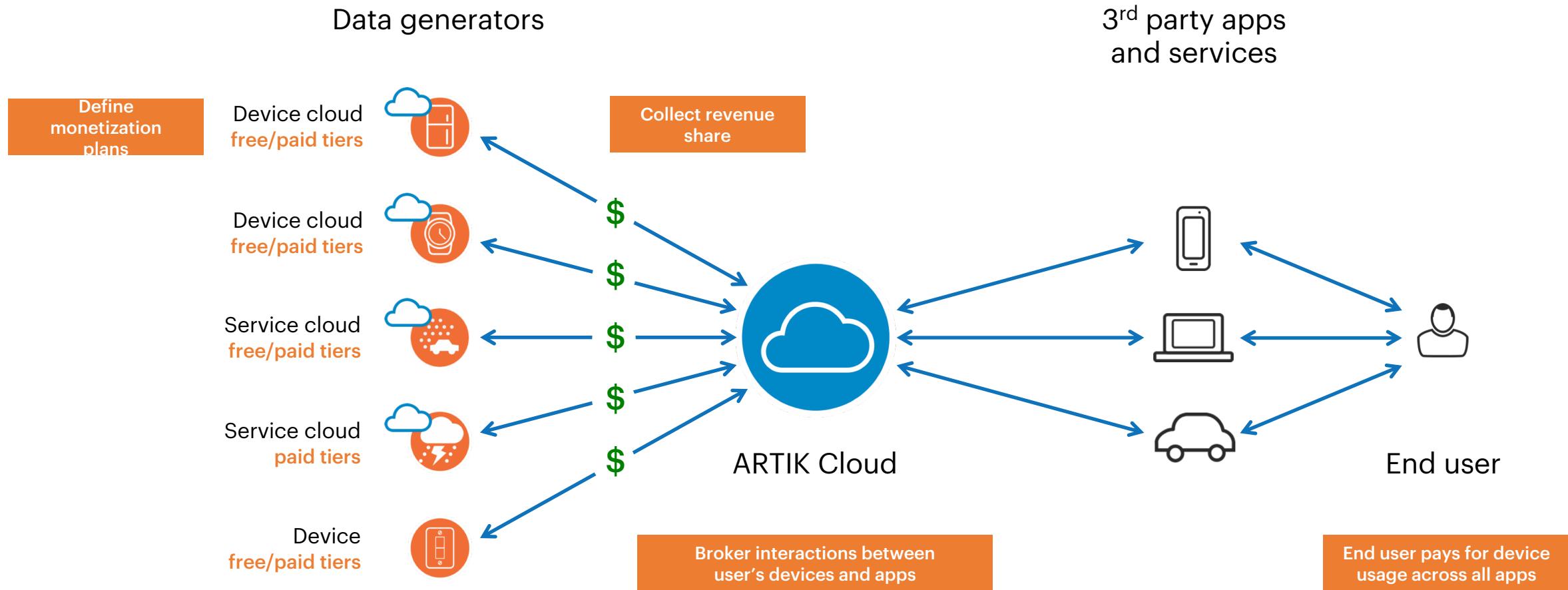
- Enables an IoT data economy by monetizing shared data
- First service of its kind
- Availability: Now



NEW

Samsung ARTIK™ Cloud Data Monetization

Brokers both data exchange and revenue collection



Samsung ARTIK™ Cloud

Immediate value “out-of-the-box”

	Customer Need	Build (DIY)	ARTIK Cloud
Securely connect and manage devices	Device to cloud connectivity	AWS IoT, etc.	Included
	End to end security	Custom development	Included
	Fast onboarding	Custom development	Included
	Integrated device & OTA management	Custom development	Included
Enable Interoperability	Device data model	Custom development	Included
	Raw data storage	Custom development	Included
	Data normalization & storage	Custom development	Included
	Cloud to cloud connectors	Custom development	Included
	Ready 3 rd party apps (e.g. Alexa skill)	Custom development	Included
	API Security	Custom development	Included
	3 rd party device discovery	Custom development	Included
	Data privacy management	Custom development	Included
Improve Outcomes	Multiple APIs w/ documentation	Custom development	Included
	Device Sharing	Custom development	Included
	Aggregations	Custom development	Included
	Orchestration Engine	Custom development	Included



