



# Rambus at Baird's 2019 Global Consumer, Technology & Services Conference

Presenter: Rahul Mathur, CFO

June 4, 2019



# Safe Harbor for Forward-Looking Statements; Other Disclosures

This presentation contains forward-looking statements under the Private Securities Litigation Reform Act of 1995 including those relating to Rambus' expectations regarding product and service offerings, growth for 2019 and financial guidance for the second quarter of 2019, including revenue, operating costs and expenses, earnings per share and estimated, fixed, long-term projected tax rates. Such forward-looking statements are based on current expectations, estimates and projections, management's beliefs and certain assumptions made by Rambus' management. Actual results may differ materially. Our business is subject to a number of risks which are described more fully in our periodic reports filed with the Securities and Exchange Commission. Rambus undertakes no obligation to update forward-looking statements to reflect events or circumstances after the date hereof.

Effective January 1, 2018, the Company adopted Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers in ASC 606. The adoption of ASC 606 materially impacted the timing of revenue recognition for the Company's fixed-fee intellectual property licensing arrangements. The adoption of ASC 606 did not have a material impact on the Company's other revenue streams, net cash provided by operating activities, or its underlying financial position.



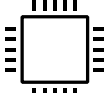

This presentation contains non-GAAP financial measures, including operating costs and expenses, operating margin, operating income (loss) and net income (loss). In computing these non-GAAP financial measures, stock-based compensation expenses, acquisition-related transaction costs and retention bonus expense, amortization expenses, non-cash interest expense and certain other one-time adjustments were considered. The non-GAAP financial measures should not be considered a substitute for, or superior to, financial measures calculated in accordance with GAAP, and the financial results calculated in accordance with GAAP and reconciliations from these results should be carefully evaluated. Management believes the non-GAAP financial measures are appropriate for both its own assessment of, and to show investors, how the Company's performance compares to other periods. Reconciliation from GAAP to non-GAAP results are made available and more fully described on our website as well as the back of this deck and in the earnings release.

# Rambus at a Glance

## Market Megatrends

- Renaissance of computer architectures, **memory critical and driving innovation**
- Internet giants moving **SoC design in-house**, enabling TAM expansion
- **Secure semiconductor HW, SW and supply chain essential** for global commerce

## Rambus Offerings

Architecture Licenses		High-speed IO & DPA Countermeasures
IP Cores		Memory & SerDes PHYs; Secure Cores
Chips		Memory Buffers
Key Management		Secure Supply Chain Provisioning

## Financial Performance

### Revenue

Q119: \$48.4M

2018: \$231.2M  
\$401.1M (ASC 605)

### Cash from Operations

Q119: \$28.8M

2018: \$87.1M



NASDAQ:  
**RMBS**

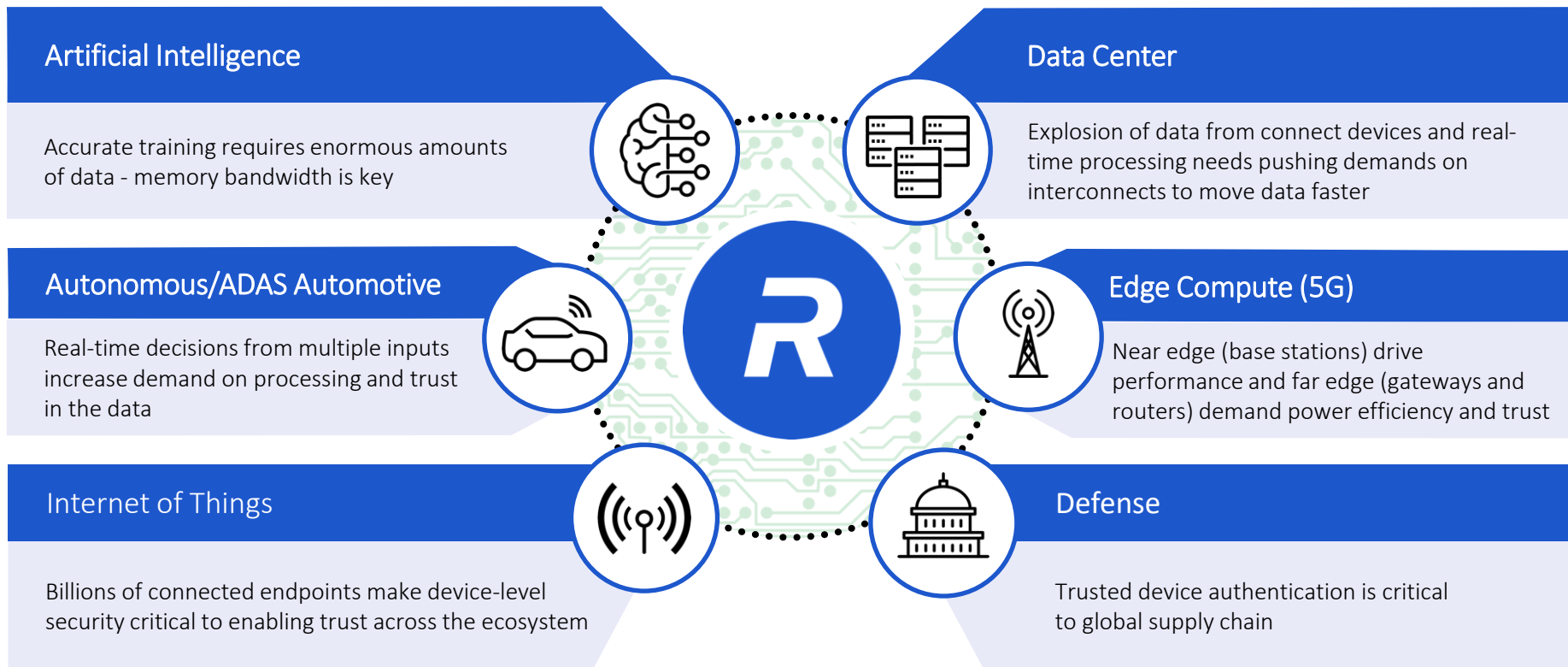
**25+**  
Years  
Tech leadership  
& innovation

**2500+**  
Patents and  
Applications

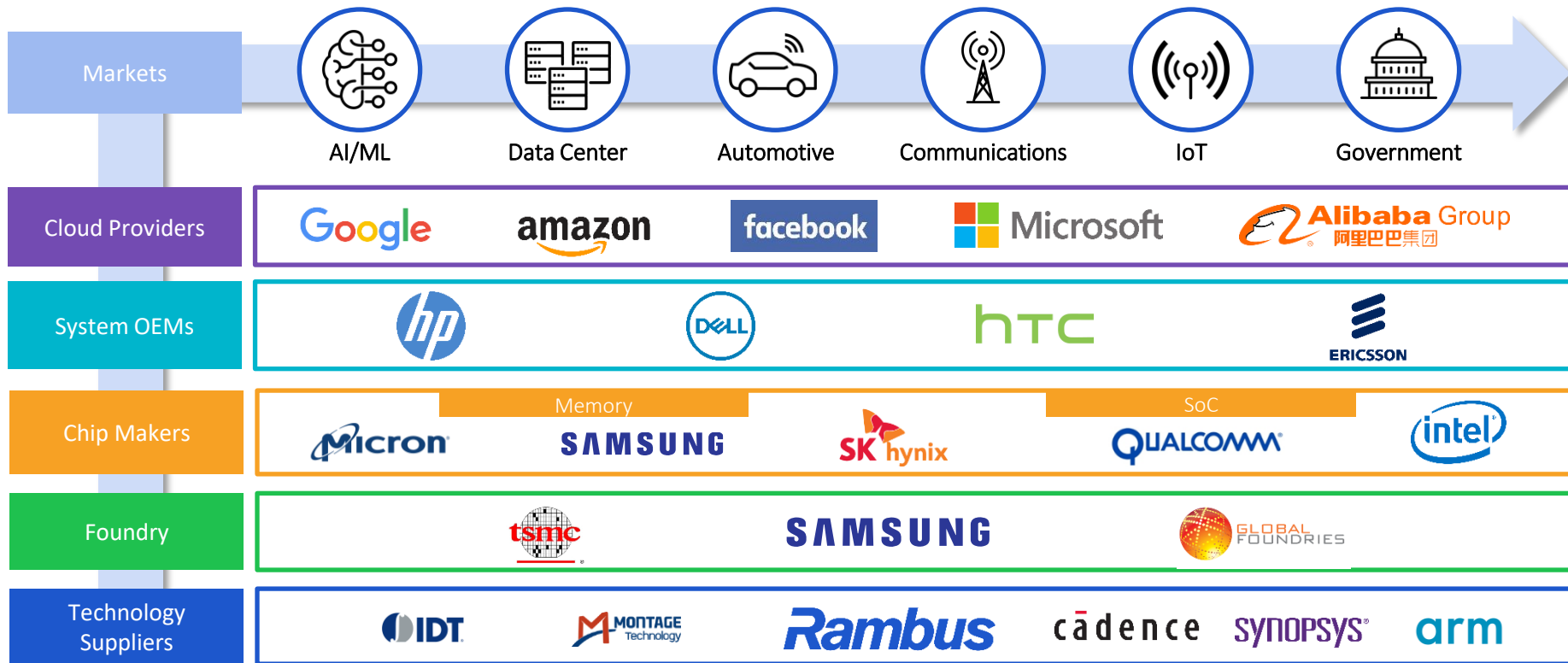
HQ:  
**California**  
WW Offices in  
India, EU, Asia

