



Capital Markets Day 2023

13 January 2023



Welcome

Jose Cano, Global Head of Investor Relations

Forward-Looking Statement

Certain statements included herein may constitute forward-looking statements within the meaning of the securities laws of certain jurisdictions. Certain such forward-looking statements can be identified by the use of forward-looking terminology such as “believes”, “expects”, “may”, “are expected to”, “intends”, “will”, “will continue”, “should”, “would be”, “seeks”, “anticipates” or similar expressions or the negative thereof or other variations thereof or comparable terminology. These forward-looking statements include all matters that are not historical facts. They include statements regarding Alphawave IP Group Plc’s (“Alphawave IP”) intentions, beliefs or current expectations concerning, amongst other things, its results in relation to operations, financial condition, prospects, growth, strategies and the industry in which it operates. By their nature, forward-looking statements involve risks and uncertainties because they relate to events and depend on circumstances that may or may not occur in the future. Forward-looking statements are not guarantees of future performance and Alphawave IP’s actual results of operations, financial condition, and the development of the industry in which it operates, may differ materially from those made in or suggested by the forward-looking statements contained in this Presentation. In addition, even if Alphawave IP’s results of operations, financial condition, or the development of the industry in which it operates are consistent with the forward-looking statements contained in this Presentation, those results or developments may not be indicative of results or developments in subsequent periods. Important factors that could cause those differences include, but are not limited to customer demand, Alphawave IP’s innovation and R&D and technology capabilities, target market trends, industry trends, customer activities and end-market trends, market acceptance of Group technologies; increased competition; macroeconomic conditions; changes in laws, regulations or regulatory policies; and timing and success of strategic actions. These forward-looking statements speak only as of the date of this Presentation. As such, undue reliance should not be placed on forward-looking statements. Other than in accordance with legal and regulatory obligations, Alphawave IP undertakes no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.



Agenda

Welcome	Jose Cano, Head of Investor Relations
Consolidating Our Vision for the Business	John Lofton Holt, Founder and Executive Chair
Leading Connectivity Technology for the Age of Exponential Data Growth	Tony Pialis, Founder and CEO
The Future of Digital Infrastructure	Tony Chan Carusone, Chief Technology Officer
QA Session	
15 Min. Break	
High-Performance IP	Jonathan Rogers, Founder and SVP Engineering
Monetising IP Through Custom Silicon	Mohit Gupta, SVP & GM Custom Silicon and IP
Connectivity Products – A New Business Opportunity	Babak Samimi, SVP & GM Connectivity Products
Financial Overview	Daniel Aharoni, Chief Financial Officer
QA Session	
Closing Remarks	Tony Pialis, Founder and CEO





Consolidating Our Vision For The Business

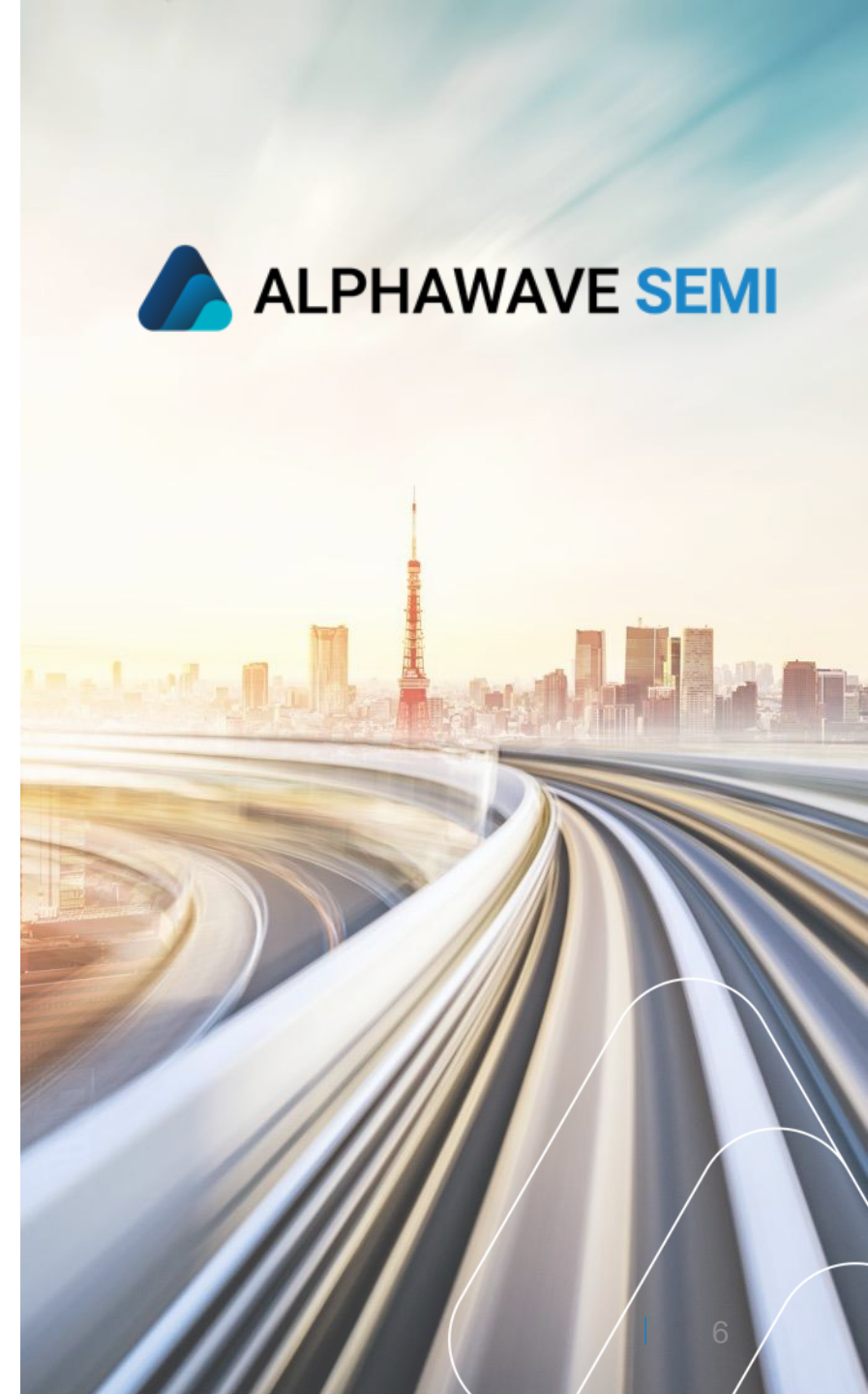
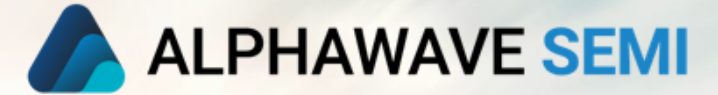
John Lofton Holt, Founder and Executive Chair

Introducing Our New Brand

- We are now a vertically integrated semiconductor company – bringing IP and silicon to customers
- Continues the technology leadership we built on high-speed connectivity IP
- Maintains the Alphawave brand that customers know and trust
- Builds on the credibility with key foundry partners
- Reflects our diverse, open, dynamic and technology-led culture



2022 Deloitte
Technology Fast 50™
and
North American
Technology Fast 500™

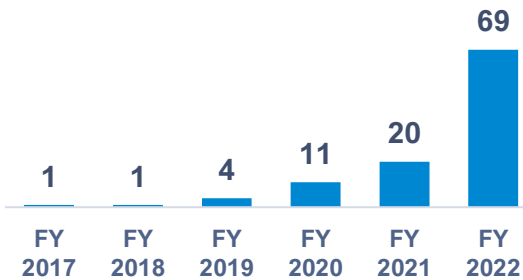


Focused on Delivering Results Since IPO...

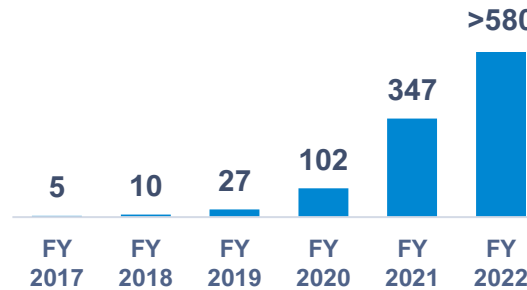
Strong Performance of Core IP Business



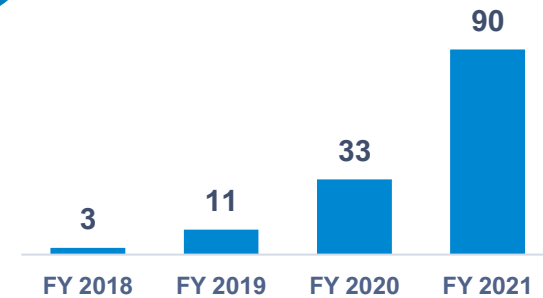
End Customers^{1,2}



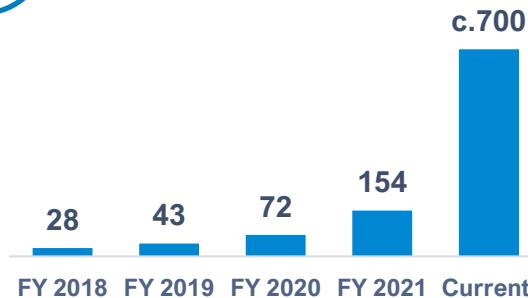
Cumulative Bookings² (US\$m)



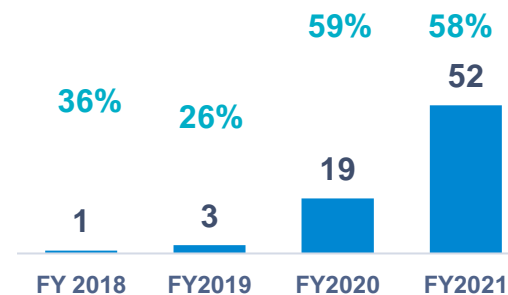
Revenue (US\$m)²



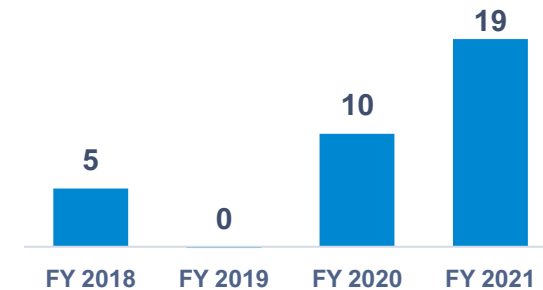
Employees²



Adjusted EBITDA² (US\$m) & Margin



Net Operating Cash Flow² (US\$m)



- 1 As reported in Q4 2022 trading update. Includes customers from OpenFive who were not already customers of Alphawave and who signed contracts over from 1st September 2022. Revenue generating customers will be reported at FY 2022 results
- 2 FY 2017 and FY 2018 as per IPO prospectus

...And Investing Capital to Deliver On Expansion Plan

While Considering Evolving Geopolitics and Uncertain Macro Environment



Scale team globally and in UK to maintain technology leadership at 112G and establish 224G lead in new products

Headcount increased from 132 in H1 2021 to c.700 FY2022E
First successful tape out 3nm
TSMC OIP Partner 2020-2022 & Samsung Innovation Award 2022



Land and Expand: Win new customers in new and existing markets, and win new designs at existing customers

From 16 to 28 revenue generating customers (H1 2021 to H1 2022)
H1 2022: Top 3 customers represented 40% of revenue (excluding WiseWave)



Expand growth globally, including key high-growth regions such as China

Increasing weight from North American customers in pipeline
Evolving go-to-market strategy in China
Future exit of WiseWave JV



Expand subscription and royalty revenue streams

3 large customers with subscription deals
Monetising IP via silicon opportunities



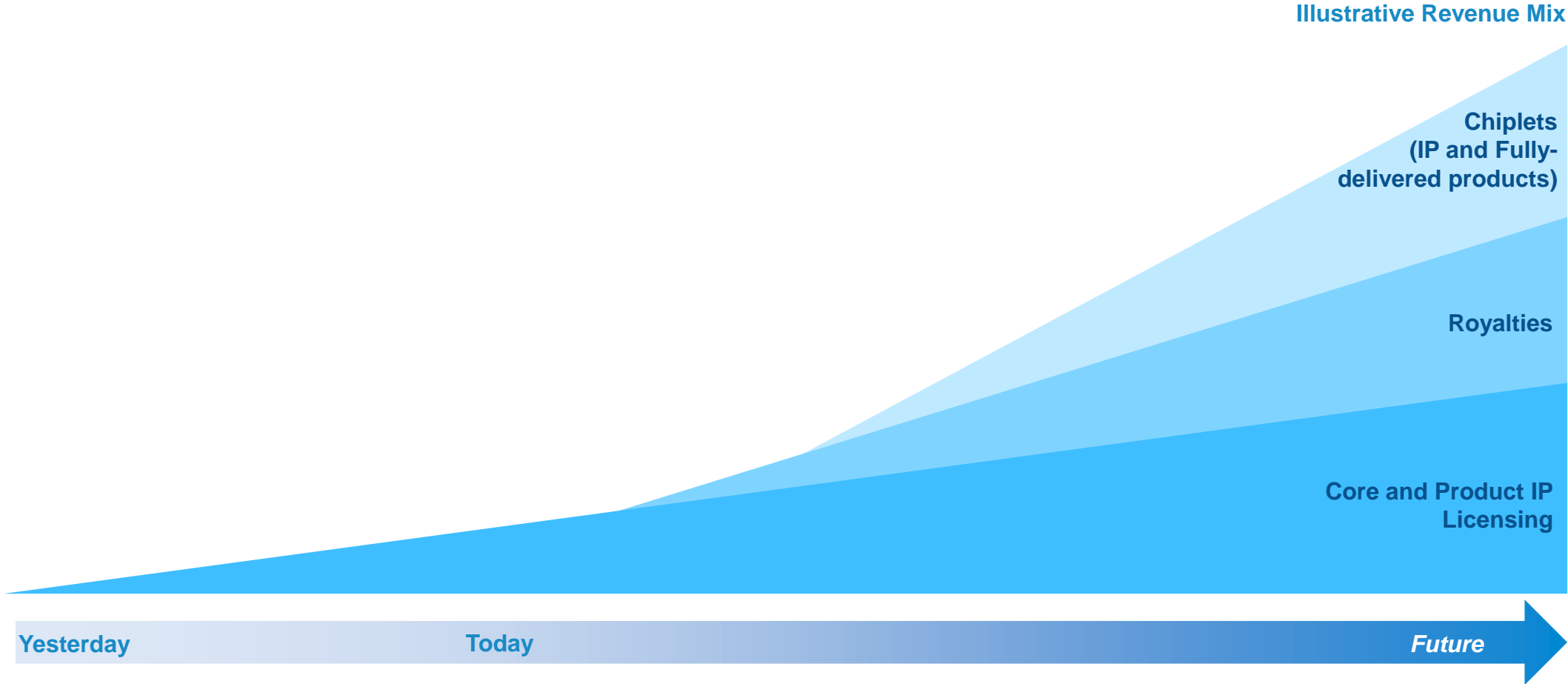
Address emerging chiplet market with chiplet IPs and eventually, manufactured chiplets

Custom silicon and advanced packaging expertise (OpenFive)
Accelerated transition – vertically integrated (hybrid business)



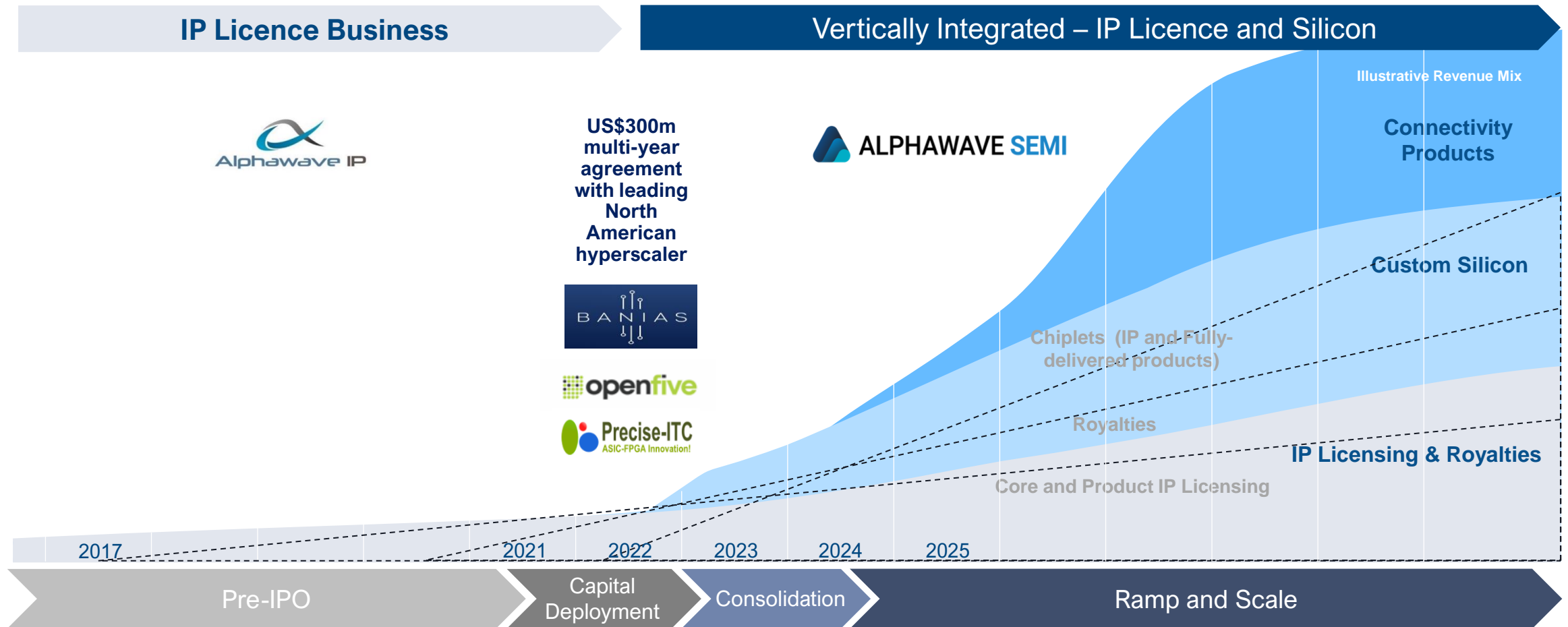
The Long-Term Vision at IPO

Driving long term scale through layered business models



Leading Connectivity Technology for Digital Infrastructure

Vertically Integrated - Monetising our IP Through IP Licence and Silicon



Drivers of Our Vision and Ambition



**Adapting to External Environment
and Stage of Our Business**



**Maximising Value For Our
Customers**



**Expand and Extend
Technology Leadership**



Greater Scale

Building a Leading Connectivity Business



Land and Expand



**High-Performance
Silicon IP and Products**

People and culture



Vertically Integrated



Alphawave's Commitment to ESG

Building the Team to Support a Responsible Business Expansion

- New hires in 2022 reinforcing our Governance, Finance and Comms functions
- ESG Steering Group to drive improvements and long-term sustainability strategy