The Internet of Things is dangerously unsecure

- Time to market prioritized over security
- 0% of IoT budgets have been allocated to security to date
- IoT hardware and app development teams lack security skills
- Unprotected “things” vulnerable to physical abuse
- Establishing trust between devices, gateways and cloud is difficult

Samsung ARTIK™ addresses all of these issues



IoT Security Guidance is Maturing Rapidly— Legislation and Certification are Coming Soon



Internet of Things
Cybersecurity
Improvement Act



IoT: Enhanced Assessments
and Guidance are Needed to
Address Security Risks in DOD



800-160 System Security
Engineering
899-183 Network of Things



UL 2900-1 Cybersecurity for Network-
Connectable Products
UL 2900-2-1 Healthcare
UL 2900-2-2 Industrial
UL 2900-2-3 Life signaling and safety



Massive Fines €20B or
4% Global Turnover

Requirements for
Hardware-Protected
Security for Ground Vehicle
Applications



Internet of Things
Security Framework



MDISS

'WHISTL' network of security
testing labs for medical devices



Internet of Things
Working Group



IoT Top 10
IoT Attack surface



Praetorian determined that Samsung's ARTIK IoT Platform has adequate security controls in place to defend against prevalent application security vulnerabilities whose existence poses moderate-to-serious risk.



OWASP Application Security Verification Standard (ASVS)

OWASP ASVS is a list of application security requirements or tests that can be used by architects, developers, testers, security professionals, and even consumers to define what a secure application is. Evaluation ratings compare information gathered during the course of the engagement to the OWASP ASVS version 3.1¹ criteria for security standards.

The grade below is a representation of the ARTIK IoT Platform's current, post-remediation security posture. Praetorian calculates grades based on the "Existing Vulnerability Measure" (EVM) formula described in the reference below². EVM is used to quantify the collective risk of the findings identified during this assessment. The letter grade leverages EVM to benchmark risk posture against Praetorian's client-base.

Product	Security	Grade
Samsung ARTIK IoT Platform	Excellent	A

Grade	Security	Criteria Description
A	Excellent	The EVM of the assessed components placed within the top 5-10% of Praetorian's client-base. The overall security posture was found to be excellent with a minimal amount of low and informational risk findings identified.
B	Good	The EVM of the assessed components was above average when benchmarked against Praetorian's client-base. Only a handful of low/informational risk shortcomings were identified in the testing time period.
C	Fair	The EVM of the assessed components was aligned closely to the average EVM of Praetorian's client-base. The current solutions protect some areas of the target from security issues, but moderate changes are required to elevate the discussed areas to acceptable standards.
D	Poor	The EVM of the assessed components fell below the average EVM, with significant security deficiencies present. Immediate attention should be given to the discussed issues to address exposures identified.
F	Inadequate	Serious security deficiencies were present in the assessed components and the EVM placed within the bottom 5-10% of Praetorian's client-base. Shortcomings were identified throughout most of the security controls examined and improved security will require significant resources.

¹ [https://github.com/OWASP/ASVS/blob/master/OWASP Application Security Verification Standard 3.1.pdf](https://github.com/OWASP/ASVS/blob/master/OWASP%20Application%20Security%20Verification%20Standard%203.1.pdf)