**~800**  
Employees  
Worldwide

# All Growth Markets Are Impacted by These Megatrends

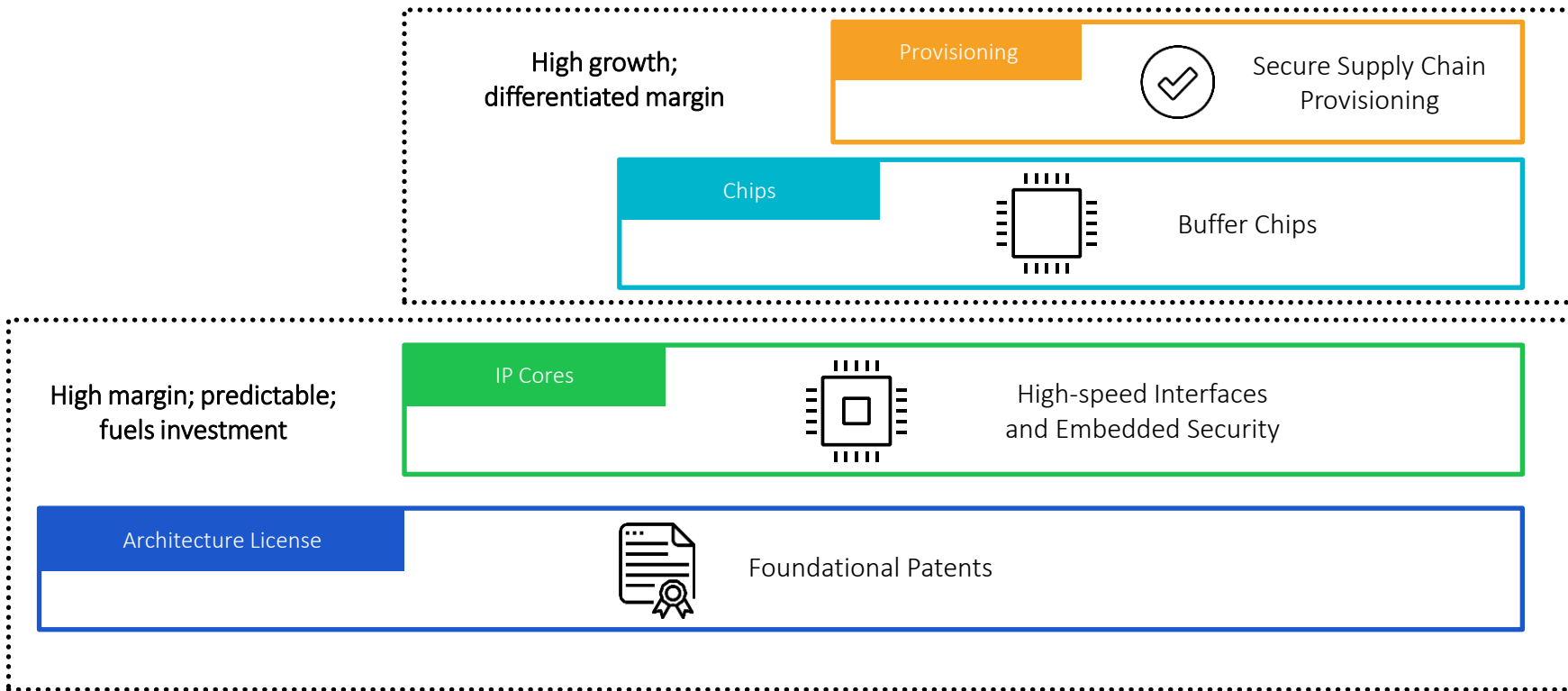


# Semiconductor Industry Ecosystem Built on Leading-Edge IP

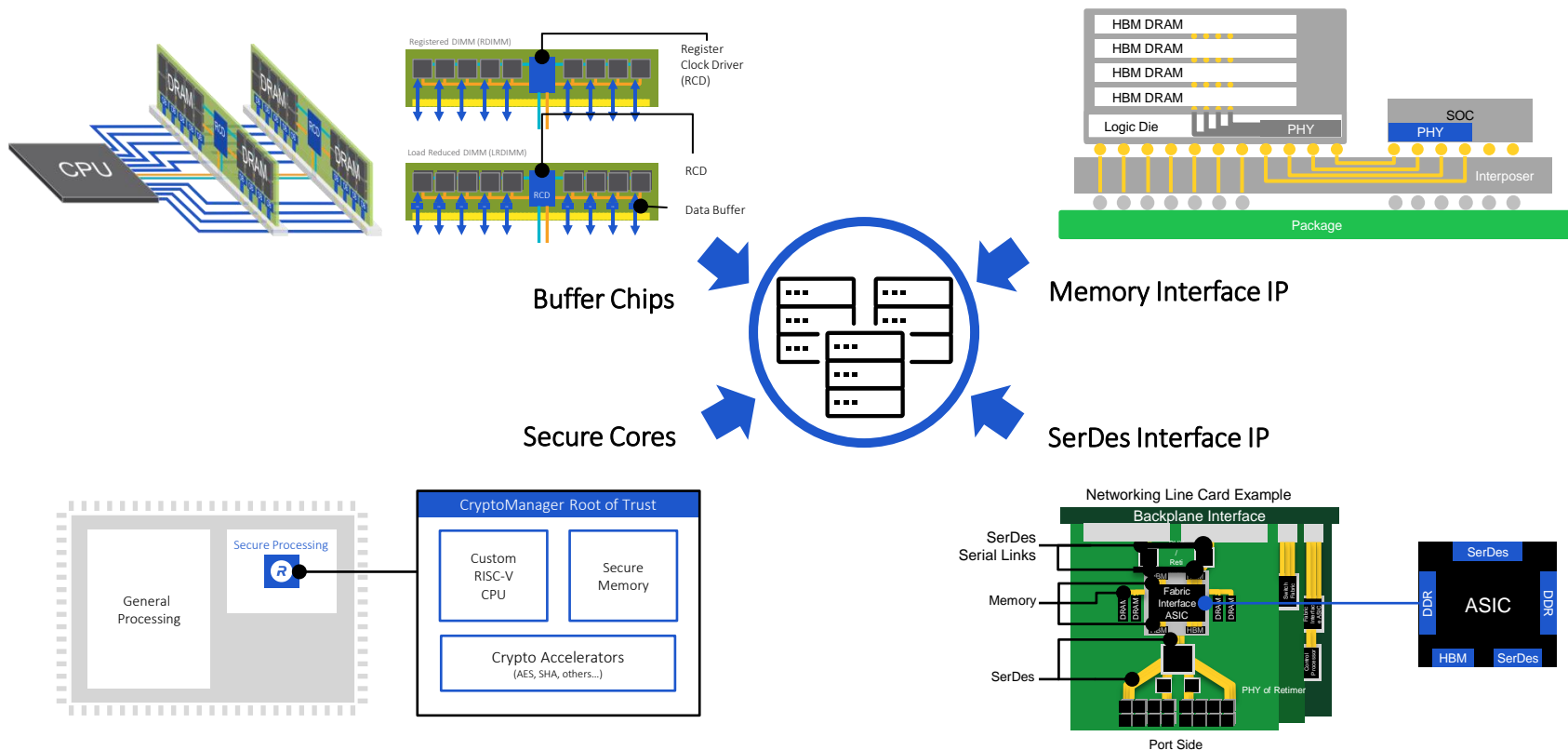


Ecosystem Example

# Rambus Semiconductor Solutions Built on Leading-Edge IP

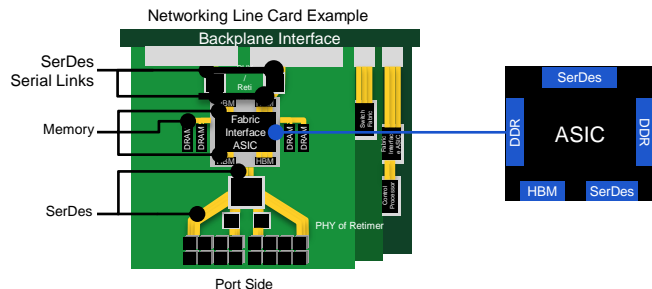


# Rambus Solutions Throughout the Data Center

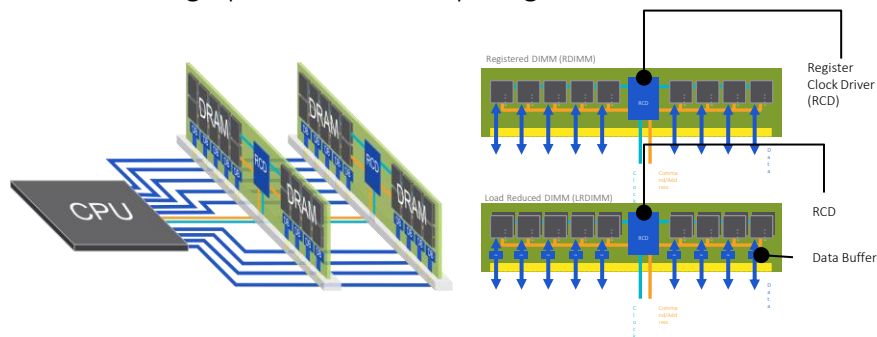


# Delivering More Data, Faster: High-speed IP Cores and Chips

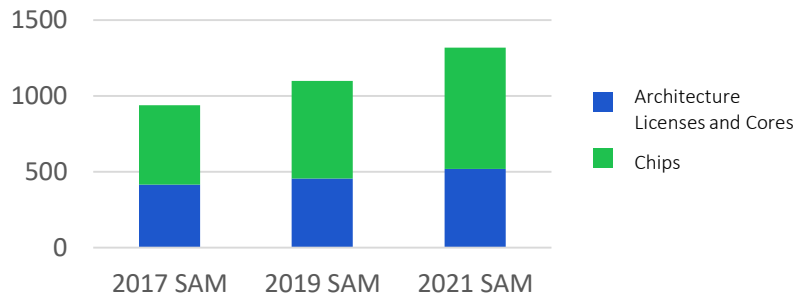
High-speed memory and SerDes interfaces are critical for performance in data-intensive applications