Environmental

- Our products contribute to more sustainable data centers
- Fabless business model with relatively lower carbon footprint
- Ongoing commitment to actively manage and reduce our carbon footprint
- Environmental disclosures following TCFD recommendations



Social

- Talent identification and retention programme
- Commitment to Diversity & Inclusion
- Corporate values fostering innovation and the next wave of innovators
- University Relations, Internships, and Community Engagement programme



Governance

- Responsible Company – adhering to high standards as per our Code of Ethics and Business Conduct
- Increasing focus on Supply Chain Governance
- Head of Governance driving further improvements





Leading Connectivity Technology For The Age of Exponential Data Growth

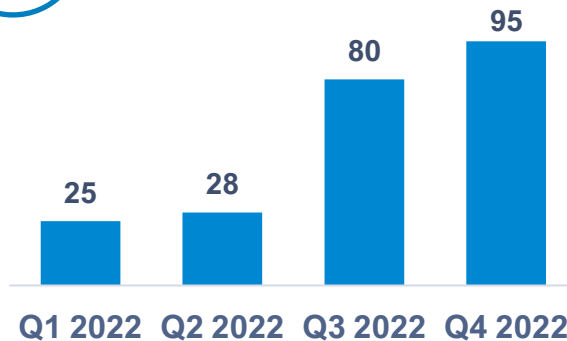
Tony Pialis, Founder and CEO

FY 2022 Bookings

H2 2022 Bookings Reflect Vertically Integrated Business Model

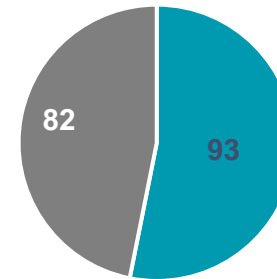


FY 2022 Bookings (US\$m)

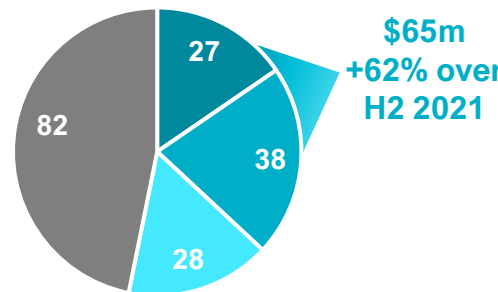


- 8 new design wins in Q4 2022
- Second design win with opto-electronics products
- Working with 7 of the top 10 semiconductor device companies¹

H2 2022 Bookings (US\$m)



- License and NRE
- Silicon and Royalties



- Stand alone IP
- Silicon + embedded AWE IP
- Silicon NRE
- Silicon and Royalties

US\$175m bookings in H2 2022

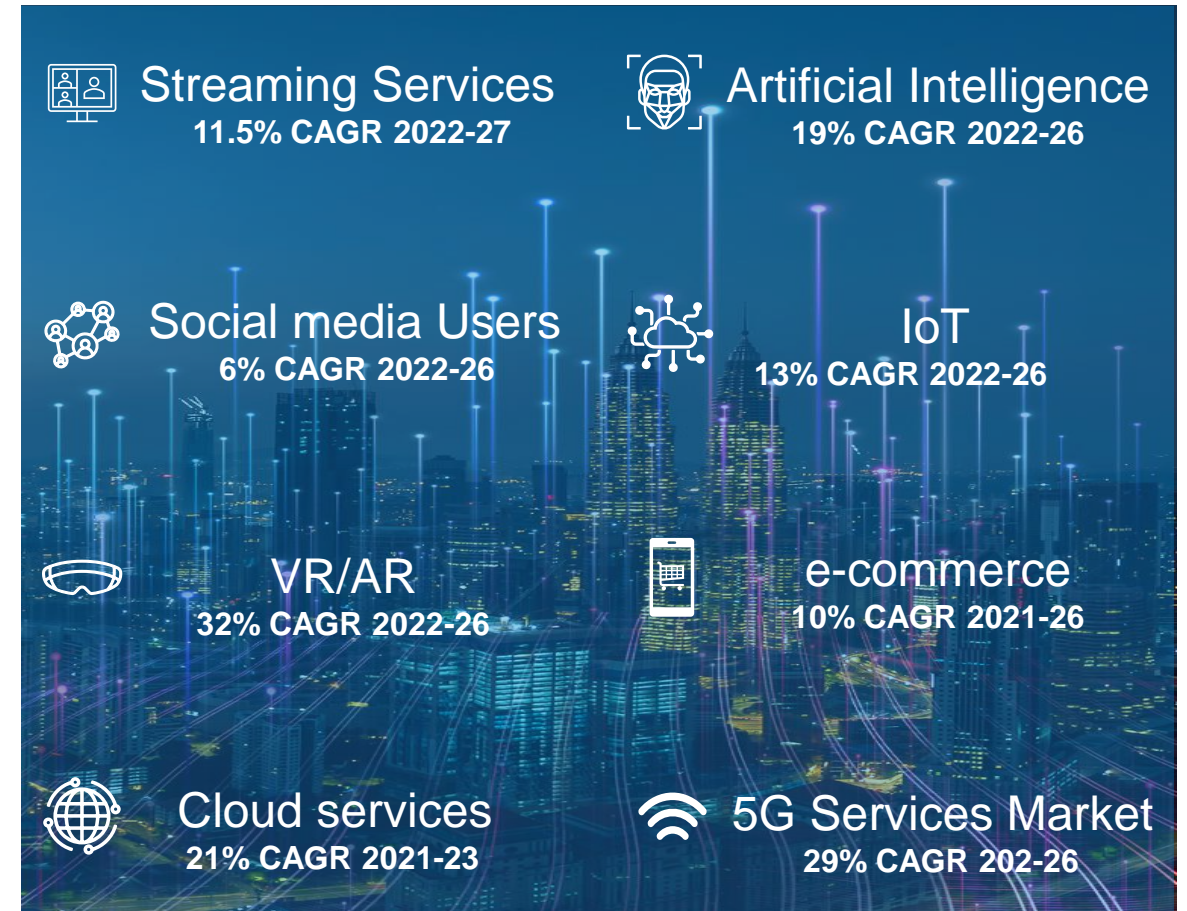
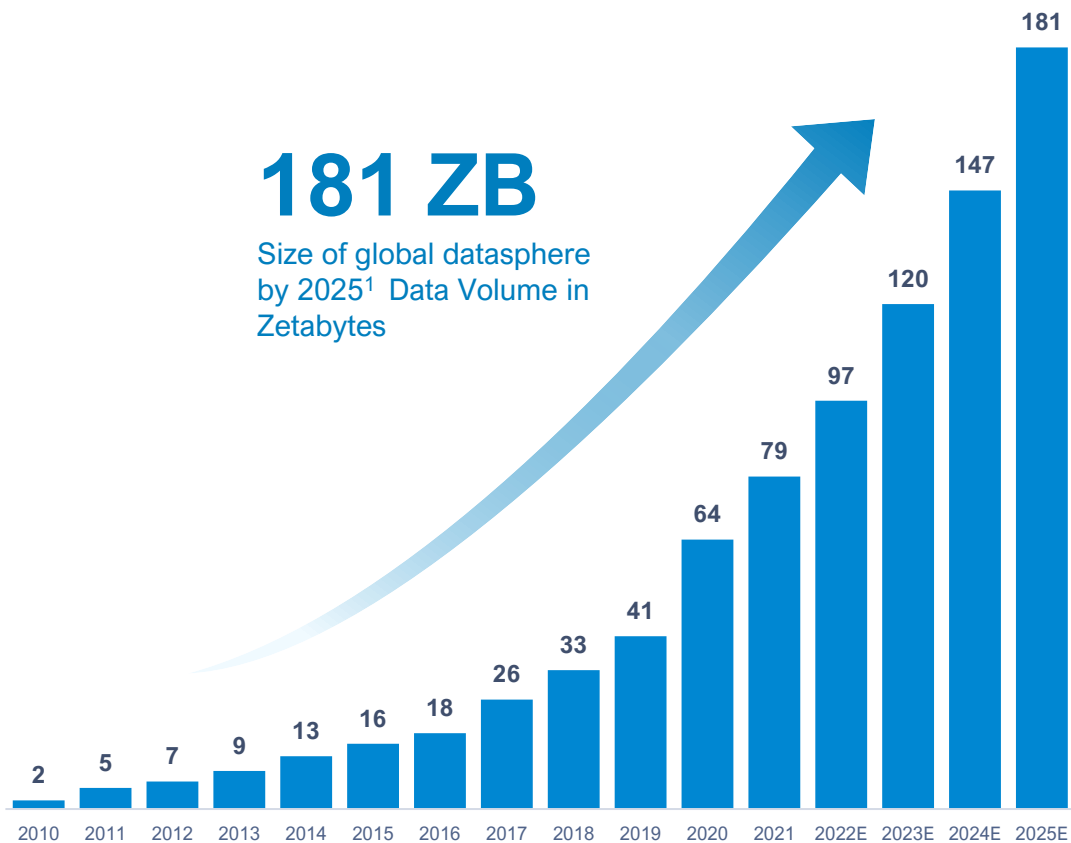
- US\$65m of orders reflect Alphawave's IP monetised through licence and silicon, up 62% over H2 2021
- Approximately 40% of Licence and NRE bookings in H2 2022 (US\$38m) monetise our IP through larger silicon opportunities. This is a reflection of our vertically integrated business model



¹ By market capitalisation as of 09.01.23

The Age of Exponential Data Growth

More Sensors, Devices, Images and Multimedia... More Enterprise Data



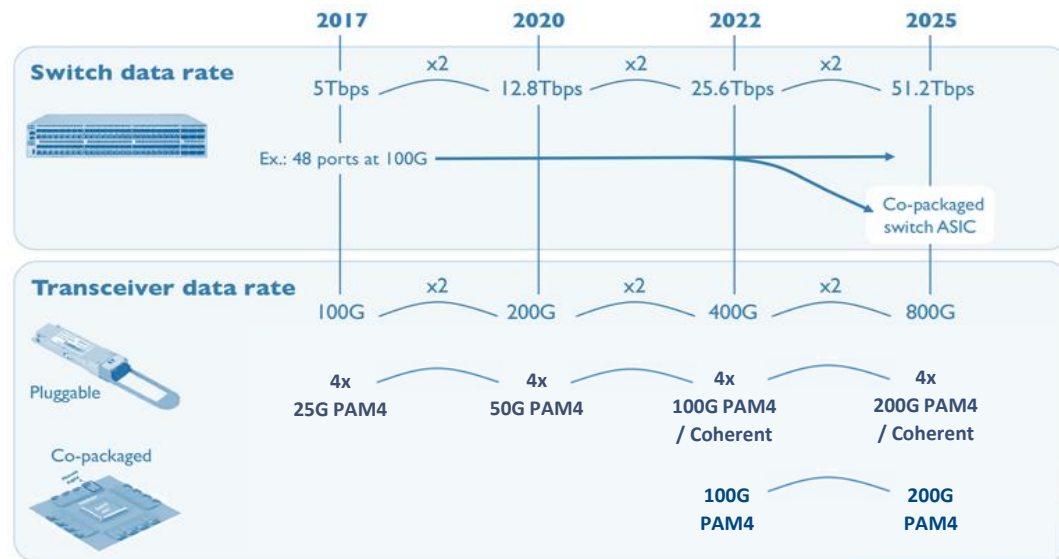
¹ The Data Center Journey, From Central Utility To Center Of The Universe (semiengineering.com). Source Statista
See slide 93 for all other references



Bandwidth-Limited Data Infrastructure

Connectivity is Struggling to Meet Bandwidth Required for Exponential Growth of Data

Data Rates Double every 2-3 Years



Source: "Silicon Photonics Market and Technology Report 2020", April 2020
Silicon Photonics Market & Technology 2020 - Yole Développement (i-micronews.com)



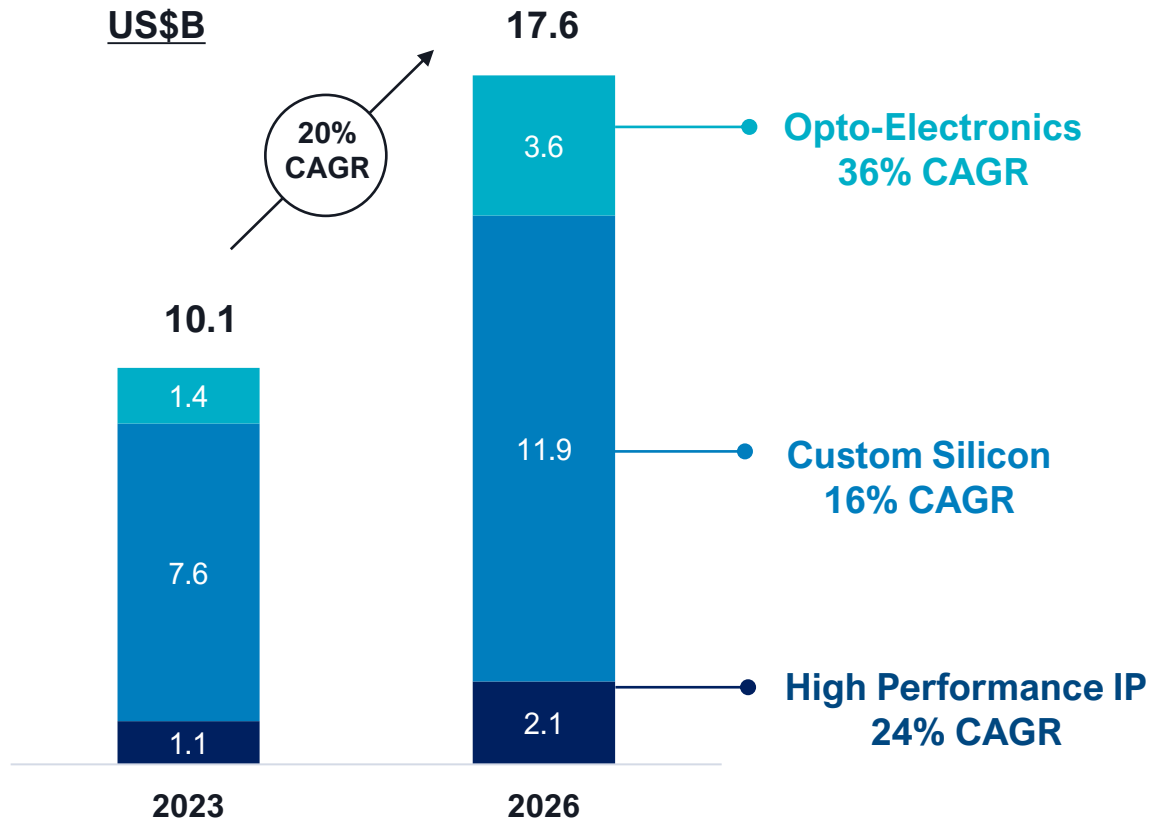
● Top 10 countries by number of data centers in 2022, Statista

> 8.5k data centers worldwide

Cloudscene



Addressable Market Expanding to \$18B by 2026



Market Drivers

- Digitalisation drives exponential growth in data
- Data bandwidth doubles every 2-3 years driving a technology refresh of switches and transceivers
- High-speed and power-efficient connectivity technology is a key enabler
- Hyperscalers investing through the economic cycle