² <https://dl.acm.org/citation.cfm?id=1179505>

Samsung ARTIK™ End-to-end Platform Security

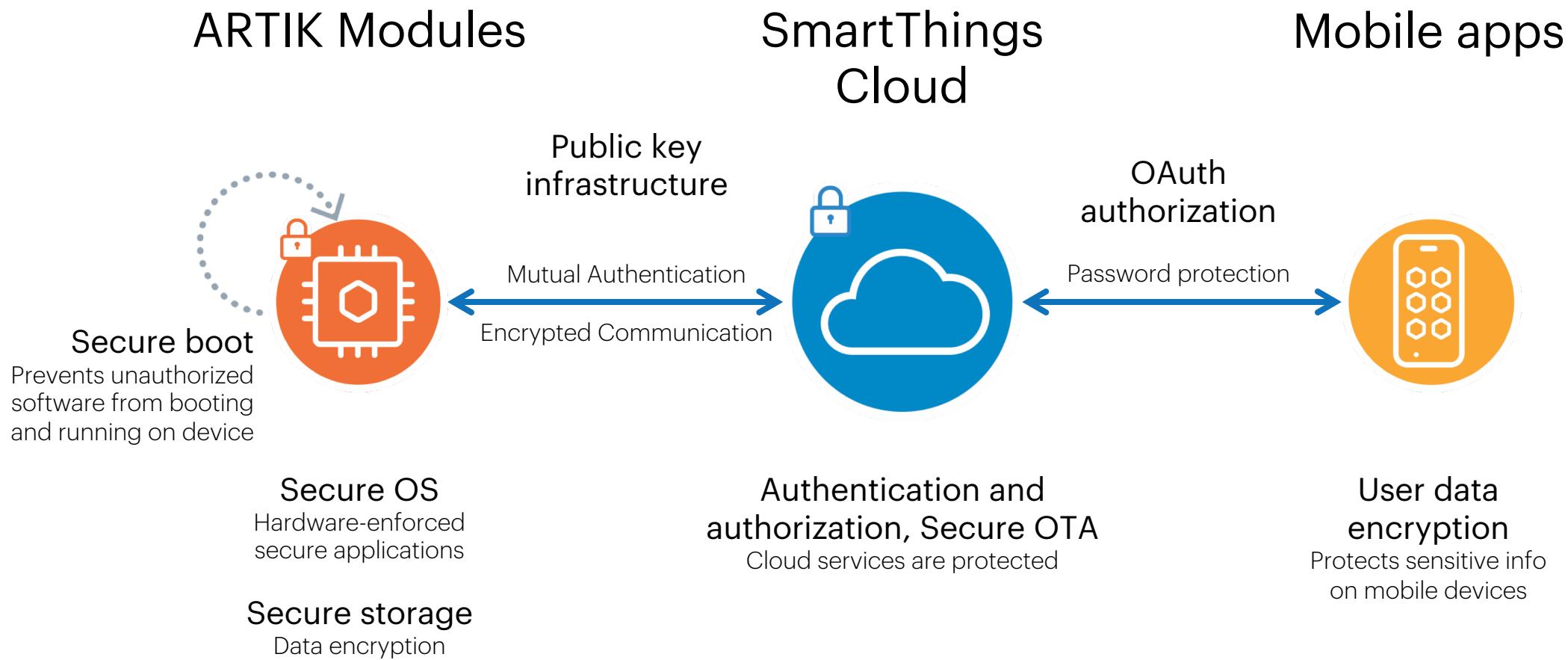
Built-in, not bolted on

- Comprehensive IoT attack surface defenses
- Hardware protection of digital certificates and keys
- Anchors trust from “things” to ARTIK cloud
- Automates secure device registration
- Protects software on devices and over-the-air
- Adds security without adding security experts