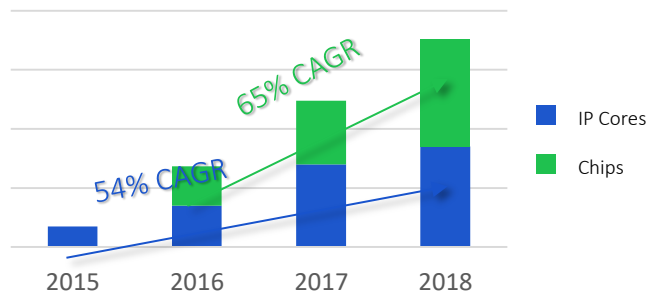
Memory buffers are the key to expanding capacity for data centers and high-performance computing



Revenue SAM (\$M)



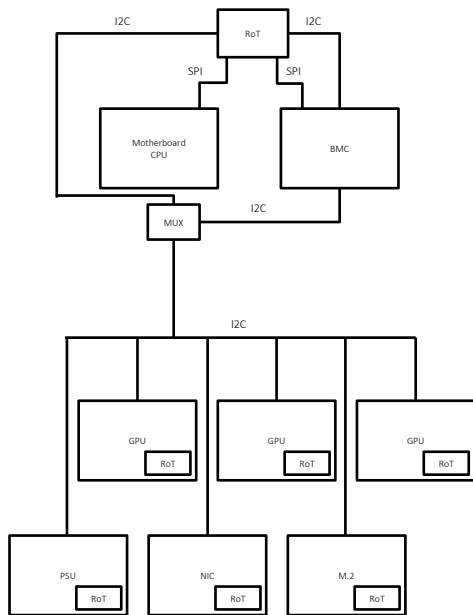
Revenue Growth



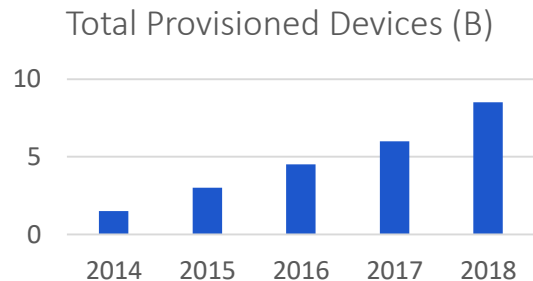
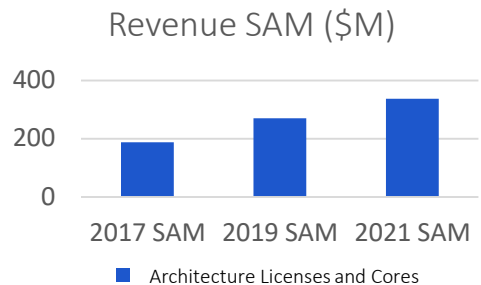
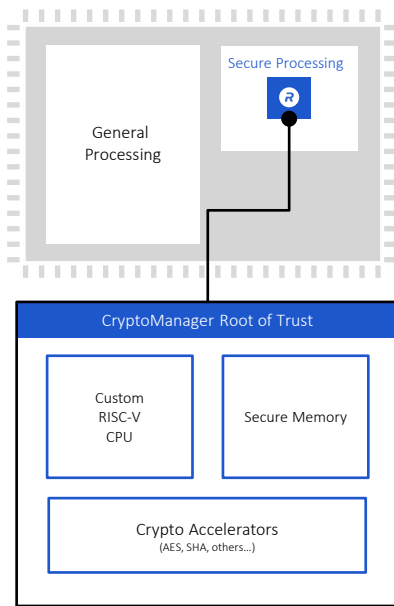


# Keeping Data Safe: Secure Silicon IP and Provisioning

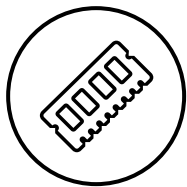
Embedding secure roots of trust in silicon and siloing it from general processing is critical to creating trust across connected devices



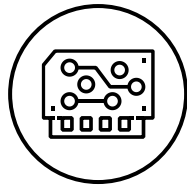
Source: Microsoft Cerberus Datacenter Architecture



# Rambus R&D Drives Datacenter Innovation in Foundational Areas



Extending the performance of DRAM for future generations



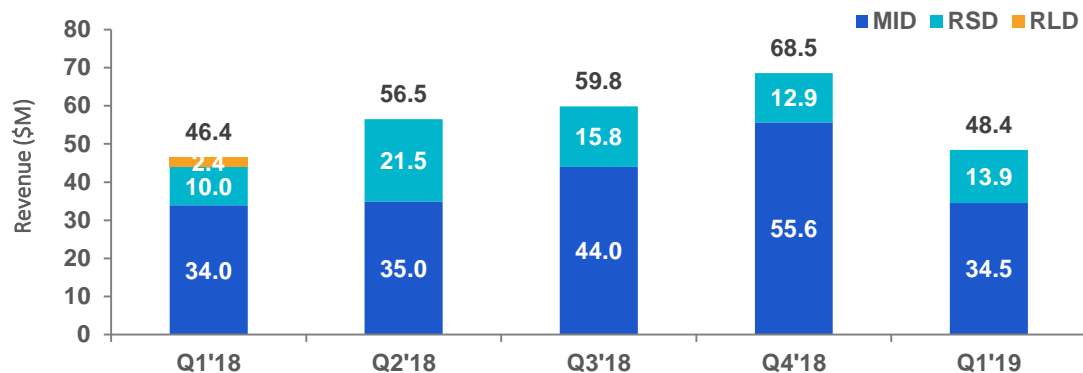
Next-generation hybrid memory subsystems for cost-effective performance



Application-specific memory solutions for Artificial Intelligence and Machine Learning

# Predictable Revenue Base

Large portion of our revenue is fixed & predictable



- Continue to leverage our high margin historic businesses to fuel growth in adjacent areas
- Revenue does not reflect billings related to fixed-fee licensing arrangements

Quarter	Q1'18	Q2'18	Q3'18	Q4'18	Q1'19
Licensing Billings	\$75.9	\$73.2	\$75.4	\$76.7	\$75.4
Royalty Revenue	\$21.4	\$30.0	\$33.6	\$45.4	\$24.8
<b>Delta</b>	<b>\$54.6</b>	<b>\$43.2</b>	<b>\$41.8</b>	<b>\$31.3</b>	<b>\$50.6</b>

# Non-GAAP Income Statement

<i>In Millions</i>	<u>ASC 606</u> Q1 2018	<u>ASC 606</u> Q2 2018	<u>ASC 606</u> Q3 2018	<u>ASC 606</u> Q4 2018	<u>ASC 606</u> Q1 2019	
Revenue	\$46.4	\$56.5	\$59.8	\$68.5	\$48.4	Driven by the structure and timing of key deals. Year over year growth from product revenue, royalties and incremental licensing agreements
Total Operating Expenses <sup>1</sup>	\$68.7	\$66.8	\$67.6	\$61.6	\$67.3	Managed expenses through refocus on core growth initiatives. Adoption of ASC 842 in Q1'19 increased operating expense with corresponding decrease in interest expense
Operating Income (Loss) <sup>1</sup>	(\$22.3)	(\$10.3)	(\$7.9)	\$6.9	(\$18.9)	Operating results under ASC 606 do not reflect significant cash flow from fixed-fee licensing arrangements
Cash from Operations	\$16.8	\$3.6	\$31.6	\$35.1	\$28.8	Consistent performance in line with expectations

<sup>1</sup>Please refer to reconciliations of non-GAAP financial measures included in this presentation and in our earnings release