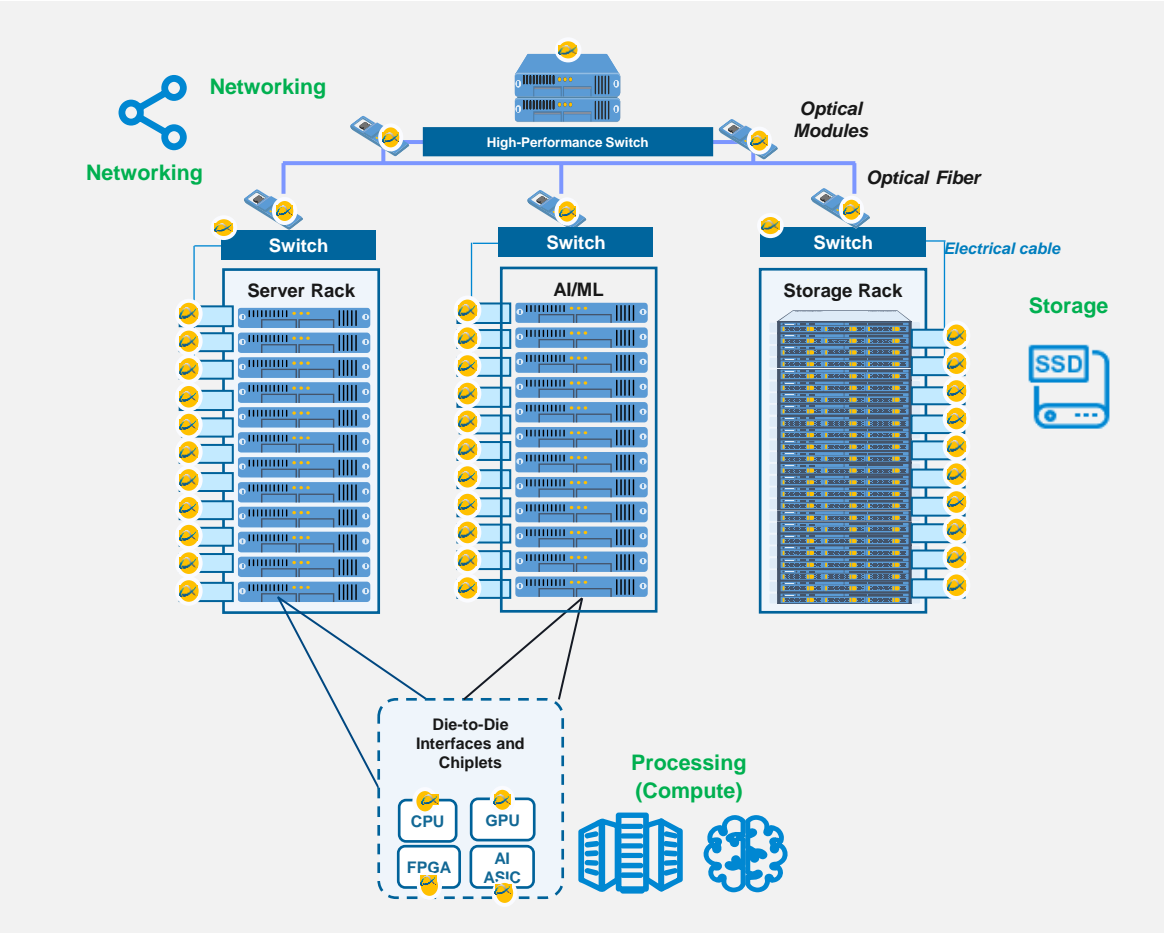


Semico Research Corporation, December 2022, IPNest and Lightcounting



Our Technology Enables High-Speed Data Transmission

In Key Applications Inside Data Centers



Semiconductors are at the start and end points of any transmission of data

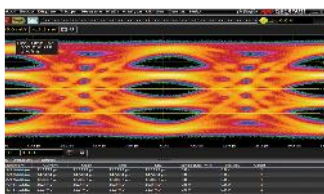
	Applications	Where
Processing (Compute)	CPU, GPU, FPGA, AI	In Servers and AI/ML racks
Networking	Network cards (NICs), Switch, optical modules and cabling	In servers and AI/ML racks, switches, optical modules, and cabling
Storage	Solid State Drives (SSD), Flash Memory, Hard Disk Drives (HDD)	In storage rack



Alphawave Technology Strengths

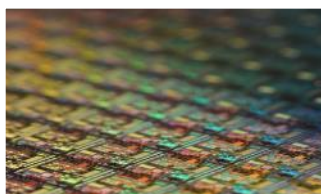
Leading Edge Capabilities and Technologies to Deliver the Fastest Connectivity Solutions

High-Speed Connectivity IP



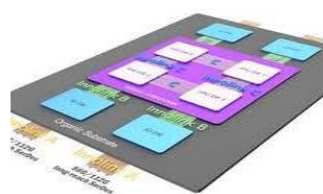
- 224Gbps, 112Gbps, chiplets
- **#1 TSMC OIP partner 2020-2022**
- **2022 Samsung Best Collaboration Award**

Advanced Silicon



- First in 7nm, 6nm, 5nm, 4nm and 3nm

Chiplet – Package Design



- Deep expertise in chiplet packages design
- 2.5D and 3D package designs in production

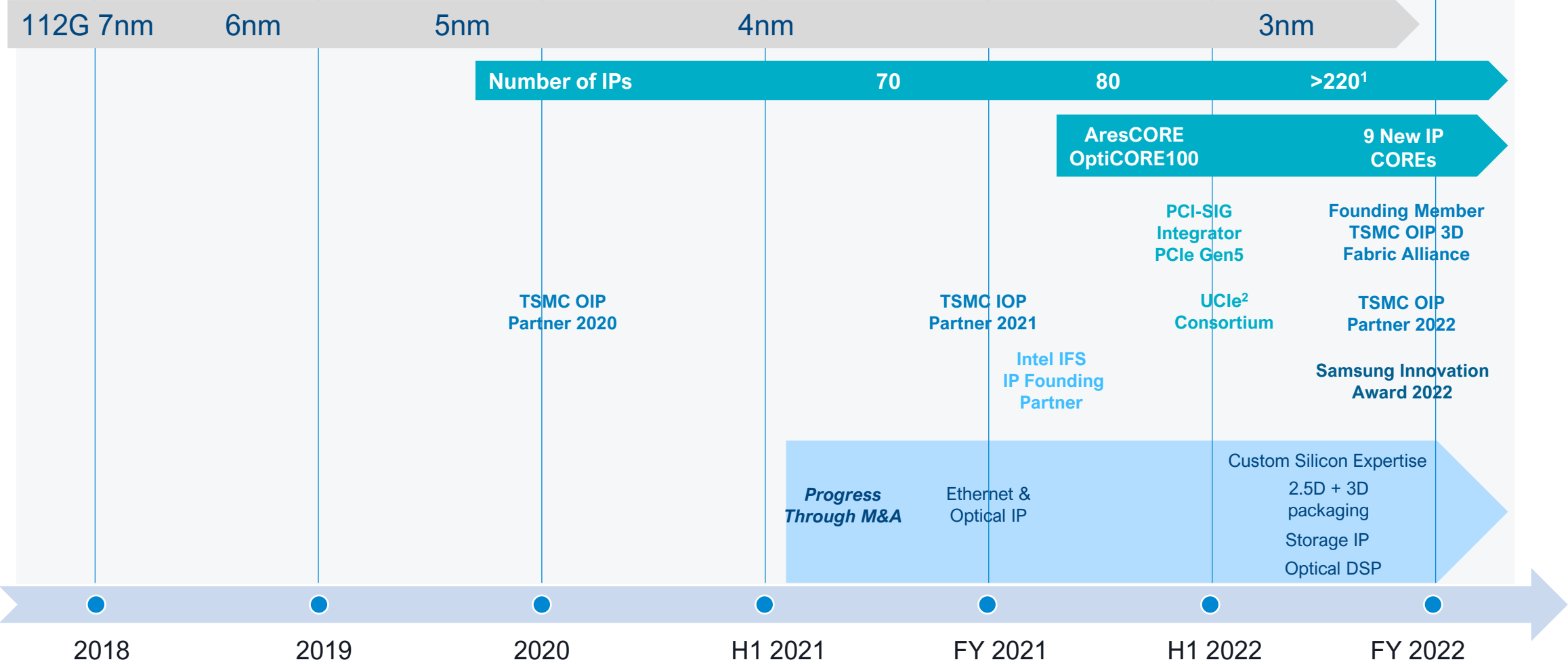
Opto-Electronics



- PAM4, Coherent DSPs, and silicon photonics for 1.6T Ethernet
- 224Gbps photonics in silicon



Technology Progress Since IPO

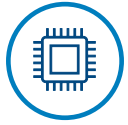


¹ Including acquired OpenFive IP

² Universal Chiplet Interconnect Express Consortium <https://www.uciexpress.org/>



Building a Leading Connectivity Business



High-Performance Silicon IP and Products

- Leading edge connectivity IP
- Delivering the fastest connectivity solutions
- Complete set of products and expertise aligned to long-term market trends



Vertically Integrated

- Monetising our IP through IP licences, custom silicon and connectivity products
- Greater scale
- Enhanced competitive position



People and Culture

- Technology-centric, open and diverse culture fosters innovation
- Approximately 700 employees
- Key design centres in Canada, US, Israel and India



Land & Expand

- Adding value to customers by servicing more of their connectivity needs
- Growing opportunity with large cloud, wireless infrastructures and hyperscalers
- Collaborative approach with customers promotes innovation



Leading Connectivity IP and Silicon

Vertically Integrated Business Offering Customers a Wide Range of Products/Solutions

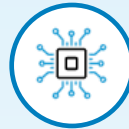
Connectivity Silicon IP



Networking, Optical, Compute,
Storage, AI, CPU, 5G Infrastructure,
Automotive

> 220 IPs and partnered with TSMC,
Samsung, Intel

Custom Silicon



Bespoke silicon to customers'
requirements incorporating our
Connectivity IP

80 active customers

Connectivity Products






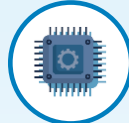




High bandwidth, advanced node
optical and electrical networking
products

PAM4 & Coherent Transceivers

Leveraging our IP



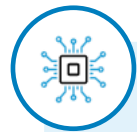
Connectivity IP Group

<div>Servers and Storage</div> <div></div> <div>High-speed Interface IP for data centre compute – CPU, GPU, AI & FPGA</div>	<div>Networking</div> <div></div> <div>Interface IP for Networks – Switches, Routers, DPUs, NICs</div>	<div>Memory</div> <div></div> <div>Memory Interface IP for DRAMs & HBM – CPU, GPU, AI, FPGA, DPUs</div>	<div>Chiplets</div> <div></div> <div>Chiplet Interface IP 2.5D and 3DIC</div>
PCIe Gen6 / CXL 3.0	400G, 800G, 1.6T Ethernet	HBM, LPDDR, DDR	UCIe, BOW, Open-HBI
<div><div>PipeCORE PicoCORE KappaCORE</div></div>	<div><div>AthenaCORE ApolloCORE ZeusCORE AlphaCORE OmegaCORE</div></div>	<div><div>HelenaCORE DemiCORE</div></div>	<div><div>AresCORE DieCORE GammaCORE</div></div>



Custom Silicon Group

Silicon Proven Solutions Leveraging Our High-Performance IP



Custom Silicon Expertise

- Experienced engineering teams and advanced packaging expertise (2.5/3D)
- Reliable operations and partnerships
- Proven design flow and methodology for leading nodes
- Application optimized IP sub-systems



**Complete
Solution**

Silicon IP



>155 IPs and partnered with TSMC, Samsung, Intel

- PCIe/CXL
- 224G/ 112G
- Ethernet
- HBM, LPDDR, DDR
- Die-to-Die – Chiplets
- RiscV

Strong Partnerships Across the Supply Chain

EDA/IP



Manufacturers

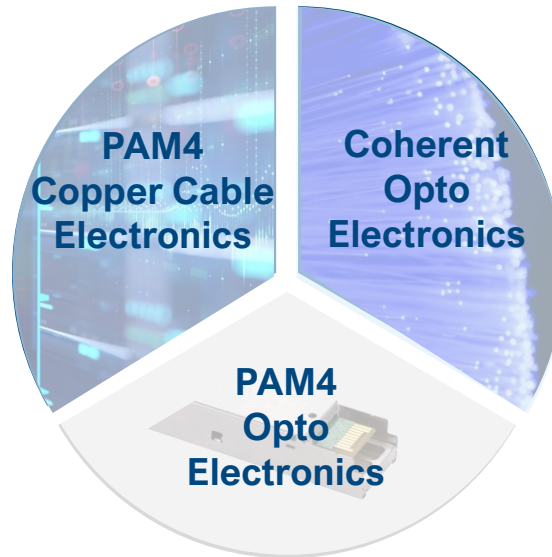
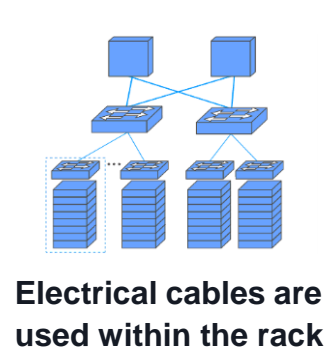


Package and Test



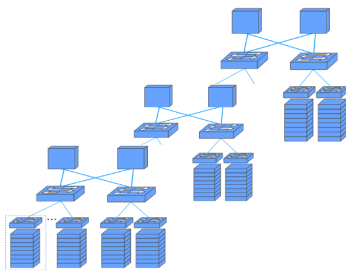
Connectivity Products Group

Full Range of PAM4 and Coherent DSPs – Electrical and Optical



Optical coherent signalling is used today, to connect regional data centers through optical cables

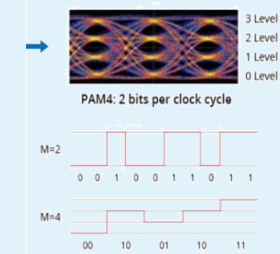
Growing opportunity to use coherent inside data centers



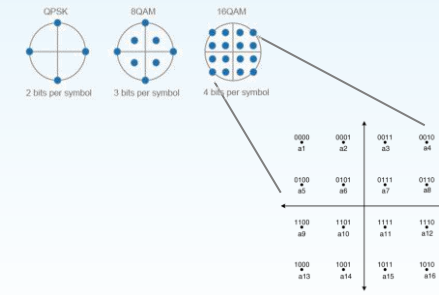
Optical cables distribute data across a data center

Co-packaged Optoelectronics

Direct Detect modulation such as **PAM4 DSP** for speeds up to 200G

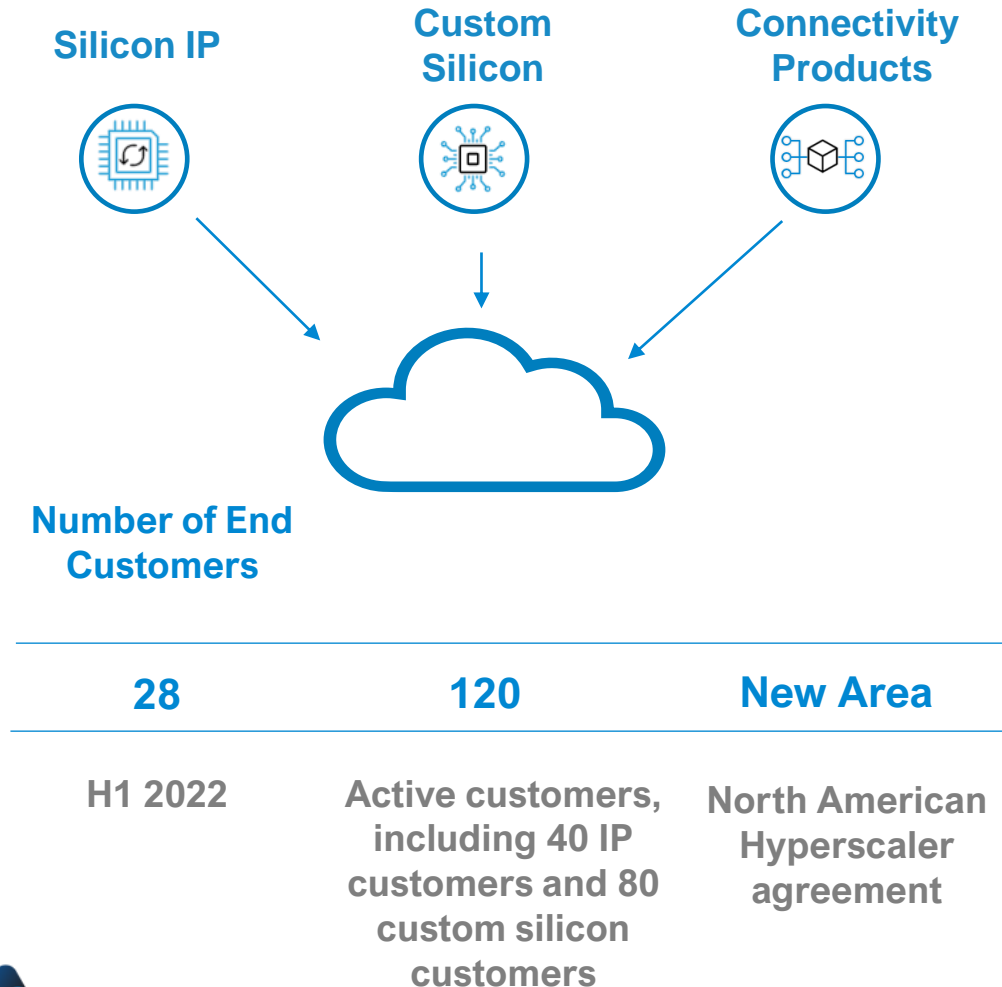


Coherent DSP for longer reaches and for shorter reaches at 200G and above



Adding Value to Customers - Land & Expand

Servicing More Connectivity Requirements



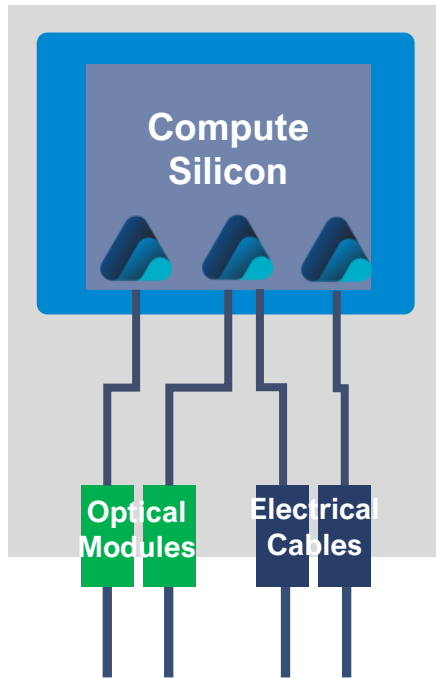
- Technology refresh/upgrade provide an opportunity to work with new customers
- Once technology is qualified and deployed is easier for customers to increase adoption
- Close R&D collaboration with customers drives product development
- Hyperscaler multi-year agreement provides unique platform to develop new products and scale the business
- More than 120 customers added since 2018