Samsung ARTIK™ End-to-end Platform Security

End-to-end protection for you and your customers

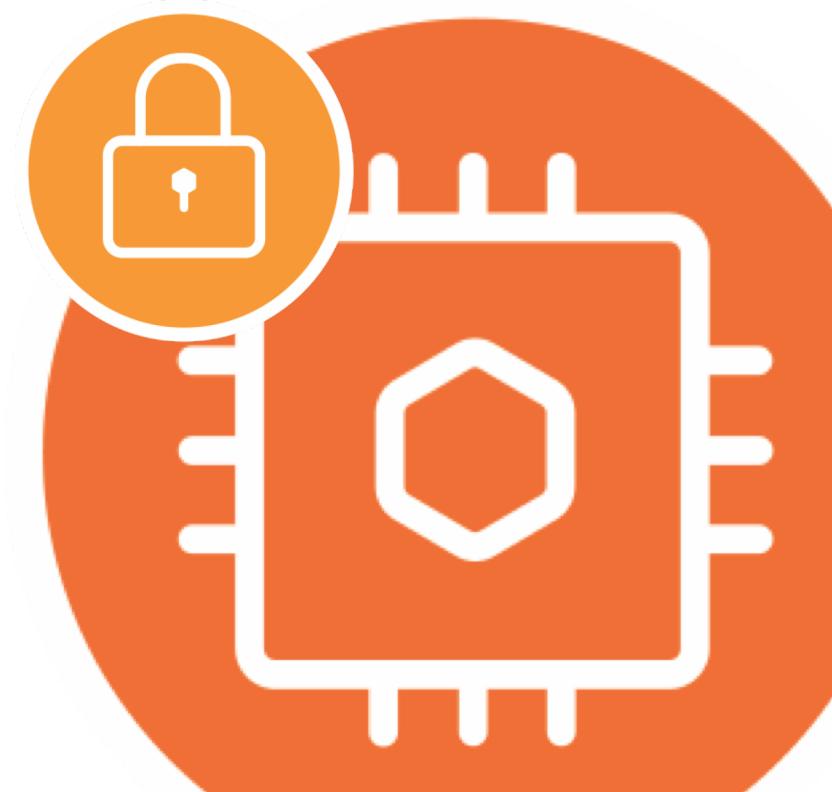


NEW

Samsung ARTIK™ S-Modules (053s, 055s, 530s, 710s)

Most comprehensive IoT security solution available today

- Same cost as other ARTIK modules
- Integrated Public Key Infrastructure (PKI) and Key Management Service (KMS) features
- Full support of ARTIK security APIs

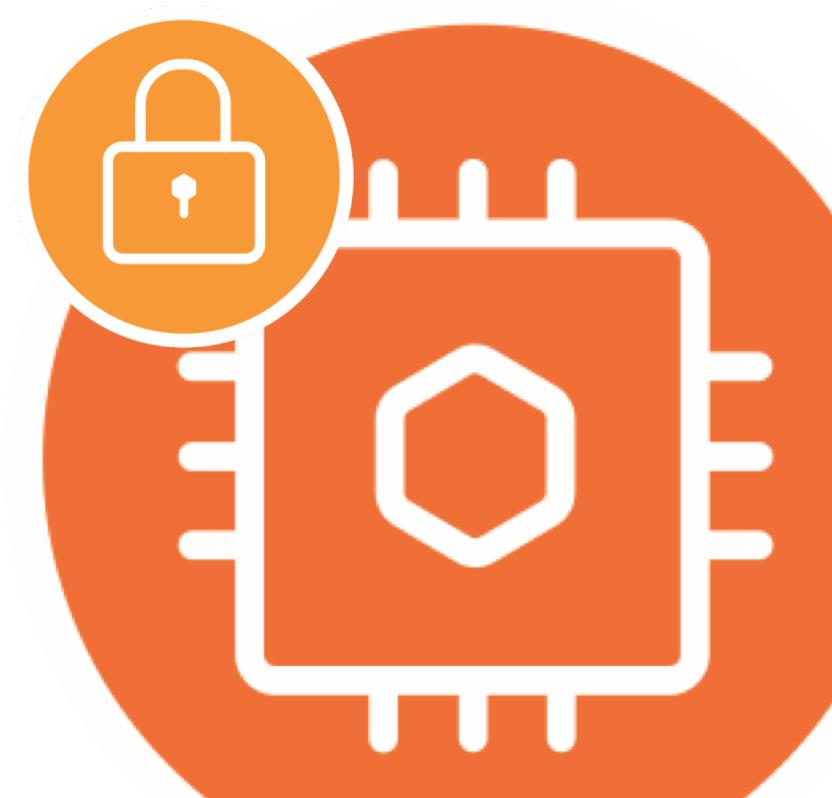


NEW

Samsung ARTIK™ S-Modules (053s, 055s, 530s, 710s)