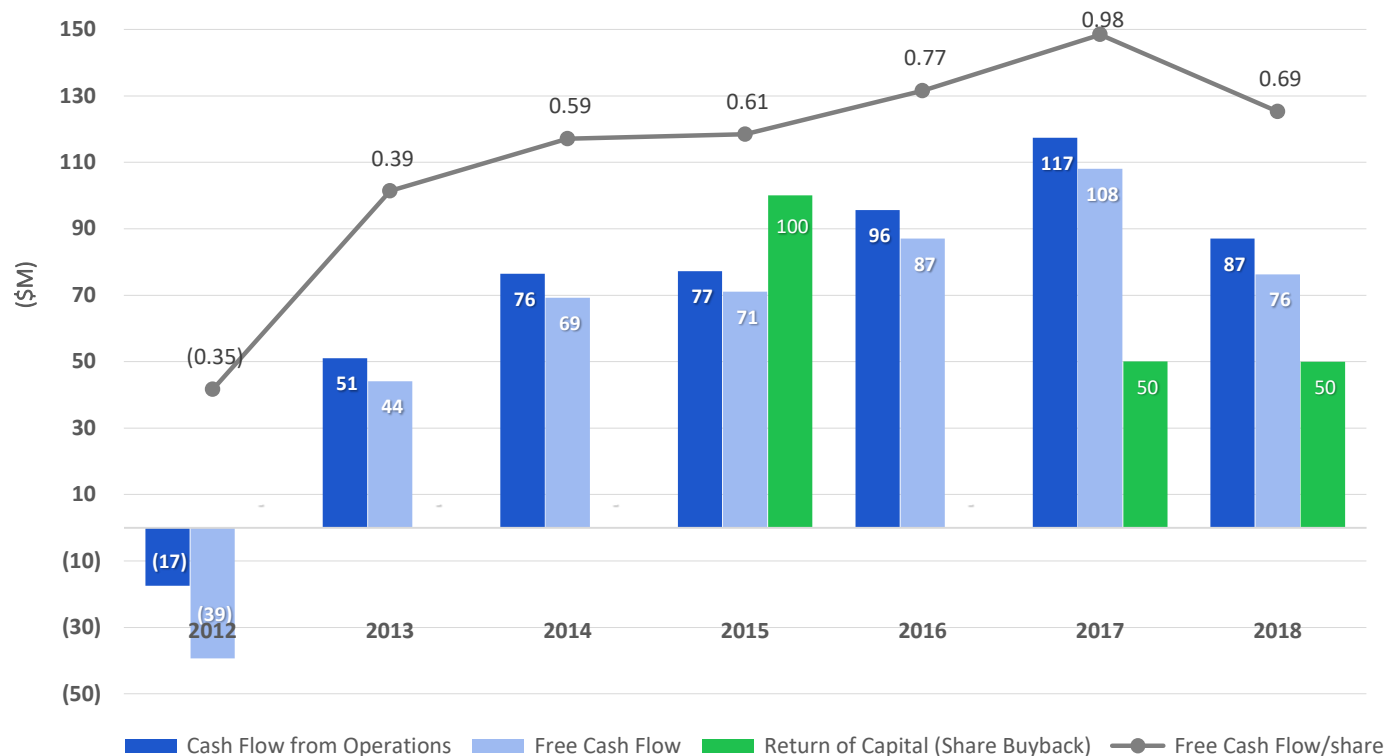
# Financial Strength

<i>In Millions</i>	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	
Total Cash & Marketable Securities	\$291.2	\$298.3	\$248.2	\$277.8	\$305.9	Issued \$172.5M convert and extinguished \$56.8M of debt in Q4 2017 and \$81.2M of debt in Q3 2018
Total Assets	\$1,539.7	\$1,525.8	\$1,344.0	\$1,361.1	\$1,321.4	Strong balance sheet with limited debt  \$50M of cash used for share repurchases in Q1 2018  \$674M and \$629M contract assets in Q4 2018 and Q1 2019 respectively, related to ASC 606 adoption
Stockholders' Equity	\$1,119.0	\$1,105.5	\$1,008.3	\$1,012.1	\$999.9	
Cash from Operations	\$16.8	\$3.6	\$31.6	\$35.1	\$28.8	Continued strong cash performance

<sup>1</sup>Please refer to reconciliations of non-GAAP financial measures included in this presentation and in our earnings release

# Strong Cash From Operations

Low Capital Expenditure, Consistent Return to Shareholders



- Predictable revenue stream provides consistent cash flow
- Returned \$200M of cash to shareholders from 2015 through 2018 through Accelerated Share Repurchase programs

# Rambus Investment Summary

- Focus on core strength in semiconductor

Targeting high-growth data center and edge markets with steady growth in product revenue

- Solid foundation of committed, long-term revenue

Continued profitable growth with high, predictable margin from reoccurring royalties and fees

- Strong balance sheet to support strategic initiatives

Consistent generation of cash from operations



Thank you

***Rambus***  
***Data*** • Faster • Safer



# Reconciliation of Non-GAAP Financial Measures

Net Income (Loss) in Millions	Q1 2018 (ASC 606)	Q2 2018 (ASC 606)	Q3 2018 (ASC 606)	Q4 2018 (ASC 606)	Q1 2019 (ASC 606)
GAAP Net Loss	(\$36)	(\$15)	(\$105)	(\$2)	(\$27)
Adjustments:					
Stock-based compensation	\$8	\$2	\$6	\$6	\$7
Acquisition-related transaction costs & retention bonus	\$0	\$0	\$0	\$0	\$0
Amortization	\$11	\$9	\$5	\$5	\$5
Restructuring charges	\$3	(\$1)	\$0	\$0	\$0
Non-cash interest expense	\$3	\$3	\$2	\$2	\$2
Provision for (benefit from) income taxes	(\$0)	(\$0)	\$90	(\$2)	\$3
Non-GAAP Net Income (Loss)	(\$11)	(\$3)	(\$1)	\$9	(\$9)

Operating Income (Loss) in Millions	Q1 2018 (ASC 606)	Q2 2018 (ASC 606)	Q3 2018 (ASC 606)	Q4 2018 (ASC 606)	Q1 2019 (ASC 606)
GAAP Operating Loss	(\$44)	(\$20)	(\$19)	(\$4)	(\$31)
Adjustments:					
Stock-based compensation	\$8	\$2	\$6	\$6	\$7
Acquisition-related transaction costs & retention bonus	\$0	\$0	\$0	\$0	\$0
Amortization	\$11	\$9	\$5	\$5	\$5
Restructuring charges	\$3	(\$1)	\$0	\$0	\$0
Non-GAAP Operating Income (Loss)	(\$22)	(\$10)	(\$8)	\$7	(\$19)
Depreciation	\$3	\$3	\$3	\$3	\$3
Adjusted EBITDA	(\$19)	(\$7)	(\$5)	\$10	(\$16)

Certain amounts may be off \$1.0M due to rounding.

# GAAP & Non-GAAP P&L

<u>ASC 606</u> In \$ Millions	GAAP Actual Q1'19	Pro Forma Actual Q1'19	Delta to GAAP
Revenue	48.4	48.4	-
Cost of revenue	11.2	7.3	(3.9)
Research and development	40.6	37.4	(3.2)
Sales, general and administrative	27.6	22.6	(5.0)
Restructuring charges	0.3	0.0	(0.3)
Total operating costs and expenses	79.8	67.3	(12.5)
Operating loss	(31.4)	(18.9)	12.5
Interest and other income (expense), net	5.1	6.8	1.7
Loss before income taxes	(26.3)	(12.1)	14.2
Income tax provision	0.3	2.9	2.6
Net loss	(26.6)	(9.2)	17.4

Certain amounts may be off \$0.1M due to rounding.

# Non-GAAP Provision for (Benefit from) Income Taxes

ASC 606 In \$ Millions	Actual Q1'19	Actual Q4'18	Variance QoQ
Provision for income taxes (GAAP)	0.3	1.8	
Adjustment to GAAP provision for income taxes	(3.2)	1.2	
<b>Non-GAAP provision for (benefit from) income taxes</b>	<b>(2.9)</b>	<b>3.0</b>	<b>(5.9)</b>

## Supplemental Reconciliation of GAAP to Non-GAAP Effective Tax Rate (1)

	Actual Q1'19	Actual Q4'18	Variance QoQ
GAAP effective tax rate	(1)%	(894)%	
Adjustment to GAAP effective tax rate	25%	918%	
<b>Non-GAAP effective tax rate</b>	<b>24%</b>	<b>24%</b>	<b>0.0</b>

(1) For purposes of internal forecasting, planning and analyzing future periods that assume net income from operations, the Company estimates a fixed, long-term projected tax rate of approximately 24 percent for both 2018 and 2019, which consists of estimated U.S. federal and state tax rates, and excludes tax rates associated with certain items such as withholding tax, tax credits, deferred tax asset valuation allowance and the release of any deferred tax asset valuation allowance. Accordingly, the Company has applied these tax rates to its non-GAAP financial results for all periods in the relevant year to assist the Company's planning. Certain amounts may be off by \$0.1M due to rounding.

# Revenue Breakdown

In Millions

	ASC 606					ASC 606
Rambus	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19
Royalty Revenue	\$21.4	\$30.0	\$33.6	\$45.4	\$130.5	\$24.8
Product Revenue	\$7.3	\$8.1	\$11.8	\$11.5	\$38.7	\$9.0
Contract and Other Revenue	\$17.7	\$18.3	\$14.4	\$11.6	\$62.0	\$14.6
<b>Total</b>	<b>\$46.4</b>	<b>\$56.5</b>	<b>\$59.8</b>	<b>\$68.5</b>	<b>\$231.2</b>	<b>\$48.4</b>

MID	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19
Royalty Revenue	\$19.5	\$18.3	\$27.3	\$40.3	\$105.4	\$19.4
Product Revenue	\$6.3	\$7.6	\$11.3	\$11.1	\$36.4	\$8.8
Contract and Other Revenue	\$8.2	\$9.1	\$5.4	\$4.2	\$26.8	\$6.3
<b>Total</b>	<b>\$34.0</b>	<b>\$35.0</b>	<b>\$44.0</b>	<b>\$55.6</b>	<b>\$168.6</b>	<b>\$34.5</b>

RSD	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19
Royalty Revenue	\$1.5	\$11.8	\$6.3	\$5.1	\$24.6	\$5.4
Product Revenue	\$0.1	\$0.4	\$0.5	\$0.4	\$1.4	\$0.2
Contract and Other Revenue	\$8.5	\$9.3	\$9.0	\$7.4	\$34.2	\$8.3
<b>Total</b>	<b>\$10.0</b>	<b>\$21.5</b>	<b>\$15.8</b>	<b>\$12.9</b>	<b>\$60.2</b>	<b>\$13.9</b>

RLD	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19
Royalty Revenue	\$0.4	\$0.0	\$0.0	\$0.0	\$0.4	\$0.0
Product Revenue	\$0.9	\$0.0	\$0.0	\$0.0	\$0.9	\$0.0
Contract and Other Revenue	\$1.1	\$0.0	\$0.0	\$0.0	\$1.1	\$0.0
<b>Total</b>	<b>\$2.4</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$2.4</b>	<b>\$0.0</b>

Certain amounts may be off \$0.1M due to rounding.