Delivering Optimized Data Infrastructure Solutions - Faster

The Evolution of Data Center Silicon: A Growing Opportunity For Chiplets

N-1 Silicon Designs 16/12/7 nm

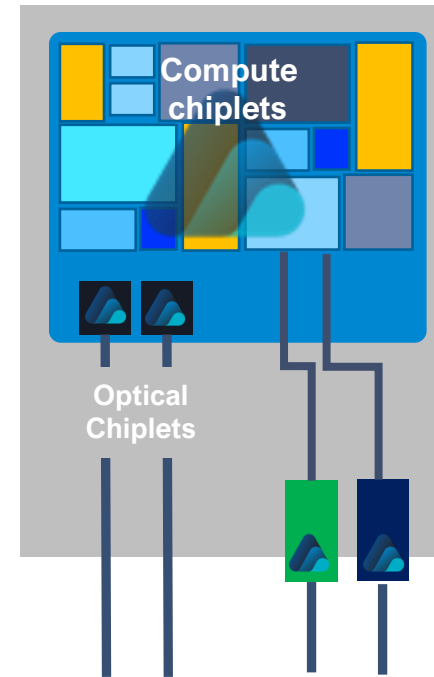


Alphawave IP integrated in compute silicon. One die and one package:

> \$250M cost of design
> 2 years design cycle

Silicon costs increasing in advanced manufacturing technologies like FinFet

N+1 Silicon Designs 5/4/3 nm



Alphawave custom silicon expertise the foundation to prebuild connectivity chiplets and optical chiplets

Delivering connectivity at higher bandwidth and lower power

Cost effective and flexible approach: individual chiplet components can be manufactured at different and less expensive nodes and individually replaced



People and Culture

Attracting Talent and Creating an Environment to Foster Leading Innovation

- Welcomed approximately 400 new employees from Precise-ITC, OpenFive and Banias Labs
- Attracting and retaining talent:
 - Employee share ownership aligned to shareholder's interests
 - Working on leading edge technology
 - Supporting employees' wellbeing through period of accelerated business expansion
- Technology-centric culture focused on solving the hardest challenges
- Promoting an open and diverse environment to foster innovation



20% Female



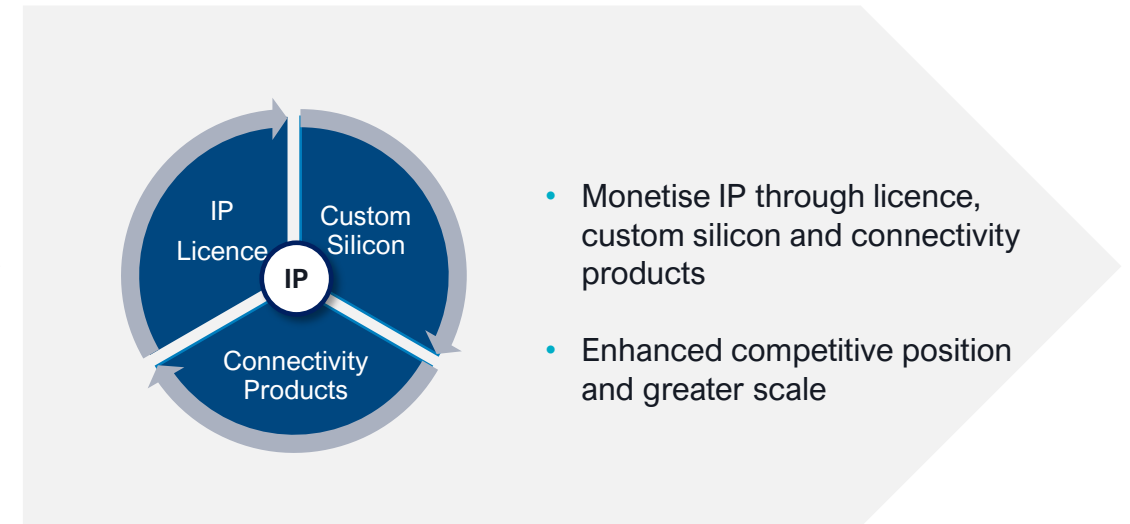
>50% Visible Minority



Greater Scale of Vertically Integrated Model

Delivering Accelerated Revenue Growth

- High-growth expanded addressable market accessible by vertically integrated business
- Wider offering of connectivity silicon IP, custom silicon and opto-electronic products focused on data centers and wireless infrastructure
- Supports our long-term ambition of \$1 billion revenue run rate by 2027





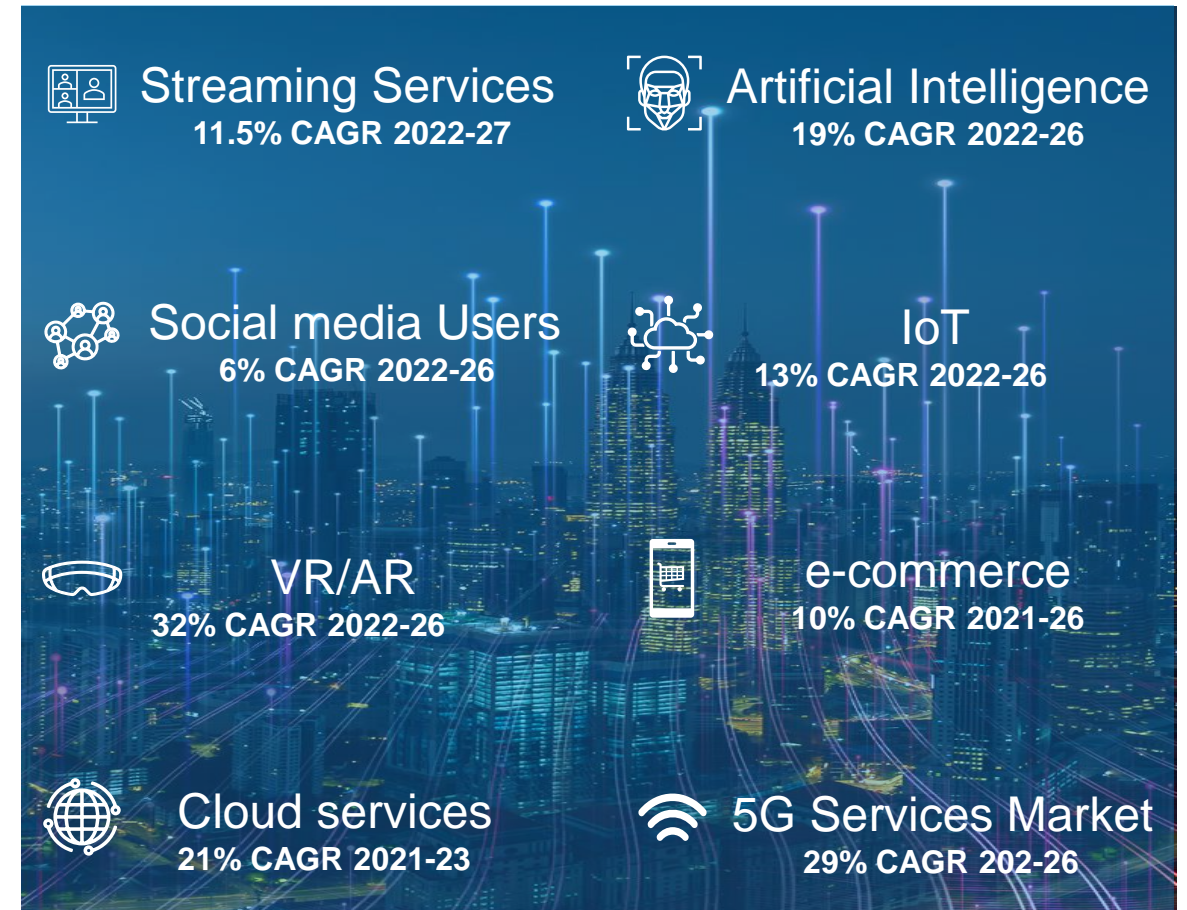
The Future of Digital Infrastructure

Tony Chan Carusone, Chief Technology Officer

Connectivity – Digital Infrastructure

Infrastructure Computing and Networking

- Infrastructure computing and networking are the basis for the modern world:
 - Mobile communication (5G+)
 - Remote work, education, entertainment (Metaverse)
 - AI training (autonomous driving)
 - Scientific computing (chemical and multi-physics simulations: drug discovery, climate change, human brain emulation)
- Data transmission networks account for 1-1.5% of global electricity use¹
- Data centres and data transmission networks represent about 1% of energy-related greenhouse gas emissions¹



¹ IEA (2022), Data Centres and Data Transmission Networks, IEA, Paris.
See slide 93 for all other references



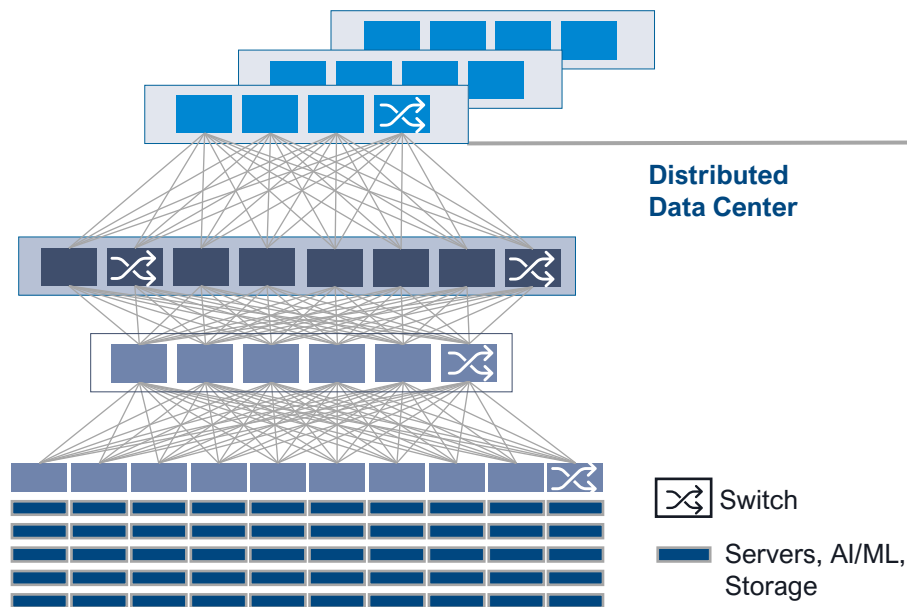
Data Connectivity Everywhere

Our Expertise is in The Circuits and Systems Required to Communicate Data...

...Whether separated by kilometres of optical fibre or meters of copper cable, sub-millimetre printed wiring, the start- and end-points of data are silicon chips

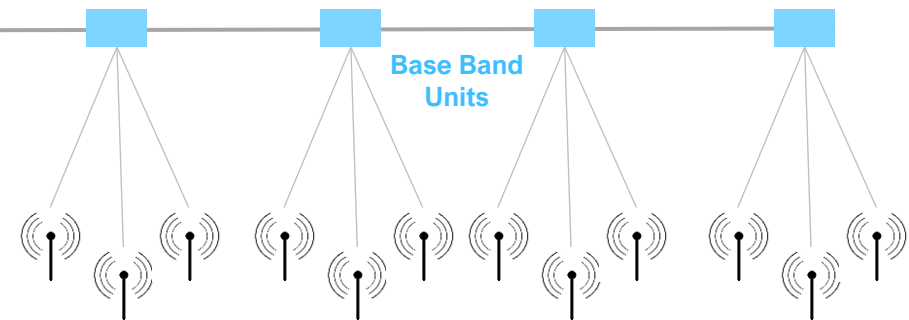
Inside Data Centers...

- Up to 76% of all data centre internet traffic traverses internally within data centres



...and at the Edge (5G rollout a major driver)

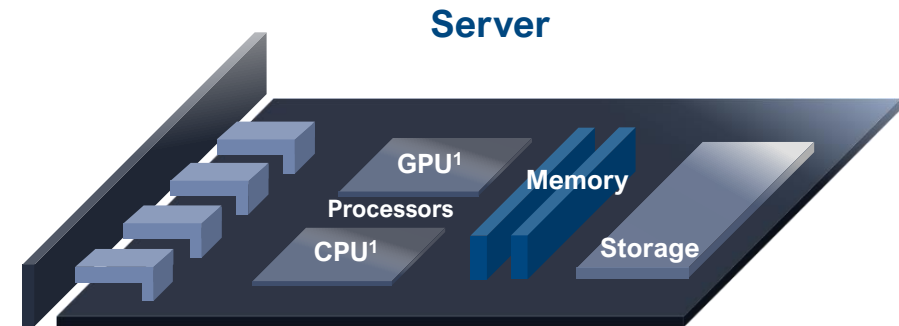
- Placing application-specific compute close to the sources of data
- Creating new applications for high-speed connectivity



Chip-to-chip Connectivity

Our Expertise is in The Circuits and Systems Required to Communicate Data

- Wiring printed on the circuit boards carries the data between chips
- Connectivity between processors (CPU, GPU¹) and storage is generally PCIe (Peripheral Component Interconnect Express)
- Connectivity between processors and memory is DDR (Double Data Rate) or HBM (High Bandwidth Memory)
- PCIe, DDR and HBM are standardized interfaces



¹ CPU: Central Processing Unit; GPU: Graphics Processing Unit



Strong Performance Across a Range of Metrics

Our Solutions Meet the Increasing Requirements of Infrastructure Computing and Networking

Bandwidth

Throughput achievable over a single link: data/time

The higher the better

Latency

End-to-end travel time for data

Dedicated solutions for applications where (low) latency is critical

Reach

The length and attendant signal loss between the start- and end-points of a link

Longer reach allows to eliminate intermediate silicon parts to receive and retransmit

Density

Number of transmitters and receivers in a single chip

100's of parallel streams of data in and out of a single chip

Power Consumption

Main operating cost
Impact of heat dissipation on reliability

Low-power modes and flexible power supplies

Robustness

Work reliability of the link in every environment

Highly reliable, reconfigurable and adaptive

Cost

Smaller chip area = lower silicon cost

Self-test features to keep production test costs low



Key Technology Trends

Optics Getting Closer to The End Points

Increasing use of optical cables over copper and co-packaged optics for lower cost, power and latency

Coherent Optical

Increasing use of coherent optical communication inside data centers to overcome the bandwidth limitations of optical components

Disaggregated Computing

Disaggregation of compute and storage to increase efficiency

Advances on CMOS Technology

Higher development and manufacturing costs of high-end semiconductors

Chiplet

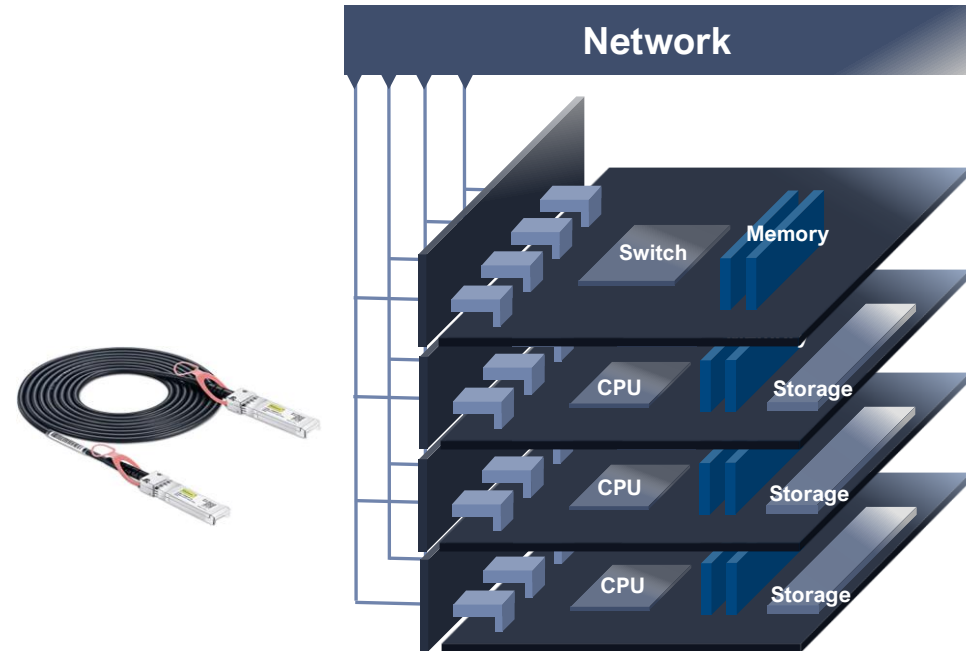
Emergence of the chiplet design paradigm



Increased Use of Optical Cables For Shorter Reaches

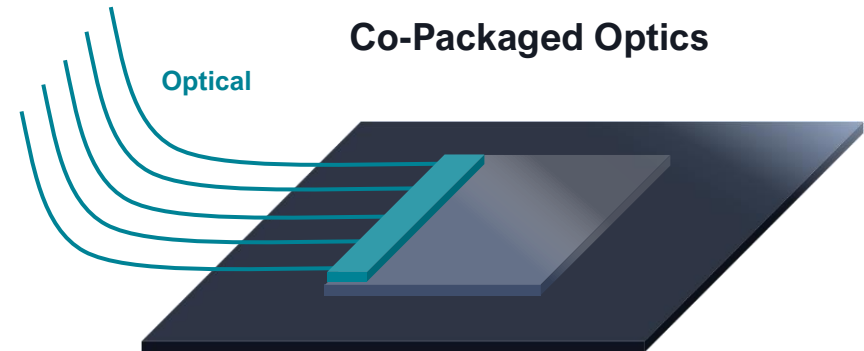
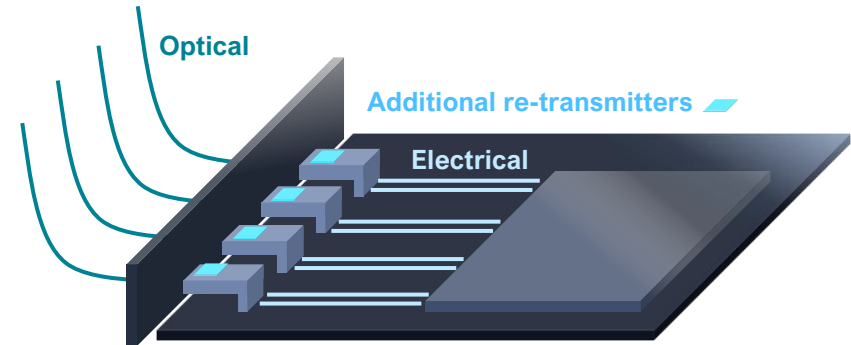
Alphawave Technologies For Both Copper and Optical Connectivity

- Cables connect computers in racks to each other, today mostly copper cables
- Switches route data to other racks, typically over Ethernet links
- In hyperscale data centres, aggregated data traffic flows across longer distances up to a few kilometres
- Increasing data rates is driving a long-standing trend towards the increasing use of optical fibre
- Even short links that were previously copper, are now converting to optical fibre



Co-Packaged Optics – Lower Cost, Power and Latency

- Both optical and electrical links are combined in the network
- Emerging trend towards integration of the optics directly alongside the silicon end-points
- Eliminates the need for intervening receive and re-transmit
- Alphawave is well positioned to benefit from this trend. Our solutions' reach and robustness eliminate the need for additional re-transmitters.