Device and data protection with secure communications

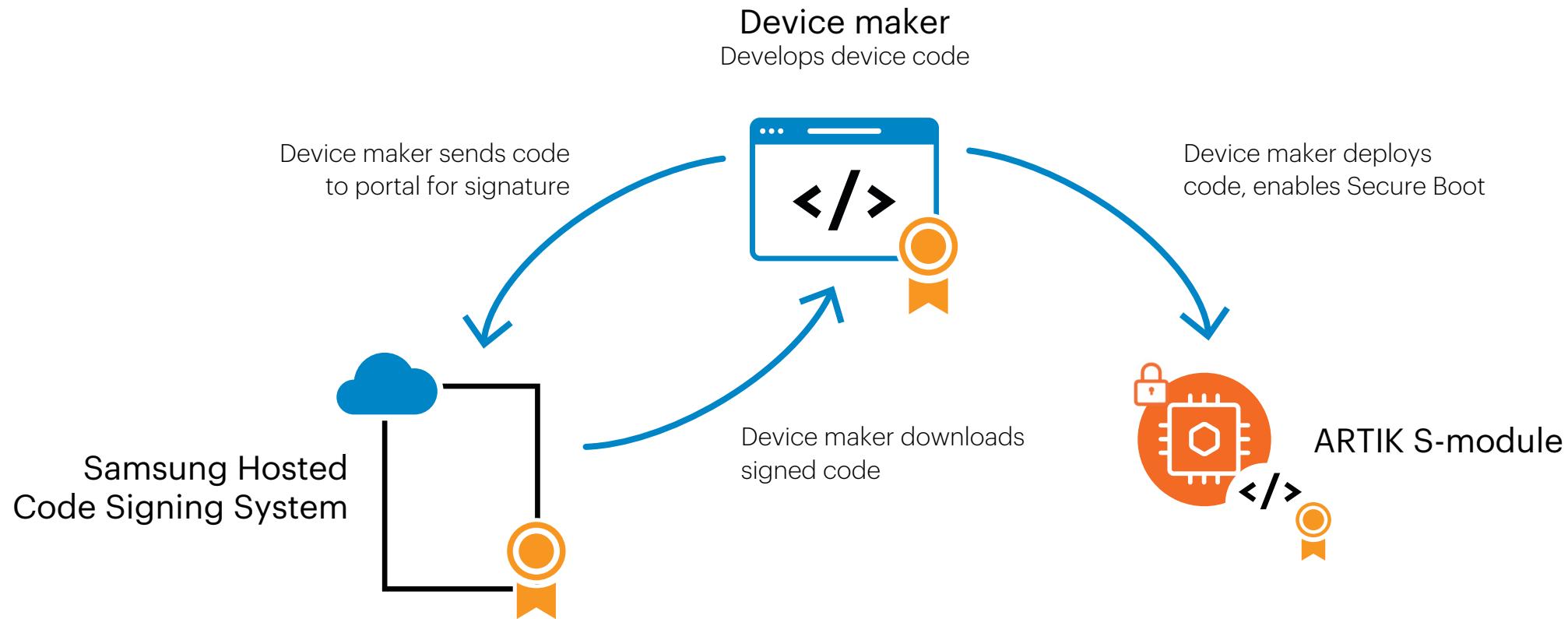
- Secure boot protects from malicious software
- Strong root of trust from ARTIK PKI with mutual authentication to ARTIK Cloud
- Trusted over-the-air (OTA) updates
- Secure OS creates a Trusted Execution Environment (TEE) on gateway modules (530s, 710s)
- Unique device certificate and key are factory injected, protected by tamper-resistant Secure Element EAL Level 5+
- Security API for processing, storing and managing sensitive data
- JTAG access locked