# Revenue and Licensing Billings

In Thousands

	ASC 606					ASC 606	ASC 605				
Rambus	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018
Royalty Revenue	\$21,374	\$30,049	\$33,599	\$45,430	\$130,452	\$24,853	\$77,174	\$73,626	\$75,704	\$76,717	\$303,221
Product Revenue	\$7,313	\$8,087	\$11,753	\$11,537	\$38,690	\$8,964	\$7,556	\$8,221	\$11,753	\$11,867	\$39,397
Contract and Other Revenue	\$17,739	\$18,322	\$14,402	\$11,596	\$62,059	\$14,567	\$15,729	\$16,973	\$12,383	\$13,398	\$58,483
<b>Total</b>	<b>\$46,426</b>	<b>\$56,458</b>	<b>\$59,754</b>	<b>\$68,563</b>	<b>\$231,201</b>	<b>\$48,384</b>	<b>\$100,459</b>	<b>\$98,820</b>	<b>\$99,840</b>	<b>\$101,982</b>	<b>\$401,101</b>

Rambus	Q1'18	Q2'18	Q3'18	Q4'18	FY 2018	Q1'19
Royalty Revenue	\$21,374	\$30,049	\$33,599	\$45,430	\$130,452	\$24,853
Licensing Billings <sup>1</sup>	\$75,924	\$73,210	\$75,374	\$76,717	\$301,225	\$75,460
<b>Delta</b>	<b>\$54,550</b>	<b>\$43,161</b>	<b>\$41,775</b>	<b>\$31,287</b>	<b>\$170,773</b>	<b>\$50,607</b>

<sup>1</sup> Licensing billings is an operational metric that reflects amounts invoiced to our patent and technology licensing customers during the period, as adjusted for certain differences.

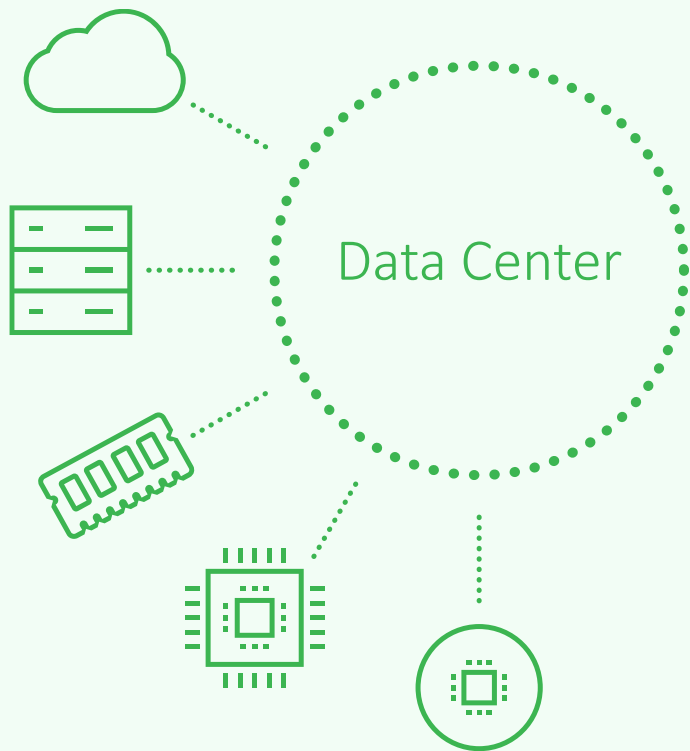


# Product Overview

***Rambus***  
**Data** • Faster • Safer

# The Data Center

Data • Faster



## • Cores

SerDes PHYs

Move data from chip to chip

Memory PHYs

Move data between chips and memory

## • Chips

Server DIMM Chipsets

Enables more capacity at high performance

# SerDes PHYs

**Rambus**  
Data • Faster • Safer

Optimized for power and area, our line-up of SerDes Interface solutions deliver maximum performance and flexibility for today's most challenging systems.

## Fully Standards-Compatible

- Compliant with the latest industry-standard specifications
- Support for multi-modal functionality

## Enhanced Design Flexibility

- Support for multiple packaging options
- Enhanced margin and yield

## Reduced Power

- Improved power efficiency
- Lower signaling and stand-by power

## Improved Performance

- Increased data rates
- Improved bandwidth
- Higher capacity



# Rambus High-Speed SerDes PHY Solutions

Complete Solutions: SerDes PMA+ PCS, MAC (Partners)

## 16G

28nm & 14nm

- PCIe 4/3/2
- CEI 11/6
- XFI/XAUI
- SATA
- SAS



## 28G

14nm

- CEI-28/25/11
- 100/10GbE
- FC28
- XFI/XAUI



## 56G

10nm

- CEI-56G MR
- CEI-56G LR
- CEI-28/25/11
- 400/100GbE
- PAM-4/NRZ

LEAD CUSTOMERS

## 112G

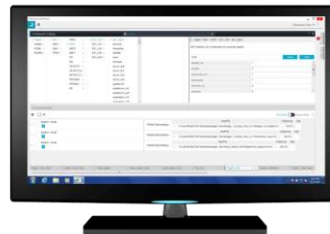
7nm

- CEI-112G LR
- CEI-56/28/25
- 800/400/200/100GbE
- PAM-4/NRZ

ROAD MAP:

- CEI-112G XSR

Integrated tools for easy bring-up and characterization



LabStation Platform

- Easy-to-use PC Interface
- Interface to 3<sup>rd</sup> party software
- Pre-defined test scripts
- PHY control settings
- External instrument control
- System characteristics and analysis

Validated solutions with partners





# Memory PHYs

**Rambus**  
Data • Faster • Safer

With their reduced power consumption and industry-leading data rates, our line-up of enhanced memory interface solutions support a broad range of industry standards with improved margin and flexibility.

## Fully Standards-Compatible

- Compliant with the latest JEDEC and industry-standard specifications
- Support for multi-modal functionality

## Enhanced Design Flexibility

- Support for multitude packaging options
- Enhanced margin and yield

## Reduced Power

- Improved power efficiency
- Lower signaling and stand-by power

## Improved Performance

- Increased data rates
- Improved bandwidth
- Higher capacity

# Rambus Memory PHY Solutions

## Memory PHY Solutions for Networking and Data Center

### DDR4/3

28nm & 14nm

- 3200Mbps
- x16 – x72-bits
- 1-4 Ranks
- DFI 4.0



### HBM2

14nm

- 2000Mbps
- 1024-bit
- 2.5D design architecture



### GDDR6

- 12-16 Gbps
- 2x 16-bit channels

In Development

### DDR5 & HBM3

ROADMAP

## Integrated tools for easy bring-up and characterization



LabStation Platform

- Easy-to-use PC Interface
- Interface to 3<sup>rd</sup> party software
- Pre-defined test scripts
- PHY control settings
- External instrument control
- System characteristics and analysis

## Validated solutions with partners



ARM



# Server DIMM Chipsets

Built for speed, power efficiency and reliability, the DDRn chipsets for RDIMM, LRDIMM and NVDIMM server modules delivers the top-of-the-line performance and capacity needed to meet the growing demands on enterprise and data center systems.

## Industry-leading Performance

- Fully-compliant with the latest JEDEC standards
- Operational speeds up to 3200 Mbps

## Enhanced Margin

- Wide margin I/O design with advanced programmability
- Exceed JEDEC reliability standards for ESD and EOS

## Optimized Power

- Advanced power management
- Frequency-based, low-power optimization

## Superior Debug and Serviceability

- Integrated tools for bring-up and debug
- Works out-of-the-box with no BIOS changes required