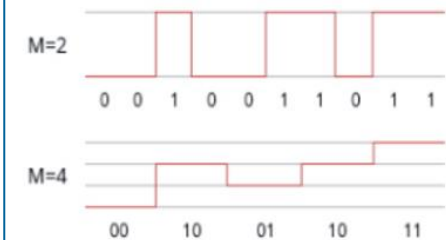
Increasing Use of Coherent Optical Communication

- PAM4 electrical and optical communication used inside the data center
- Coherent optical communication was traditionally reserved for long-haul, for example connecting data centers across countries
- With increasing data rates, its use has migrated to shorter reaches with a popular coherent standard (400G-ZR) for campus-area networks
- Further cost and power reductions required to bring coherent technology to even shorter-reach applications, such as inside the data center (IDC)
- The acquisition of Banias Labs brings a unique, differentiated and patent-protected technology for low-power, low-cost coherent optical communication

Direct Detect modulation such as PAM4 DSP for speeds up to 200G

Intra Data Center (IDC) <2km

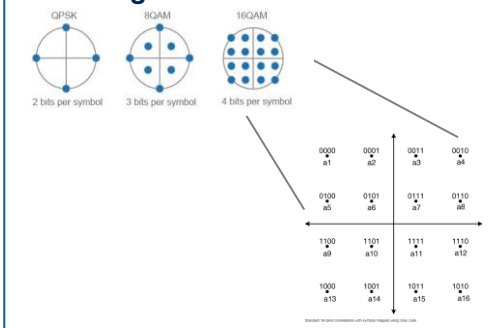
One dimensional: information is in the power of the signal



Coherent DSP for longer reaches and for shorter reaches at 200G and above

IDC <2km
Campus reach <10km
Data Center Interconnect (DCI) <120km

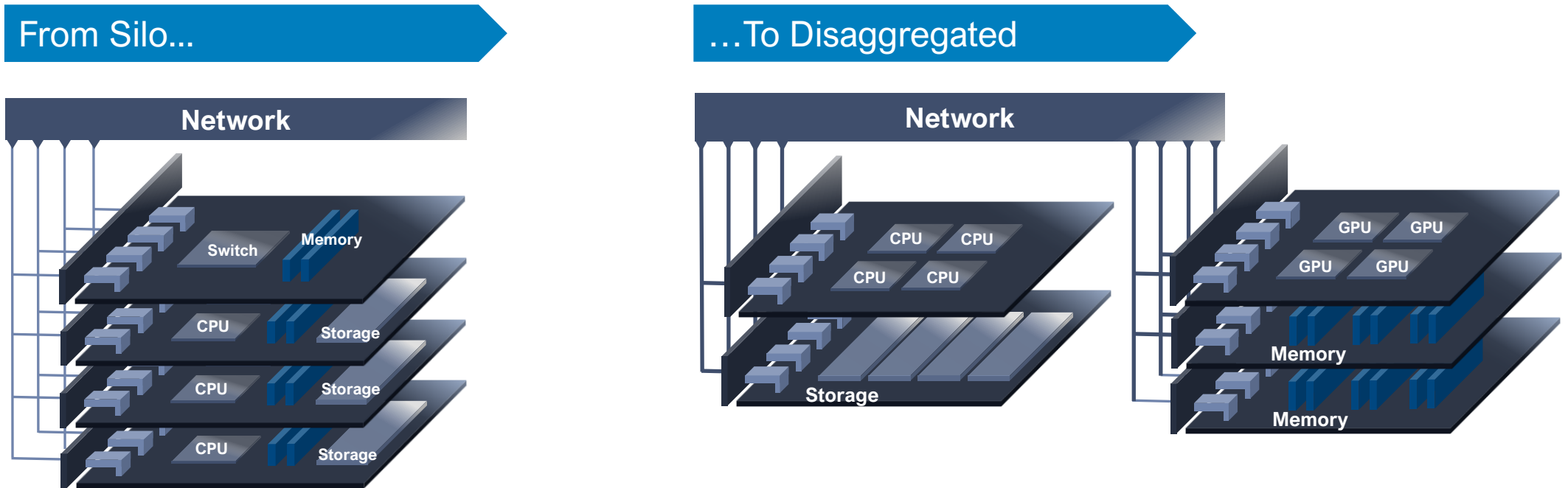
Two dimensional: information is in the power and phase of the signal



Disaggregated Computing

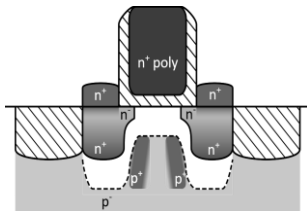
Increased Efficiency of Storage Capacity Supported by Specialised Connectivity Solutions

- Sharing memory and storage in centralized pools allows it to be used more efficiently
- Disaggregated model requires specialized low latency connectivity solutions, such as Compute eXpress Link (CXL)



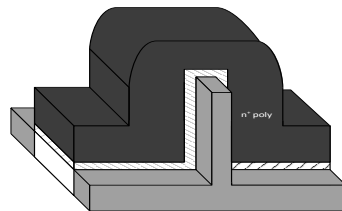
CMOS Fabrication Technology Scaling

- CMOS chip fabrication technology continues to advance
- Alphawave works with the leading foundries who provide the manufacturing capabilities
- Advances in CMOS now allow tremendous computational power on a single silicon die, requiring tremendous connectivity
- Alphawave has consistently been first to provide leading-edge (100 Gbps) connectivity IP in every major new CMOS technology node since its founding from 7nm to now 3nm
- BUT... the cost of integrating compute, connectivity and ancillary functionality on a single die is prohibitive



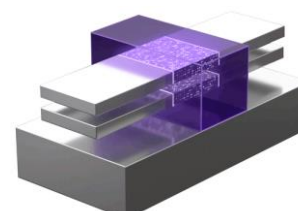
2011

Planar transistor architecture



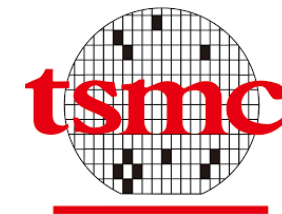
2015

FinFET transistor architecture



2023

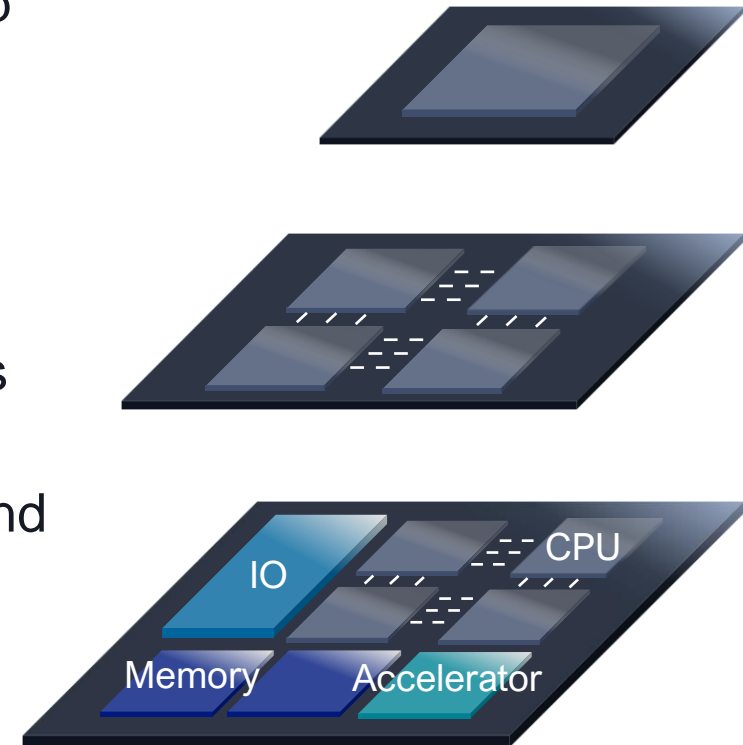
Gate-all-around transistor architecture



Chiptlets Enabled by High-Speed Die-to-Die (Data) Links

Alphawave is at The Forefront of The New Chiplet Design Paradigm

- Chiptlets are individual dies that are co-packaged side-by-side. The combination operates and is sold as a single chip
- Relies on a fabric of dense high-speed interconnect
- Wide acceptance of the Universal Chiplet Interconnect Express¹ (UCIe™) standard in 2022 to accelerate and democratize the chiplet ecosystem
- Alphawave is a contributing member in UCIe which defines the standards governing chiplet design and use
- We are a leader in developing both silicon IP for chiplets and complete chiplets for the market



¹ <https://www.uciexpress.org/>

IO – Input/Output – Data connectivity



Key Technology Trends

Optics Getting Closer to The End Points

Technology for both optical and electrical cables

Coherent Optical

Coherent Optical In-house with acquisition of Baniyas Labs

Disaggregated Computing

Disaggregation enabled by specialised connectivity solutions

Advances on CMOS Technology

Extending technology leadership, from 7nm to 3nm

Chiplet

Relies on a fabric of dense high-speed data interconnect



Long-Term Technology Trends

Today

- Emphasis on using copper connectivity wherever possible to keep costs low
- Computer and system designers select packaged electronic parts and wire them together on a custom circuit board
- Global and interconnected supply chain

10 Years

- Ubiquitous use of low-cost optical connectivity solutions, even over short reaches
- Complete systems designed and made by packaging multiple standard silicon chiplets within a few centimetres
- Complete on-shore ecosystem for integrated circuits, chiplets, advanced packaging

Alphawave Semi is well-positioned to:

Extend and expand technology leadership

Deliver solutions for emerging optical connectivity

Offer complete custom silicon expertise and chiplet IP

Leverage solid relationships with major western companies and governments





QA Session



15 Min. Break



Agenda

Welcome	Jose Cano, Head of Investor Relations
Consolidating Our Vision for the Business	John Lofton Holt, Founder and Executive Chair
Leading Connectivity Technology for the Age of Exponential Data Growth	Tony Pialis, Founder and CEO
The Future of Digital Infrastructure	Tony Chan Carusone, Chief Technology Officer
QA Session	
15 Min. Break	
High-Performance IP	Jonathan Rogers, Founder and SVP Engineering
Monetising IP Through Custom Silicon	Mohit Gupta, SVP & GM IP and Custom Silicon
Connectivity Products – A New Business Opportunity	Babak Samimi, SVP & GM Connectivity Products
Financial Overview	Daniel Aharoni, Chief Financial Officer
QA Session	
Closing Remarks	Tony Pialis, Founder and CEO





High-Performance IP

Jonathan Rogers, Founder and Senior Vice President Engineering

Connectivity IP is the DNA of Our Business

Growing IP Portfolio – Enabling Data to Travel Faster, More Reliably & Using Less Power

- Over 220 connectivity IPs
- Our customers include leading semiconductor companies and hyperscalers as well as internal Custom Silicon and Connectivity Products
- R&D Group develops reusable IP platforms:
 - Allows us to leverage core technologies across the business.
 - Platforms engineered to efficiently support high ROI customization to specific applications.
- Extremely capable team focused cutting edge analog and mixed signal design.
- Very technical and data driven R&D engineering culture that extends from front-line designers all the way up through management.



R&D Locations



320 R&D Engineering Employees



Increasing Investment in Connectivity Technology

Our Connectivity IP Enables



Faster Speeds



Lower Power



Lower Cost

Silicon IP Megatrends

3rd party silicon IP

adoption driven by

Reduced
Cost

Shorter **Time**
to Market

Increased
Complexity

Continual refresh cycles

driven by evolution of

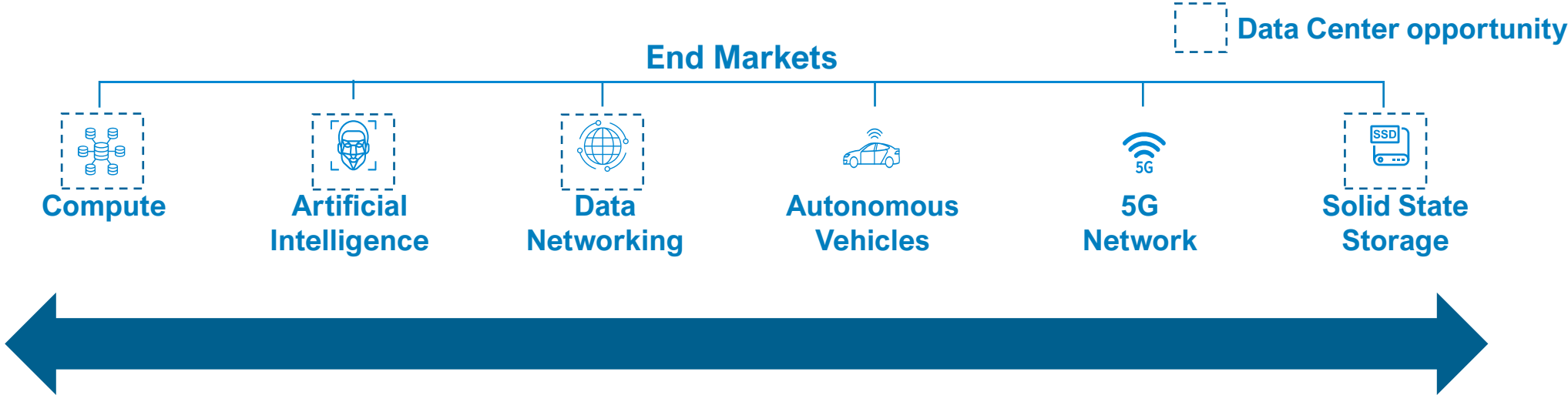
Standards

Speeds

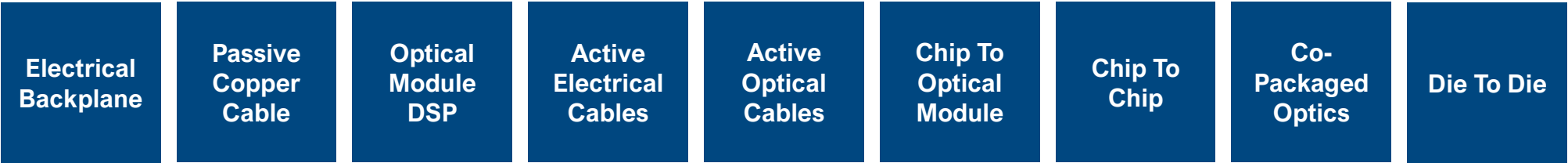
**Process
Nodes**



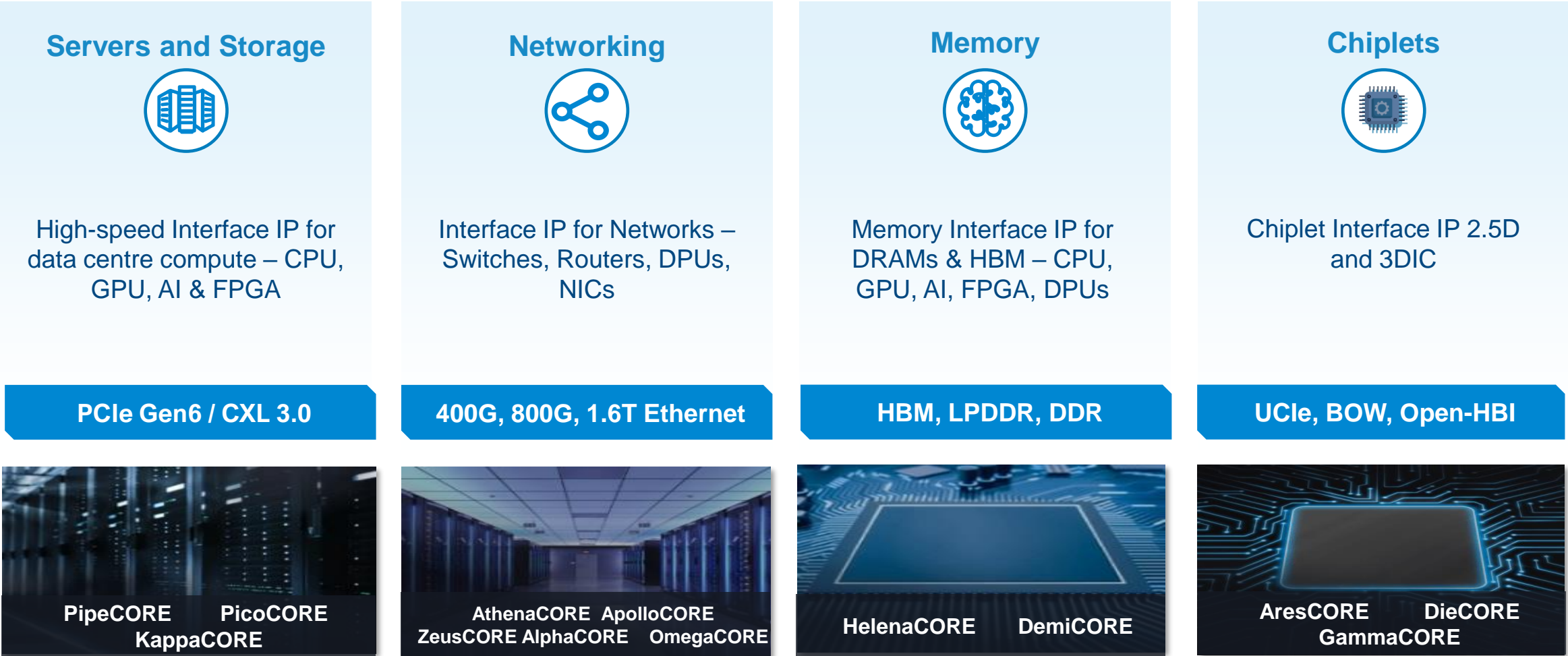
Addressing High-Growth Digital Infrastructure Markets