NEW

Samsung ARTIK™ Hosted Code Signing System

Code signing portal manages key signing



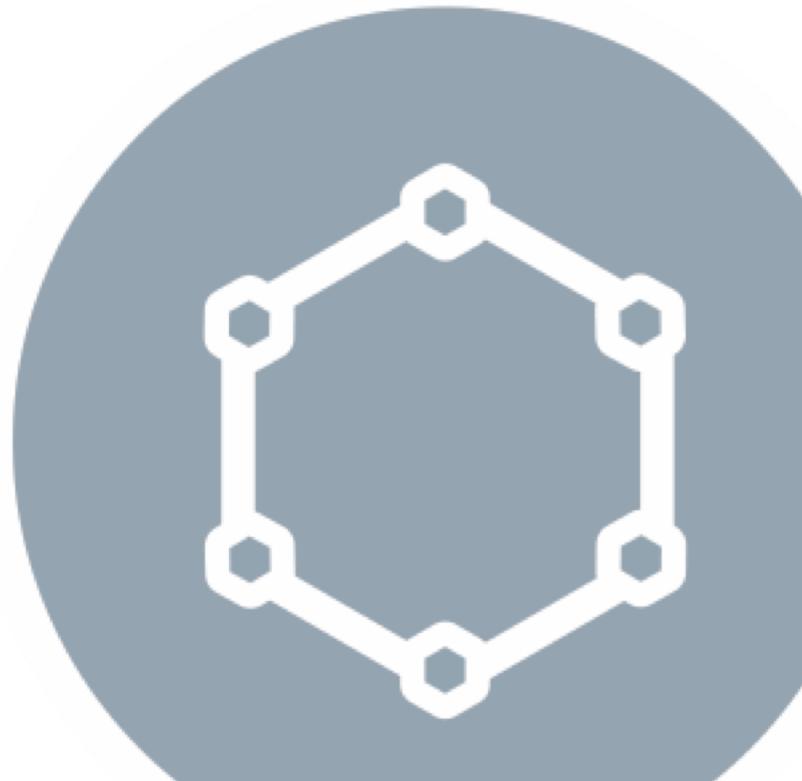
Samsung ARTIK™ Ecosystem

Accelerate your time-to-market

QuickStart program: Professional consulting to accelerate development

- Engineering, design, and prototyping services
- From benchtop to commercialization-ready quality

ARTIK Partners: Professional consulting,
products, and technologies



Samsung ARTIK™ Solution Partners

accedo

altiux

AXSYS
TECHNOLOGIES

AZUL
SYSTEMS

eInfochips

FS Studio

KALPA

MERA
Software Services, Inc.

MISTRAL

Mobile
programming

Mobiliya
An AgreeYa Mobility Company

PRISMTECH

L&T Technology Services

SpinDance

Tech
Mahindra

WHIZZ
SYSTEMS

VOLANSYS

RUSHUP

Kong Tech

APP for
GOOD

OpenMarket®

HTEC
GROUP

ramp.digital
IoT for business

sasken
Make the Right Connection

POWERBEAM

FS Studio

VECTO
MOBILE

TATA
CONSULTANCY SERVICES

Samsung ARTIK™ Technology Partners



Samsung ARTIK™

Helpful web resources

Web Documentation	https://developer.artik.io/documentation/
Document Library	https://www.artik.io/library/
Forums	https://developer.artik.io/forums/
Blog	https://www.artik.io/blog/
File Tickets	https://support.artik.io
Github Repository	https://github.com/SamsungARTIK
YouTube Channel	https://www.youtube.com/channel/UC4rolvSm8ikmnymdbznNJw