# Rambus Server DIMM Chipset Solutions

Server DIMM Chipsets: enabling performance and capacity

## DDR3

DB & RCD

- JEDEC Compliant
- Speeds up to 2133
- Multiple OEM qualifications

AVAILABLE IN  
PRODUCTION

## DDR4

DB & RCD

- JEDEC Compliant
- Speeds up to 3200
- Multiple OEM qualifications

AVAILABLE IN  
PRODUCTION

## NV

DDR4 NVRCD

- JEDEC Compliant
- Speeds up to 3200
- Ongoing qualifications

AVAILABLE IN  
PRODUCTION

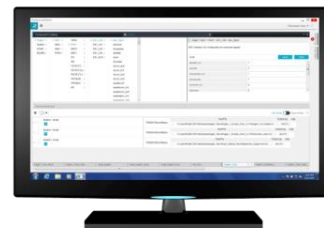
## DDR5

DB & RCD

- Consistent with JEDEC direction

UNDER  
DEVELOPMENT

Smart tools for easy integration and reduced time to market



LabStation Platform  
and Buffer BIOS Integration Tool

Validated solutions with partners

**SAMSUNG**



# The Mobile Edge

Data • Safer

## Embedded Security

Secure Cores

Embedded device protection

CryptoManager Platform

Secure provisioning and key management

## Secure Services

CryptoManager Trusted Services

IoT Security Service

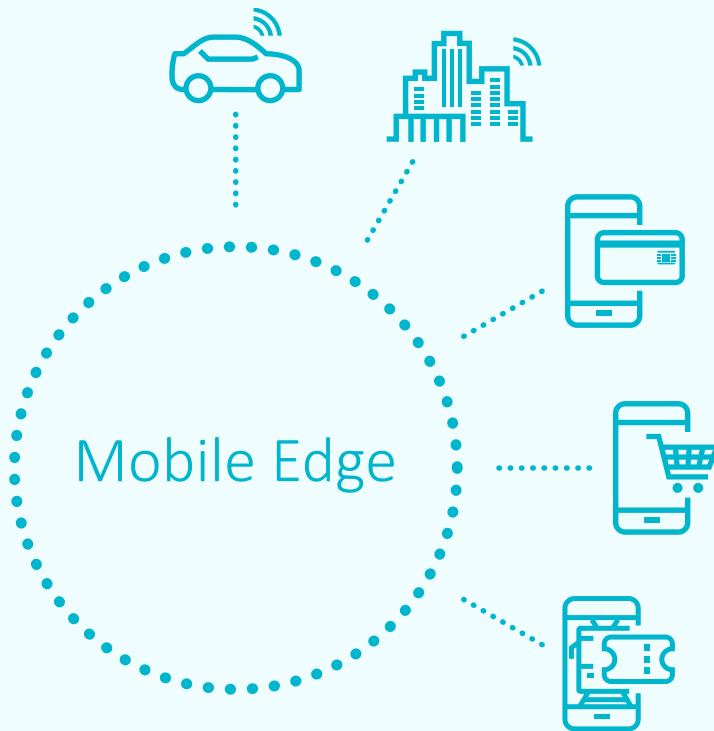
## Secure Software

Mobile Payments

Secure payments and trusted transactions

Smart Ticketing

Simplified travel with mobile ticketing

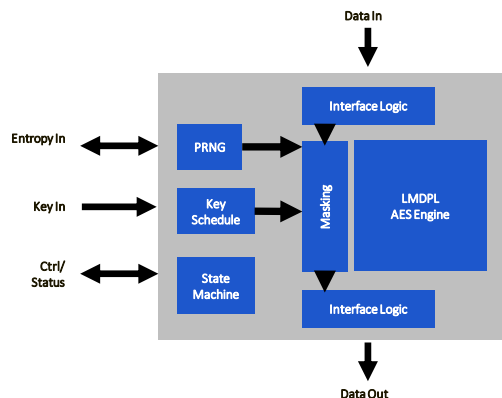


# Secure Silicon IP

## DPA Countermeasures

### Cores, Software, and Workstation

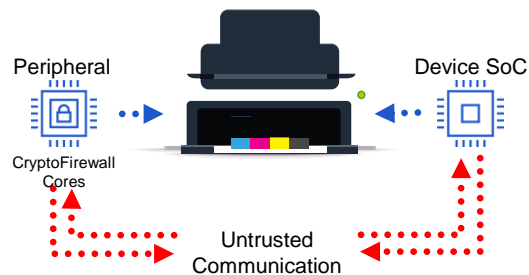
- Cores and services
- Accelerate integration & TTM



## Anti-Counterfeiting

### CryptoFirewall Cores

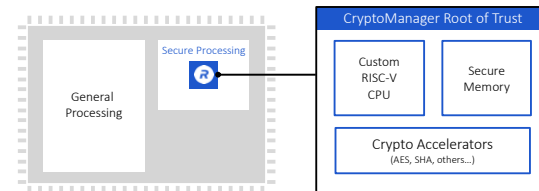
- Consumable authentication
- Major printer OEMs



## Hardware Root of Trust

### CryptoManager Root of Trust

- Siloed, layered security co-processor
- Designed with security as the #1 priority, not speed





A photograph of three people sitting on a brown leather couch. On the left, a man in a tan blazer is using a silver laptop. In the middle, a woman in a blue top is holding a tablet. On the right, a woman in a red top is holding a smartphone. They are all smiling and looking at their devices. The background is a plain, light-colored wall.

# CryptoManager Security Platform

**Rambus**  
Data • Faster • Safer

From security cores to high-performance secure device provisioning, the CryptoManager Security platform is a family of hardware security cores and provisioning infrastructure that creates a trusted path from the SoC manufacturing supply chain to downstream service providers with a complete silicon-to-cloud security solution.

## Improved Profitability

- Improved time-to-market and reduced inventory waste
- Dynamic SKU and feature management lowers inventory costs
- Reduced operating costs through unified manufacturing and provisioning systems

## Superior Security

- Provide a robust hardware root-of-trust
- Secure valuable secret keys, identity credentials, intellectual property, and other sensitive data
- Protect against cloning, counterfeiting, and reverse engineering

## Control the Value Chain

- Actively monitor production status, availability, and inventory levels
- Validate process information through secure logs
- Proven in today's high-volume manufacturing facilities



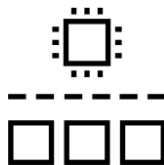
# Root of Trust: Implementing Trust by Design in Silicon

## Design Freedom



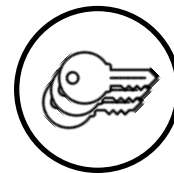
- Root of trust designed from the bottom up for security
- Control all implementation starting with open RISC-V Instruction Set Architecture

## Siloed



- Separate general and secure processing
- Optimize independently for performance and security

## Layered Security

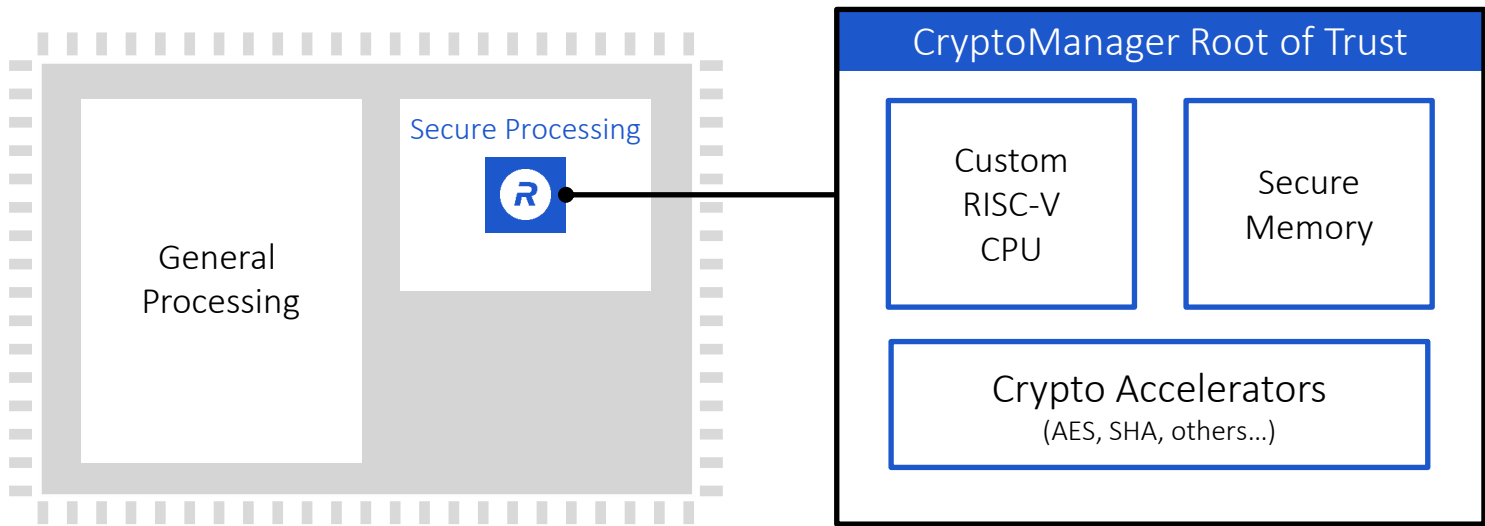


- Strongest security enforced in hardware at inner layer
- Outer layers are more flexible, but less trusted

# CryptoManager Root of Trust

## Secure Functionality:

- Secure Boot
- Remote Attestation
- Authentication
- Runtime Integrity



# CryptoManager Embedded Security Infrastructure

## Offline Root Server

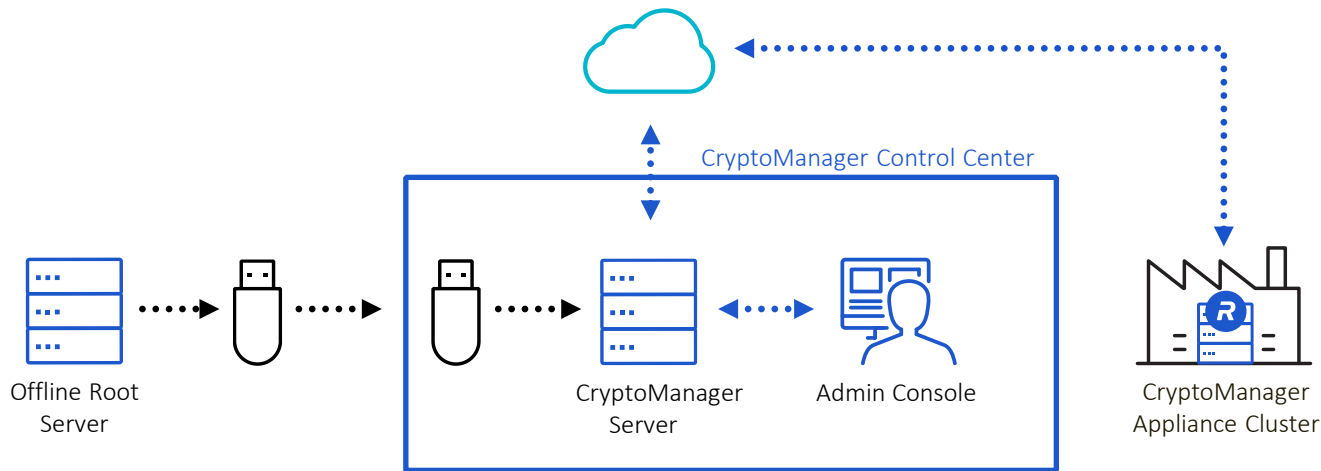
System Root-of-Trust, manages high value keys, kept in secure facility, authorizes all provisioning activity

## CryptoManager Service

Control center used for monitoring and managing all provisioning activity, typically located in chip maker data center

## CryptoManager Appliances

Tamper proof HSM-enabled devices that connect directly to testers in the manufacturing facility



# Payments & Tokenization

**Rambus**  
Data • Faster • Safer

Comprehensive solutions for banks, financial institutions and retailers alike. From Host Card Emulation (HCE) and OEM Pays, to retail scan and go with real-time loyalty redemption, to tokenization of real-time payments (RTP) and Automated Clearing House (ACH) transactions, to blockchain, Rambus software and services, secure a wide range of applications for customers worldwide.