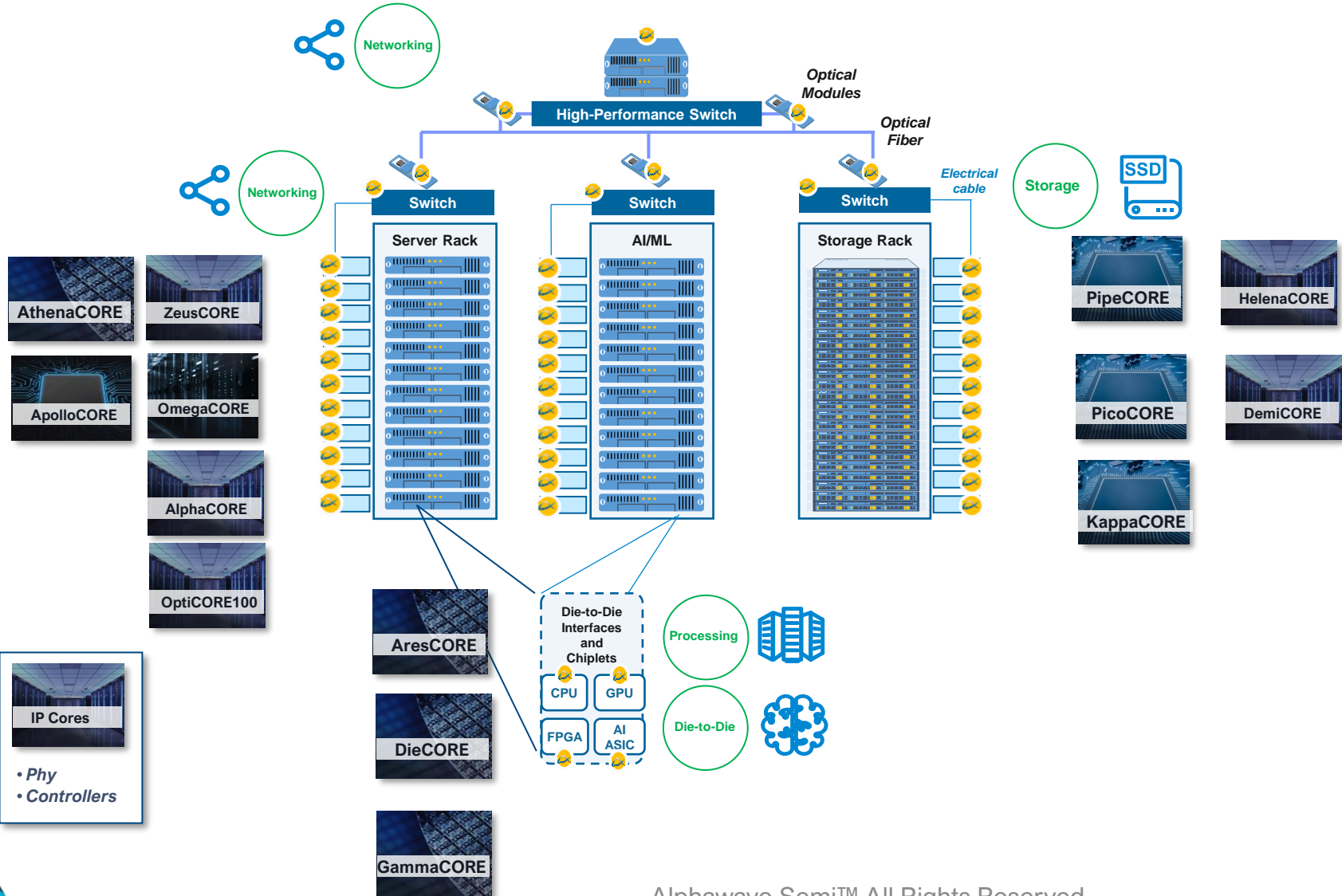
IP products offered at 7nm-3nm addressing wide range of digital communication channels



Connectivity IP Group – High-Performance Connectivity IP



Growing IP Portfolio Inside the Data Center



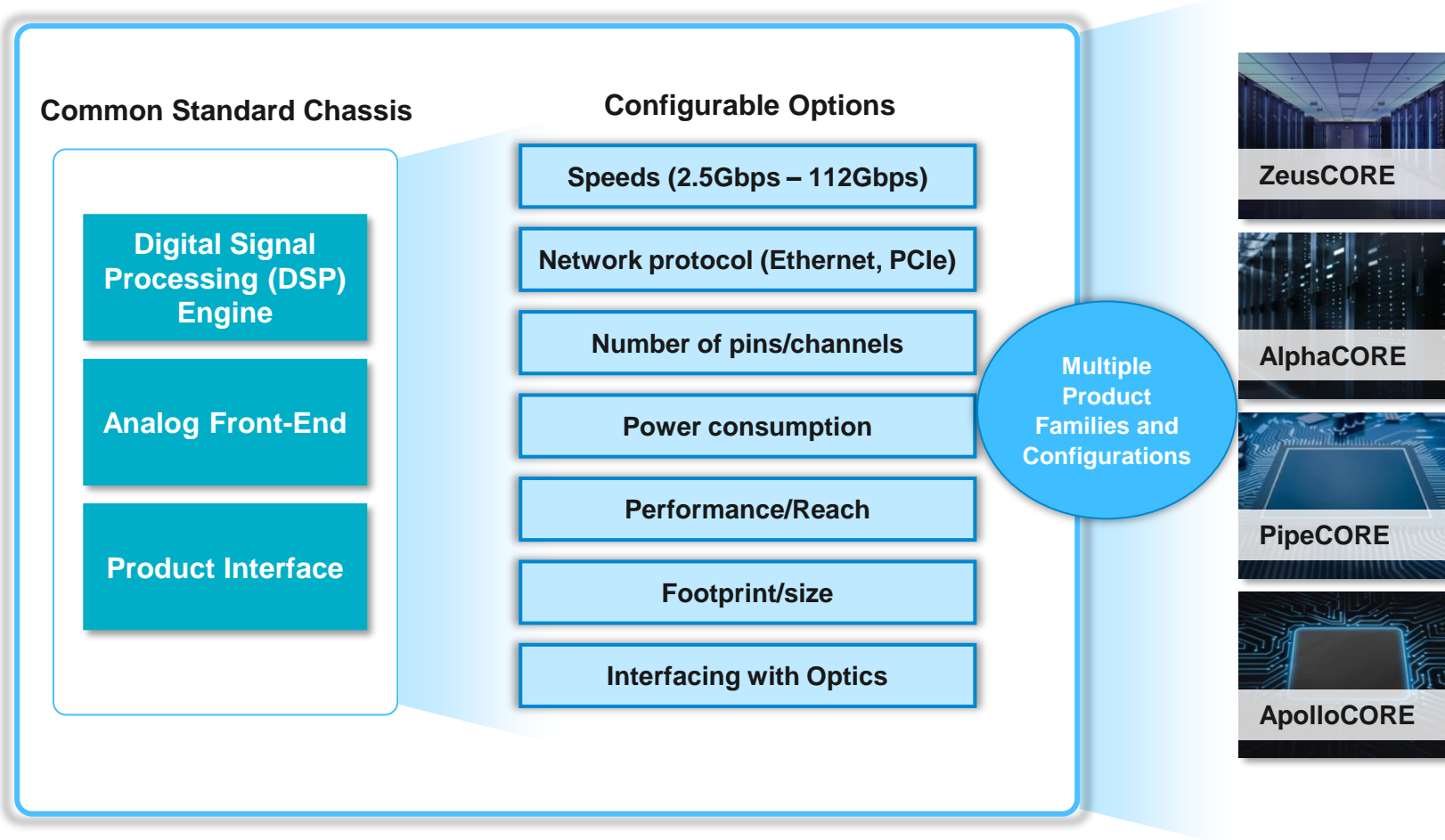
25 tape-outs in 2022

10 tape-outs in 2021



Unified Configurable DSP IP Platform Powers Our Offerings

The Alphawave IP Configurable Platform



- Configurable interface IP to deliver products to multiple markets and applications
- Supported by the leading foundries in the most advanced technology

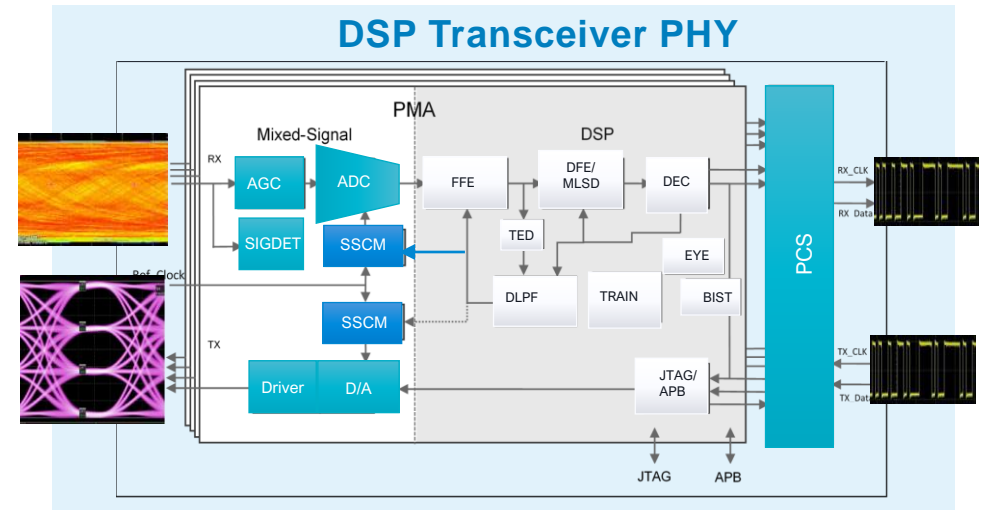


- 1st to silicon in 7nm, to 3nm nodes
- **Customer Benefits:**
 - Fast time to market
 - Low risk
 - Lower cost products
 - Configurable for wide application use/reuse



Case Study - DSP Transceivers PHY¹

- Transceiver is a bi-directional digital data communication system.
 - >100 billion bits per second on a wire
 - Located on the edges of all the key silicon communication chips
 - Gets data on and off the chips where the processing occurs
- Transceiver PHY capabilities:
 - Analog front end (AFE)
 - High performance analog to digital converter (ADC)
 - High performance digital to analog converter (D/A)
 - Clock generation
 - Digital signal processing. (DSP)
- Mixture of high-performance analog and digital design activities within the teams creating these IPs.



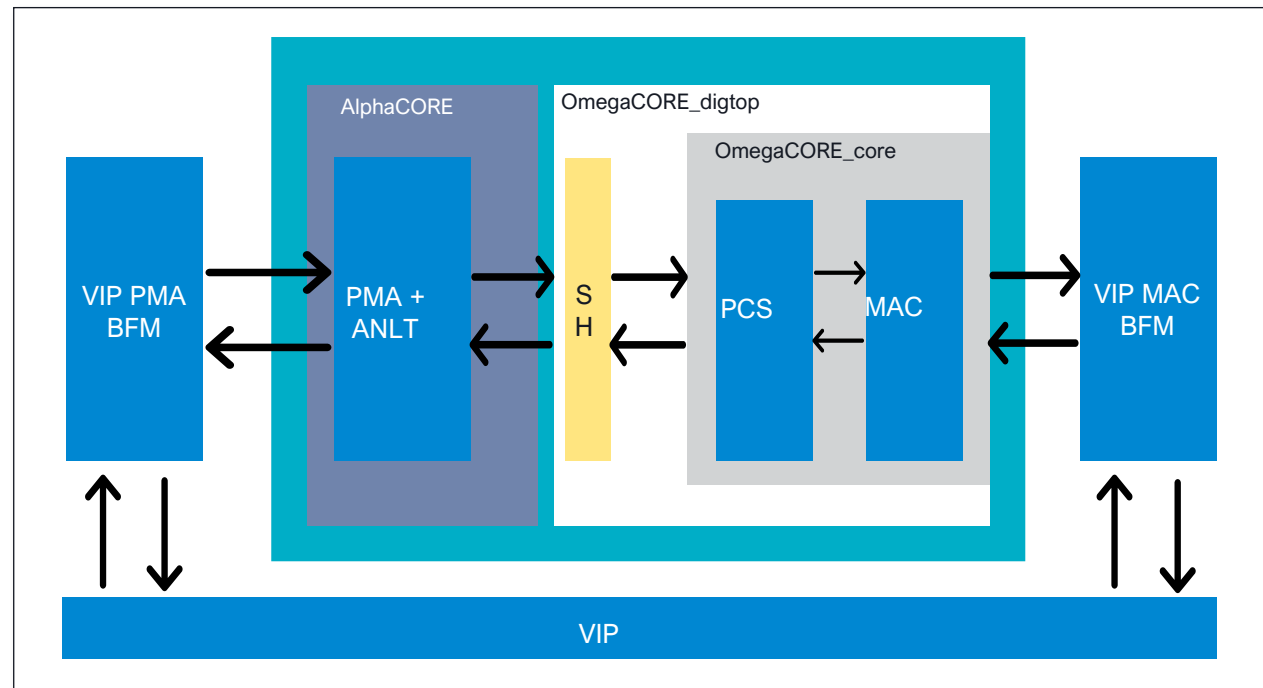
¹ The PHY forms the physical interface and is responsible for coding and decoding of data between a purely digital system and the medium on which the signals are transmitted. It represents a bridge between the digital and electrical connection levels of the interface. PHYs can be discrete components or can also be integrated



Case Study – Integrated Subsystem

Integrated Ethernet Subsystem Solutions – Faster Go-To-Market

- Combine AlphaCORE DSP transceiver and the OmegaCORE Ethernet Controller
- Pre-validated complete subsystem allows for rapid integration into customers' SoCs
- Dramatically reduces customer development effort.



Silicon IP Customer Journey



- The R&D group supports three main types of customers
 - IP licencing
 - Custom Silicon engagements
 - Internal Connectivity Products
- Average 12-month engagement - earlier part of customer development
 - IP integration support including simulation and Design For Test
 - Package signal and power integrity analysis
 - Automated Test Equipment test development
- We then support the customer in the production journey

Associated revenue



What is Next?

Leveraging R&D Across The Business

IP Development

- Next generation 200Gbs+ DSP Transceiver platform and associated products
- Extending our Integrated Subsystem offering in the PCIe and CXL space
- Enabling a wide variety of chiplet applications with our full portfolio of Transceiver and D2D¹ IP

R&D Engineering

- Continue to drive IP licensing business
- Enable higher value Custom Silicon opportunities with our IP
- Provide customized IP platform variants for our connectivity products

We have the best R&D team in the industry and this will drive our success

¹ Die-to-Die





Monetising Our IP Through Custom Silicon

Mohit Gupta, Senior Vice President and General Manager Custom Silicon and IP

Custom Silicon Group

Delivering High-Quality Custom Silicon for 20 Years

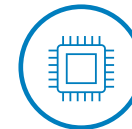
- End-to-end expertise to deliver high-quality silicon in advanced nodes
- Strong IP portfolio in memory interfaces & complex package capability
- Proven engineering and silicon operations team
- Offices in US (Silicon Valley), India (Bangalore and Pune) and APAC



300+ employees



80 active customers



14.5 million units shipped in 2022
(cumulative shipped 150m+)

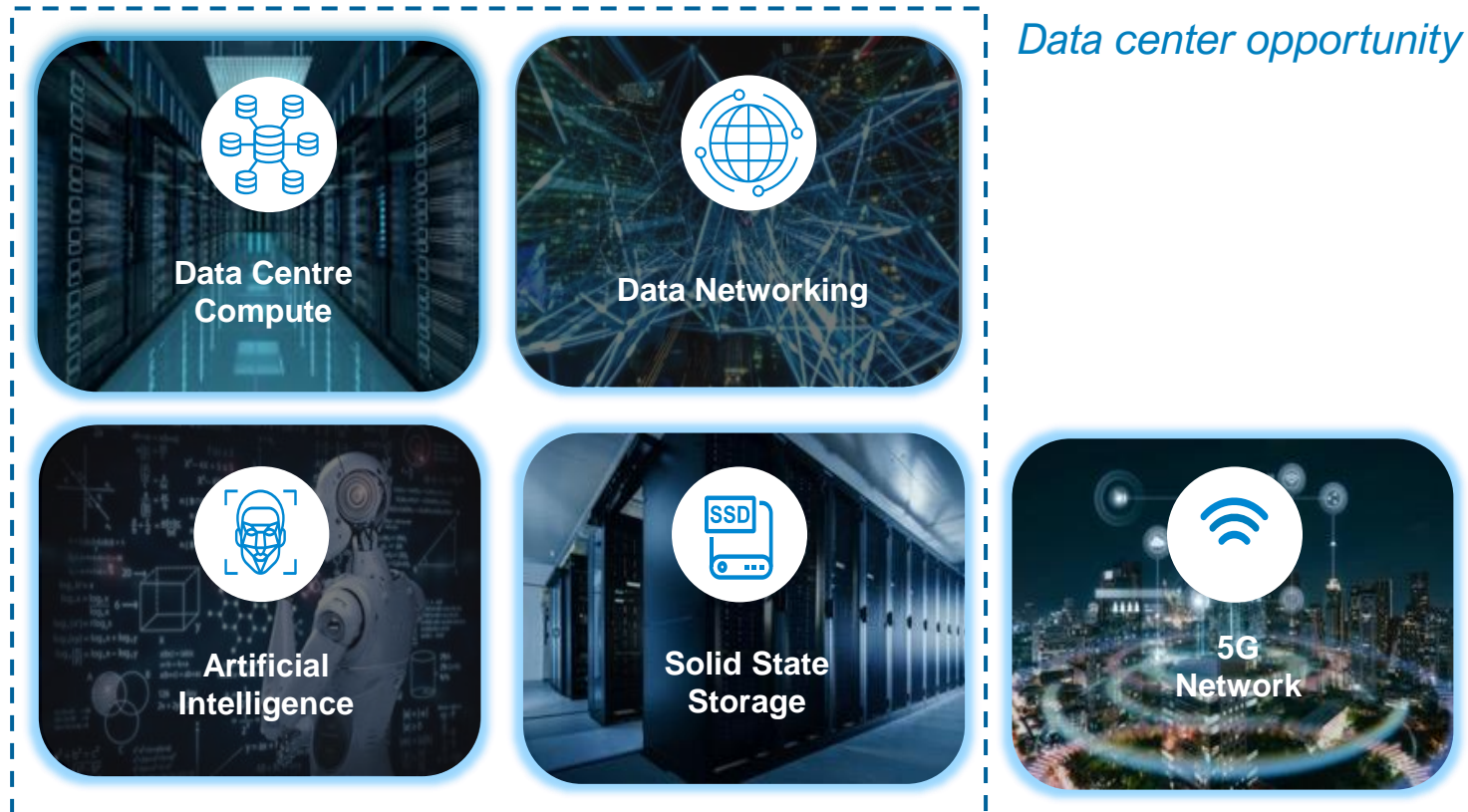


<25 DPPM¹

¹ Defective parts per million



Custom SoC's – Key Market Segments

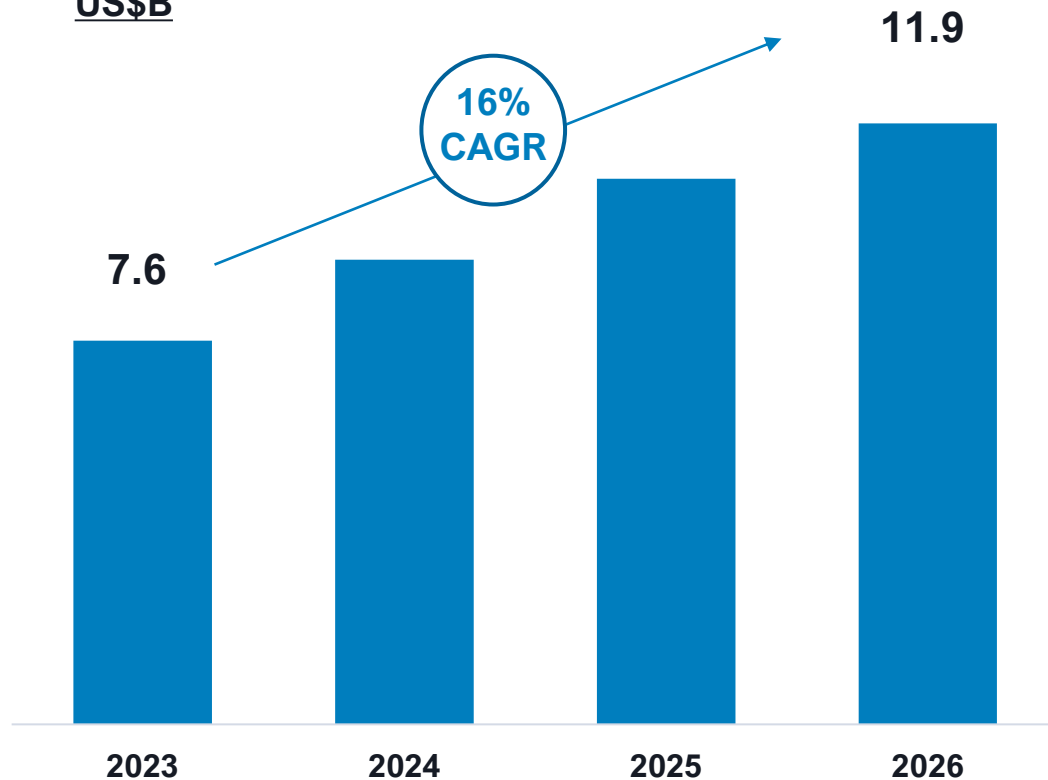


Custom Silicon – All about growth

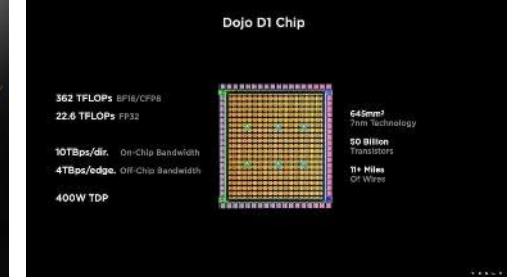
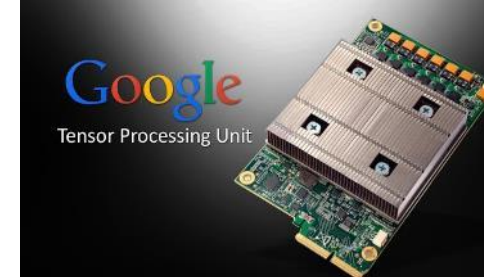
Pushing The Performance Limits for specific use-cases

Custom Silicon Addressable Market

US\$B



- Purpose built custom SoCs leveraging high speed connectivity with increasing levels of compute
- Optimized to specific use cases (Youtube servers, Tesla FSD, accelerators for public cloud, etc)
- Deeply tied to software infrastructure



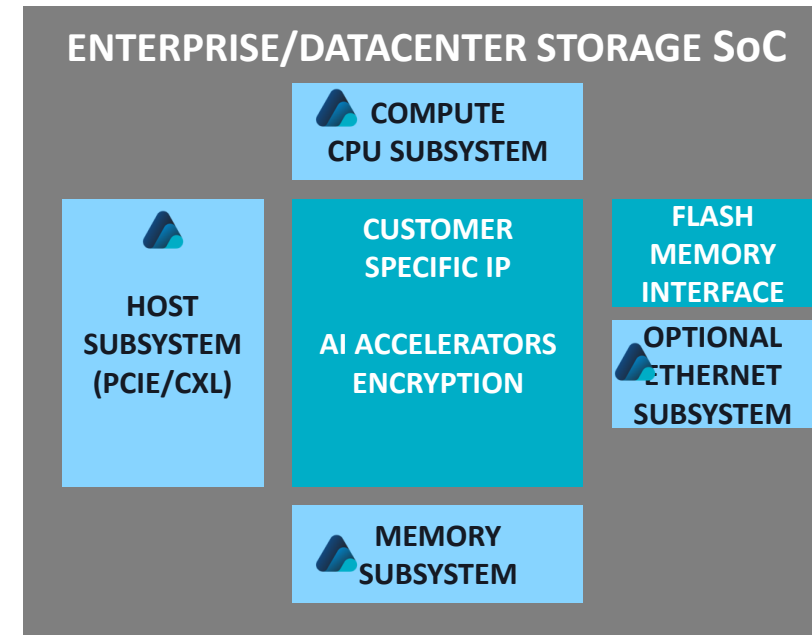
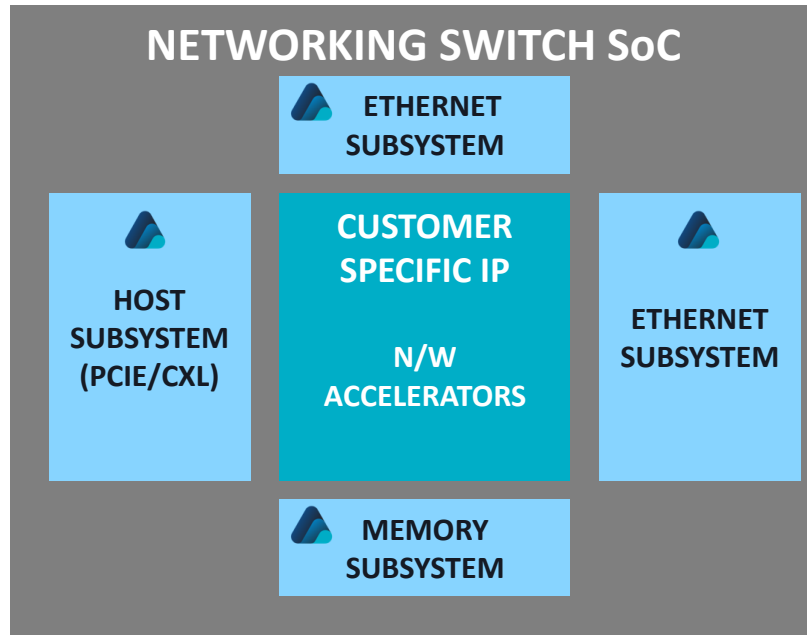
Semico Research Corporation, December 2022,



IP Integration at the Core of SoC Design

From Integrated Device Companies... to Fabless Model... to Specialized Design & “IP-less” Era

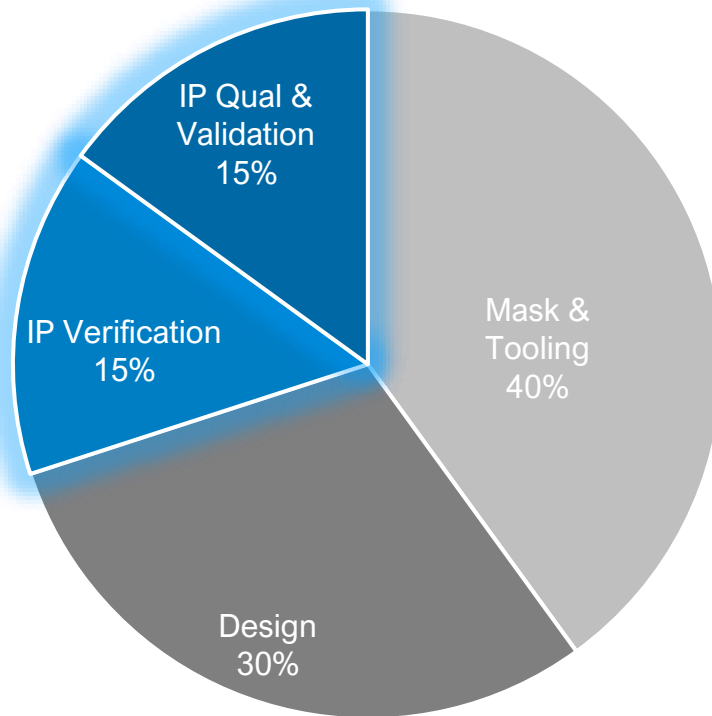
Common IP Sub-systems With Application Specific Customizations



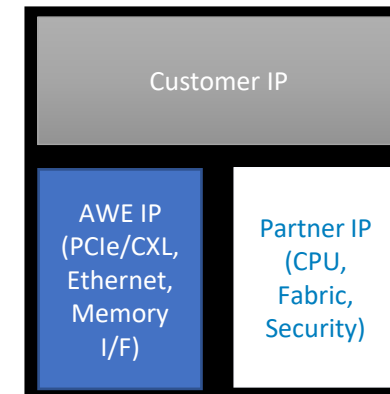
Benefits of Pre-Built “Application Optimized” IP-Subsystems

Lower Costs And Faster Time to Market

Chip Design Costs



- Validation, verification and IP qualification are major cost components of the design of any SoC
- Using pre-built IP-subsystems contributes to cost savings and faster time to market



Future: Chiplets - “More-than-Moore” Solutions

Smaller Disaggregated SOCs

Scalable architecture: adds dies to increase performance

Cost effective due to better yields with smaller die

Reduced time to market by combining custom SoC + available die

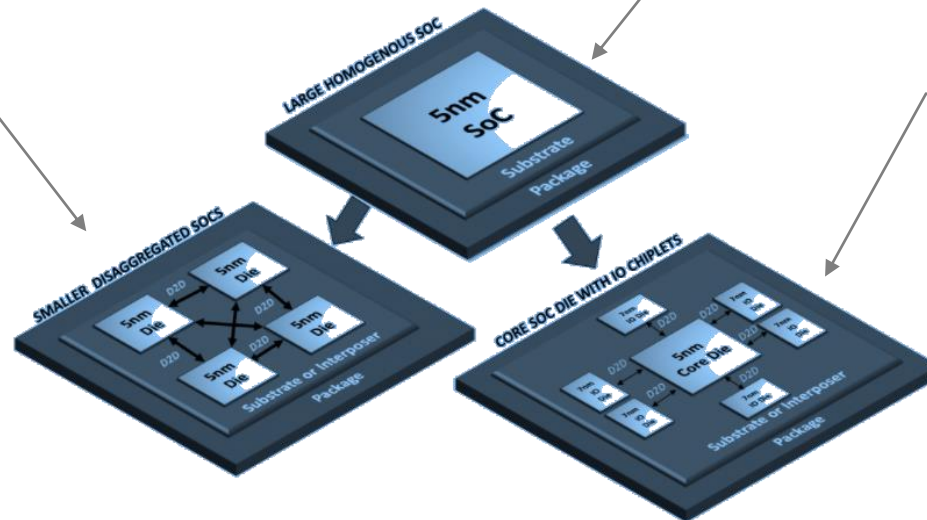
Single System-on-Chip (SoC)

Chip size limited to maximum reticle size

Very large die typically with lower yield and power limit

Bandwidth limited to number of IO (data interconnect) on die

Time to market constrained by design complexity and IP readiness



Core SoC With IO Chiplets

Higher Bandwidth enabled by increased number of IO

Reduced time to market:

- Mix die from different nodes
- Use pre-verified chiplets

Lower development cost by sharing pre-built chiplets across products



Investments in Pre-built Chiplets

Targeted to the focused market segments

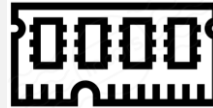
IO Chiplet



Disaggregate Logic and IO

- Integrated PCIe and Ethernet connected over D2D
- Cost advantage to stay in N-1 node for IO chiplet

Memory IO Chiplet



Memory Expansion

- Expand DDR5 memory BW
- Local cache with CPU

Accelerator Chiplet



Co-processor/Accelerator

- ARM/RISC-V high performance multi core
- PCIe and DDRx connectivity

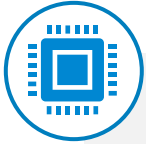


6 Chiplet Engagements



Custom Silicon – Ingredients for Success

Deep custom Silicon Expertise coupled with Connectivity IP Portfolio



Readily available, application optimized IP Sub-systems



Proven design flow and methodology for leading nodes



Experienced engineering teams and advanced (2.5D/3D) packaging expertise

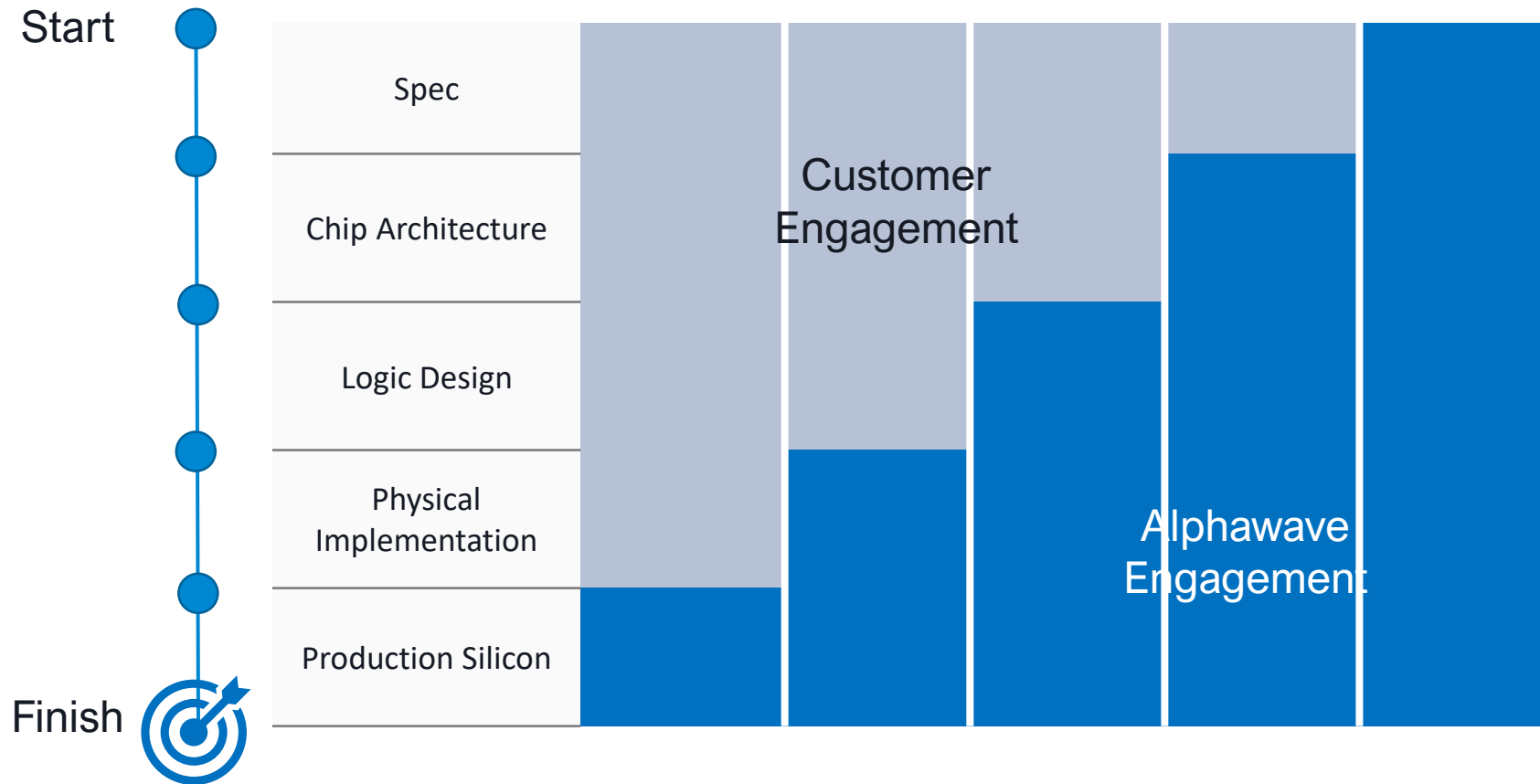


Reliable silicon operations with solid partnerships with manufacturing partners



Flexible and Valued-Added Customer Engagement Model

Complete Spec-to-Silicon Capabilities



Custom Silicon Customer Engagement Phases

Leveraging Connectivity IP portfolio fuelling the design funnel

Design & Pre-production Phase Product Development

From 6 months to 2 years to provide prototypes

- Driven by Non-recurring engineering (NREs)
- From 6-24 months to provide initial prototypes
- Typical NREs: \$20m-\$50m