## Improved Time-to-market

- Reduce implementation time with proven solutions for mobile, direct debit and credit, and retail payments
- Vertically integrated to provide a comprehensive solution

## Enhanced User Experience

- Retain branding and drive digital engagement with bank and retail mobile wallets
- Increase customer adoption with support for major mobile payment platform

## Superior Security

- Utilizes tokenization to reduce risk of card-and account-based fraud
- Provides layered security with cryptograms, domain controls and tokenization

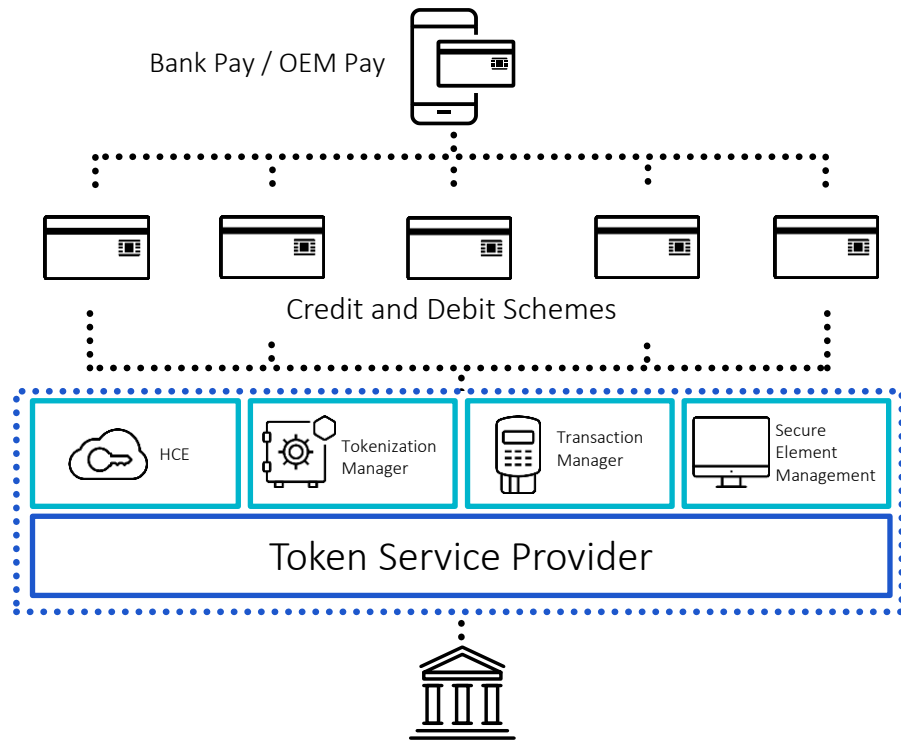
## Reduced Cost

- Integrates with existing infrastructure and processes
- Supports closed- loop payments to reduce transaction fees

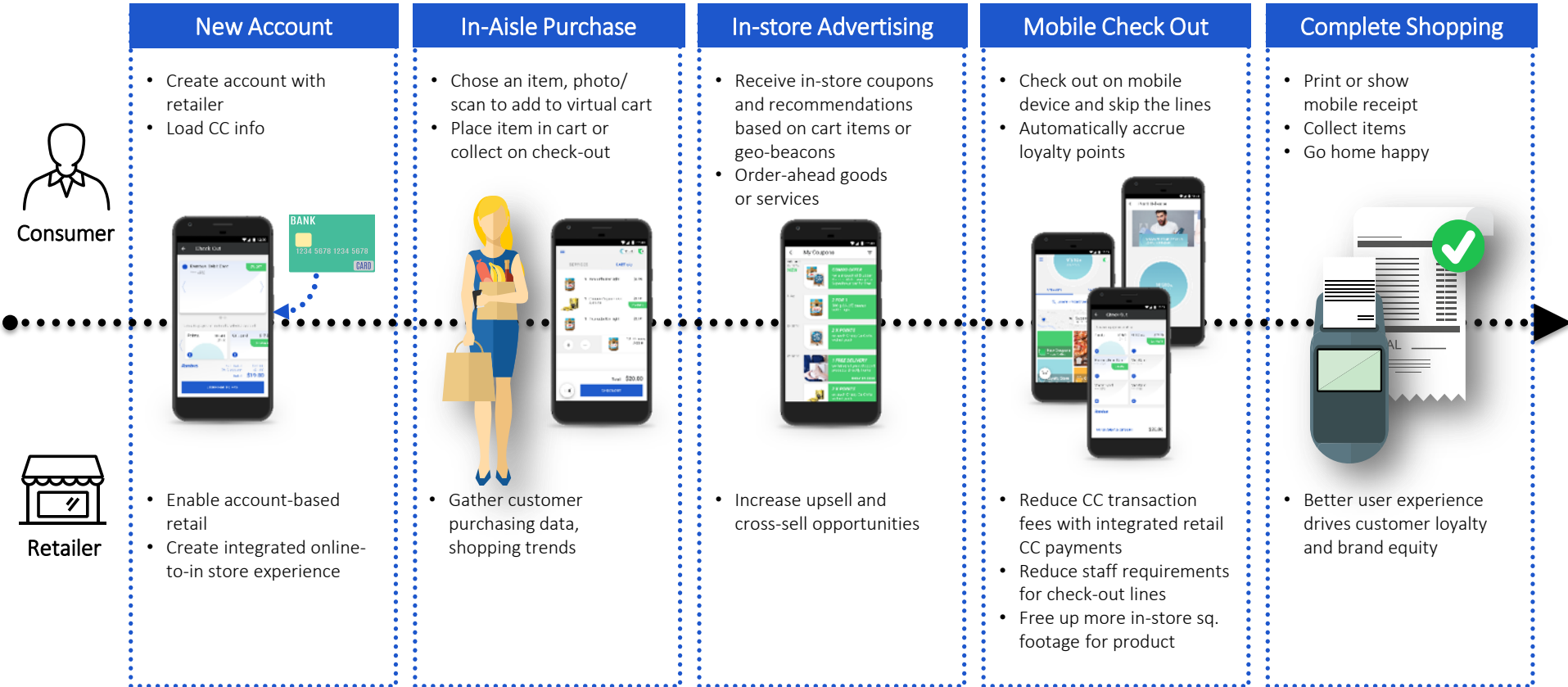
# Enabling Mobile Payments for NFC Devices

## Token Service Provider

- Leverages Host Card Emulation (HCE) and tokenization to enable secure mobile payments
- Single interface to connect with multiple schemes and OEM Pay platforms
- Maintained up-to-date with latest TSP specifications



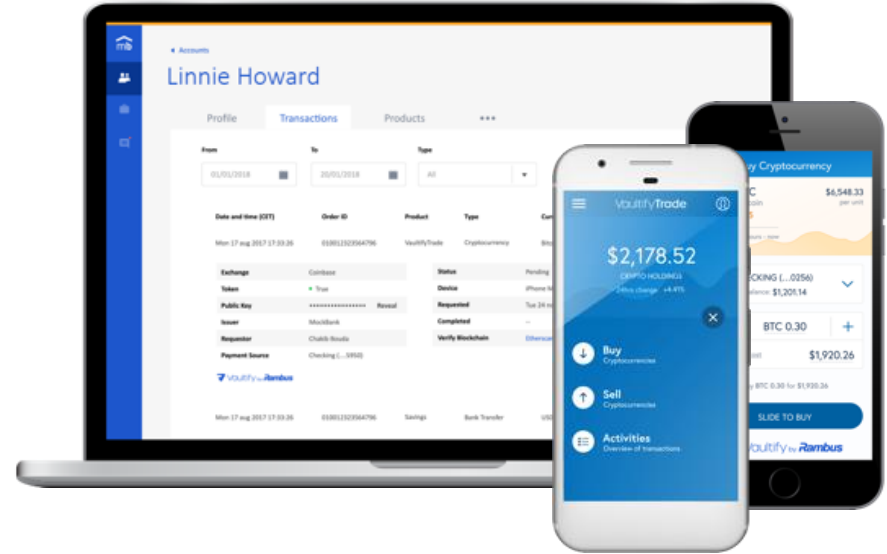
# Scan and Go with In-aisle Check Out



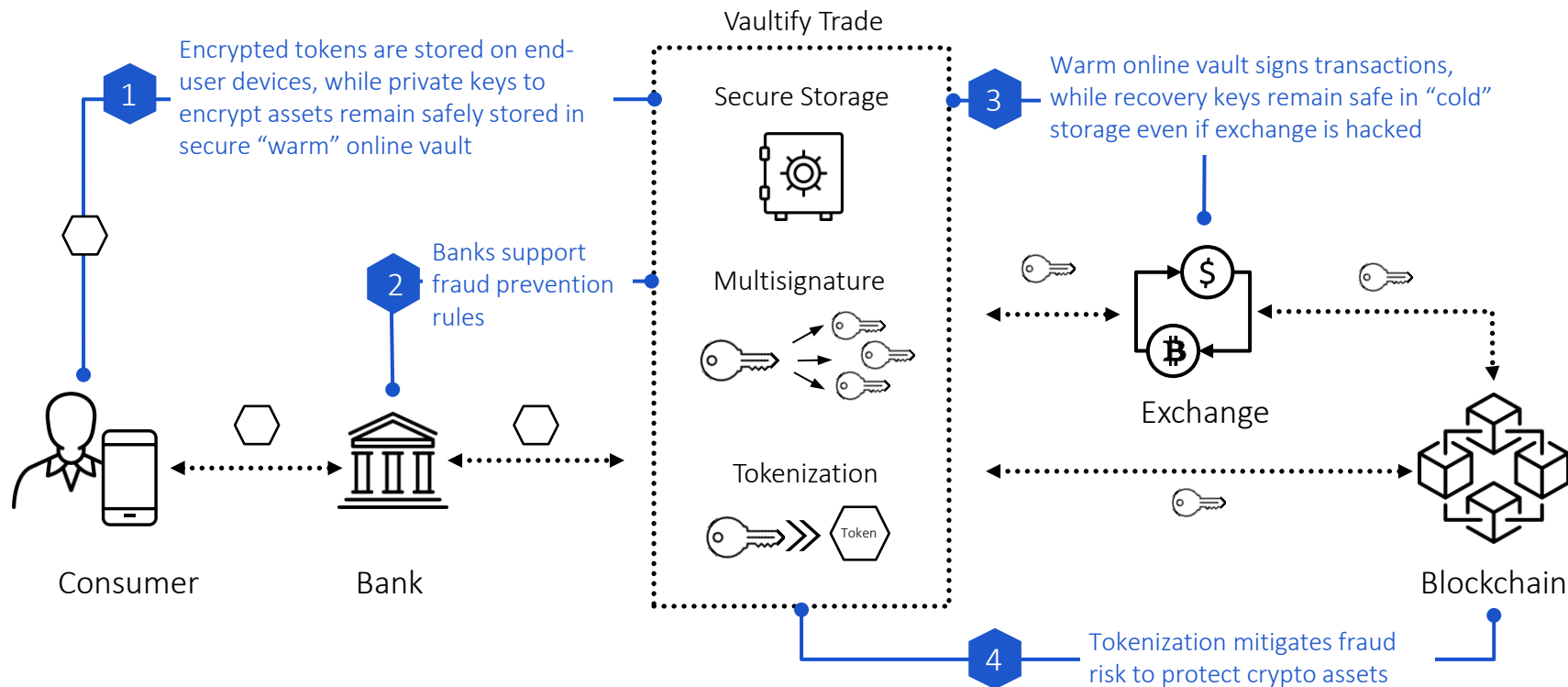
# Vaultify Trade

A Tokenization platform for the secure transaction and storage of digital assets on blockchain

- Combines multi-signature with bank-grade tokenization to enhance security, confidentiality and privacy of private keys
- First solution to enable banks, exchanges and investment companies to leverage tokens to securely buy, sell, trade and store crypto assets
- Integrates with existing mobile banking, trading and wallet apps for easy access to crypto assets



# Improving Security of the Blockchain





# Smart Ticketing



Suitable for multi-modal transport solutions including rail, bus, ferry and taxi, our end-to-end smart ticketing solutions can be implemented in any transport scenario.

## Ease of Integration

- Comprehensive solutions from back office, to mobile device, to smart card
- Compatible with existing smart systems and suppliers

## Improved Profitability

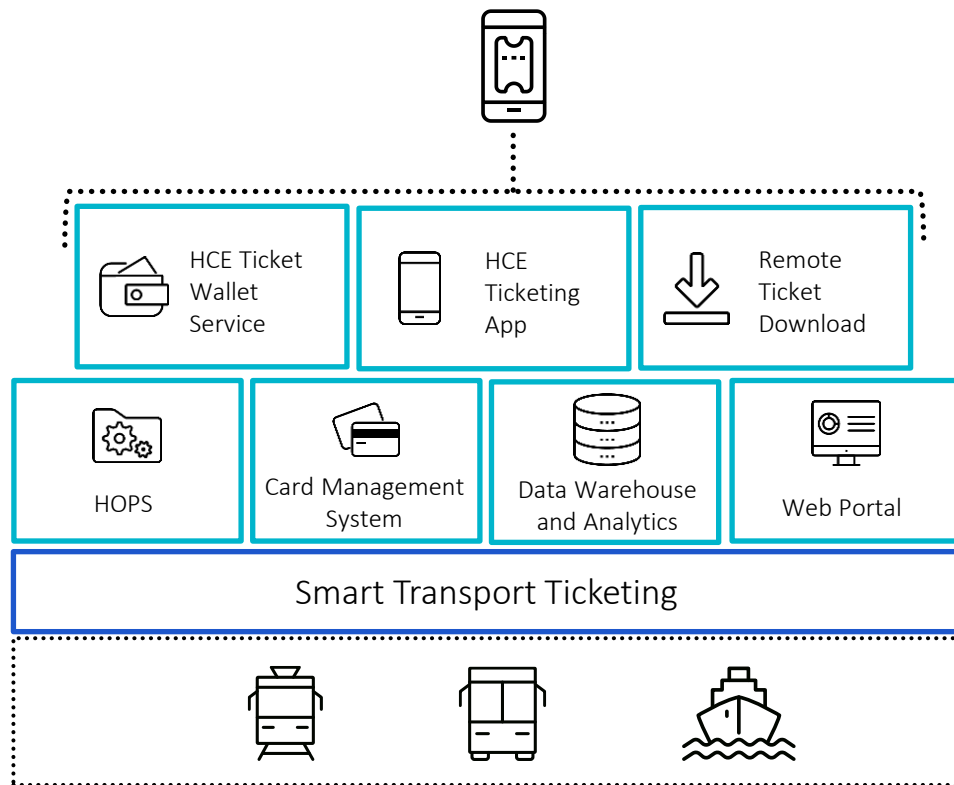
- Enhanced business intelligence through account-based ticketing and data analytics
- Easy management of transaction data to ensure correct reimbursements

## Superior Security

- Reduced risk of fraud with smart technology versus paper tickets

# Comprehensive Smart Ticketing Solutions

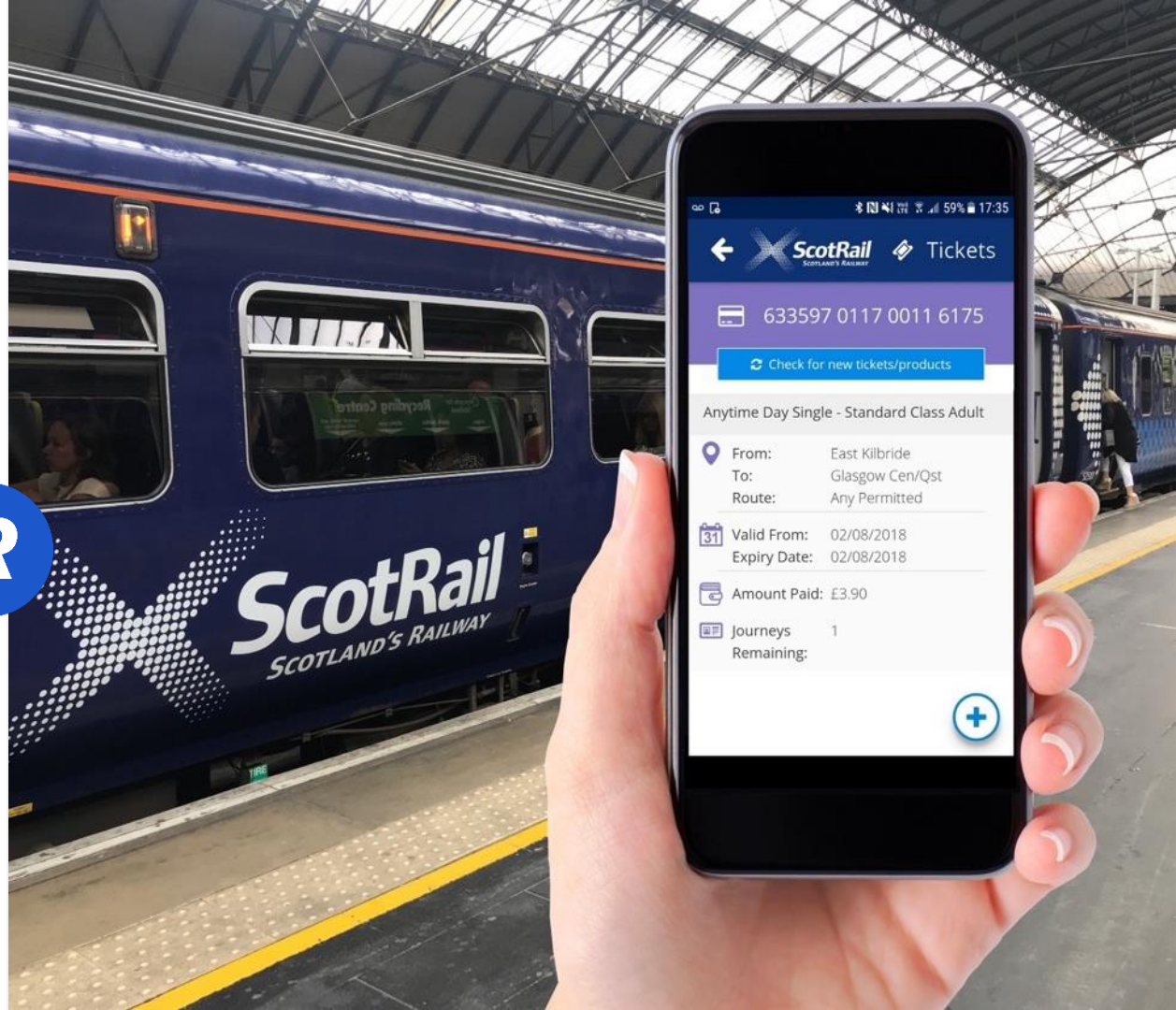
- End-to-end smart ticketing solutions from back-office processing and traveler analytics, to online purchasing and remote download of tickets
- Leverages secure NFC and mobile technology to replace paper tickets
- Integrated systems for operators to manage passenger journey transactions and analytics to optimize transport systems



# Rambus Ticketing

First to bring Smart Mobile Ticketing to Rail in UK

Enabling passengers on Scotland's national railway to use their smartphone to purchase tickets and simply tap to travel





Thank You

***Rambus***  
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