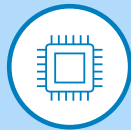
Post-production Phase Product life cycle 5-10 years

From 3 to 6 months to fulfil POs

- Driven by Unit price and volumes
- Takes anywhere from 3-6 months to fulfil the POs
- Product life cycle 5-10 years



10 major new design
wins in 2022



20 tape-outs in
2022



14.5 million units
shipped in 2022



Well Positioned to Grow

Value Proposition Enhanced Significantly With the Newly Integrated Teams



Focus on High
growth market
segments



Drive High value
opportunities



Leverage IP
portfolio to create
differentiation



End-to-end
expertise to
deliver quality
silicon



Drive larger and
long tail revenue
streams





Connectivity Products Group – A New Business Opportunity

Babak Samimi, Senior Vice President and General Manager Connectivity Products Group

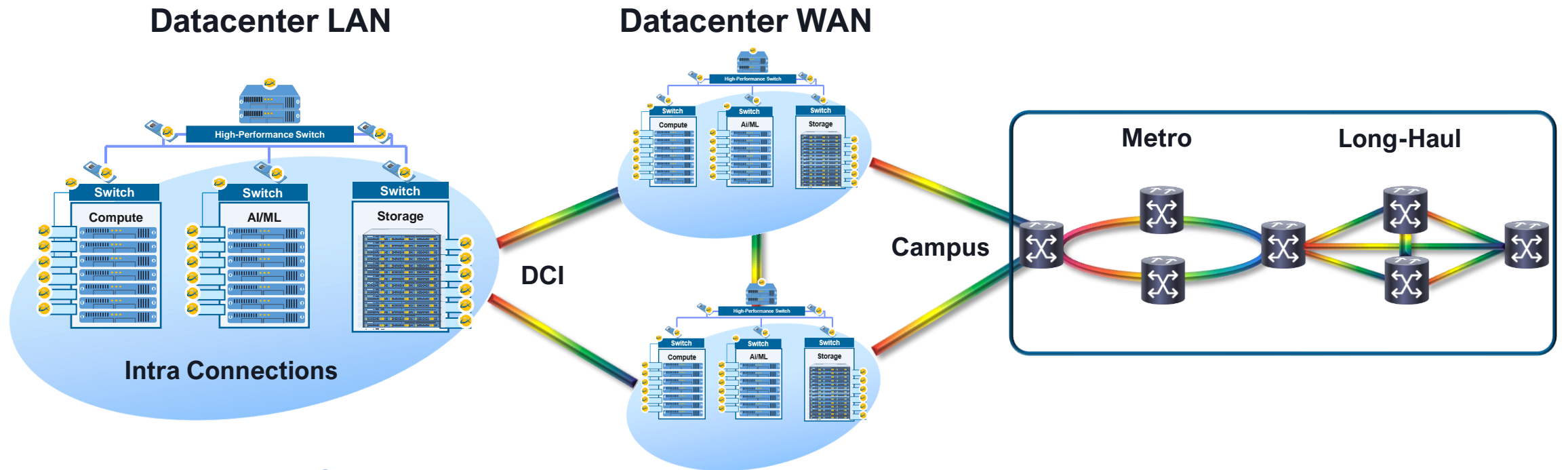
Connectivity Products Group – A New Business Opportunity

- Alphawave is expanding its total solutions offering for the Data Center market
 - Growing from IP licensing to building the required companion connectivity SoC
- Uniquely positioned to leverage our IP portfolio to add a new growing business
- Untaps >\$3B spend on opto-electronics semiconductors for connectivity
 - Dedicated SoC: connect rack-to-rack clusters and across data center campus networks
- Execution is underway, with initial products ramp in 2024



Growing Market Opportunity for Alphawave

1000x Volume Potential in Datacenter LAN(Intra) and WAN(DCI)



Reach

<10km

<100km

>100 to 1000s km

Device volume

10s millions

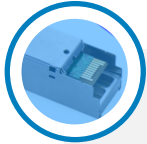
100s thousands

10s thousands



Connectivity Megatrends in Data Centers

Big Data Growth + Processing Disaggregation Demand Unrelenting Innovation



Data Center LAN: CPU/Storage/AI
Connection rates 100Gbps to 1.6Tbps

15x



Big Data Signal Processing
Signalling Complexity:
NRZ → PAM4 to Coherent

200%



Data Center WAN: Campus/DCI¹
Connection rates 100Gbps to 800Gbps

7x



Sustainability
Reduce power per Gbps of connectivity

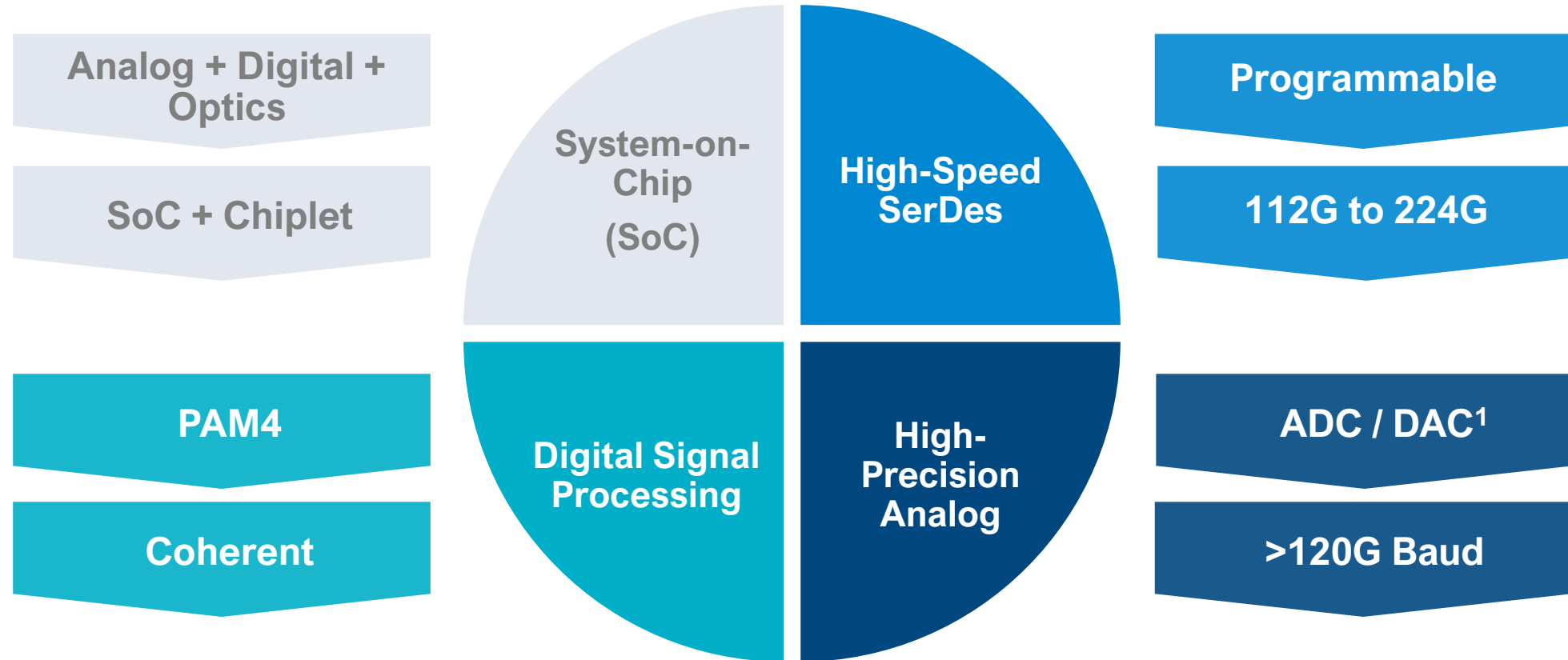
50%

¹ Data Center Interconnect



Critical Technology & Innovations Required

Multi-Disciplined Architectural Expertise Required to Win



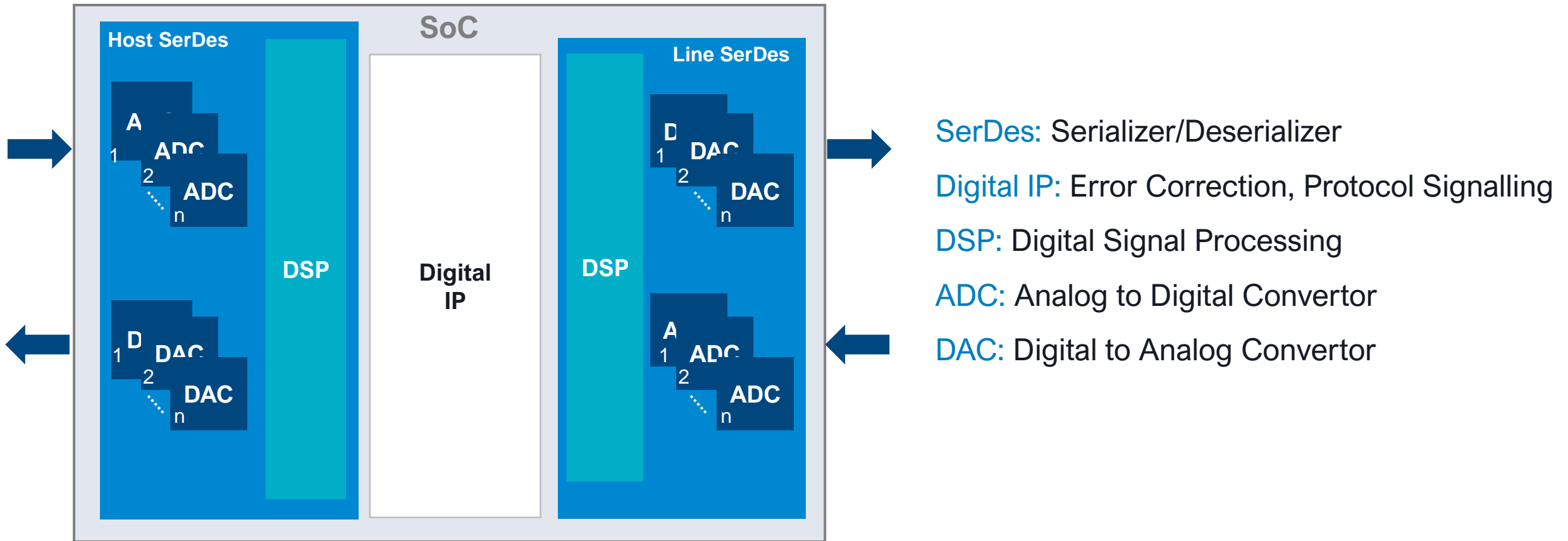
¹ Analog to Digital Conversion / Digital to Analog Conversion



Alphawave Semi Has All The IP Required

IP Assets from Organic Investments and M&A

Anatomy of a Connectivity SoC Solution

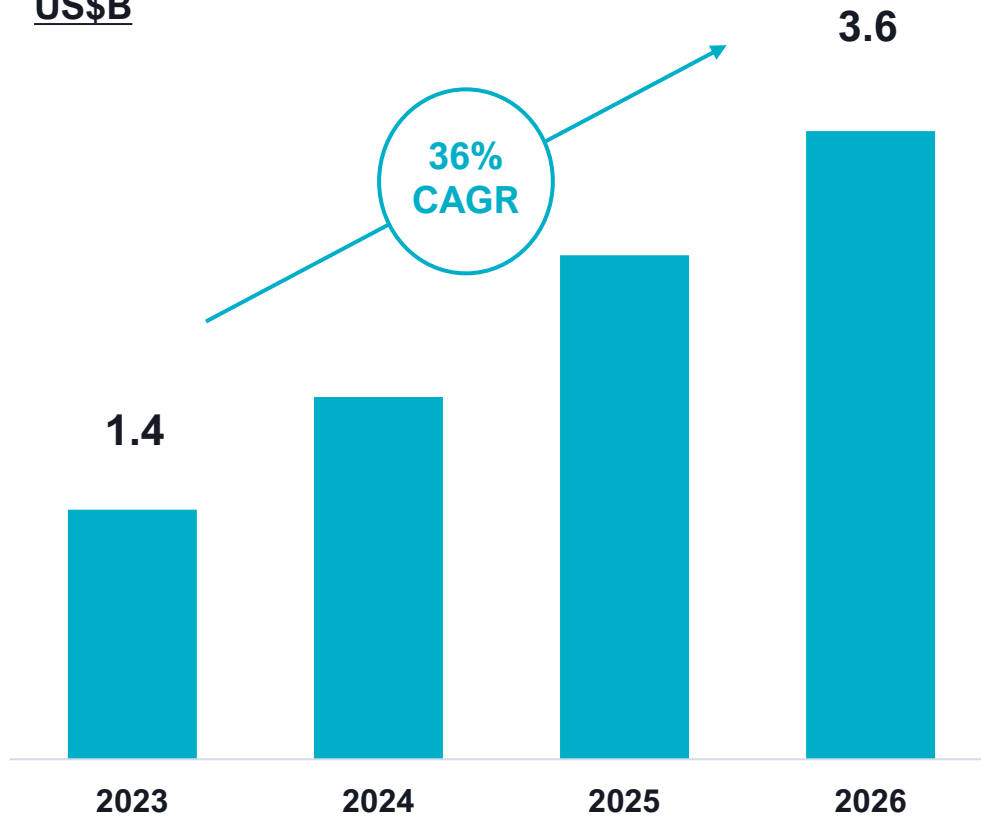


A Growing Addressable Market

First SoCs Going Into Production in 2024

Opto-Electronics Addressable Market

US\$B



Lightcounting, company estimates



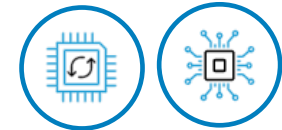
Connectivity SoCs



Silicon IP or Custom Silicon/Chiplet

Customer's Big Data Processors

- Compute
- Storage
- AI/ML
- Switching



A New Business Opportunity

- Building on the foundations of our leading-edge capabilities and technologies
- Growth in Big Data and disaggregation of compute/storage processing will continue to demand complex innovations in opto-electronics connectivity solutions
- Industry is in the early innings of growth in PAM4 and Coherent adoption into data center networking – decadal investment cycle by the Hyperscalers

Anchored by the US\$300m multi-year agreement with a leading North American hyperscaler, this business will significantly contribute to long-term revenue growth through the economic cycle





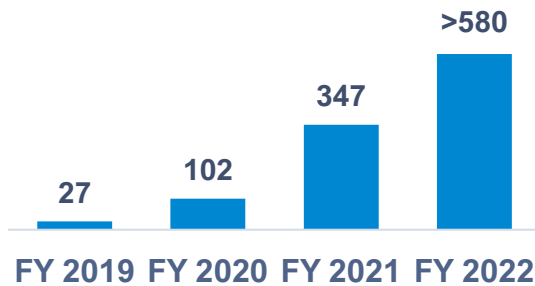
Financial Overview

Daniel Aharoni, Chief Financial Officer

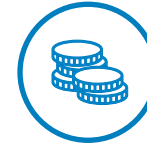
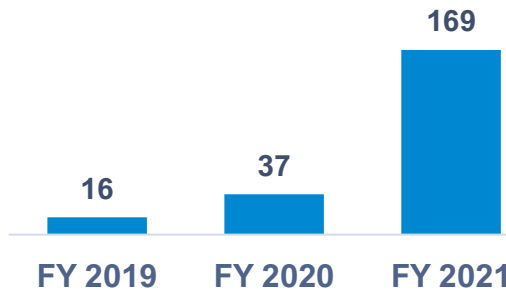
Strong Performance of Core IP Business



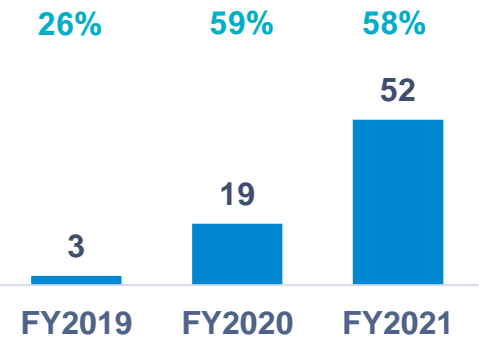
Cumulative Bookings (US\$m)



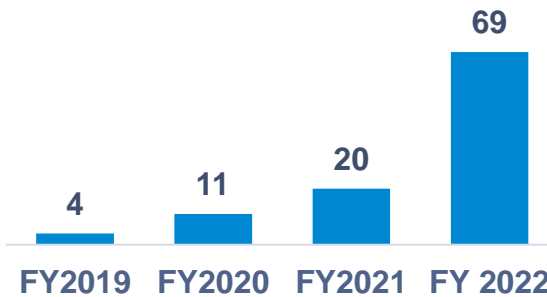
Backlog (US\$m)



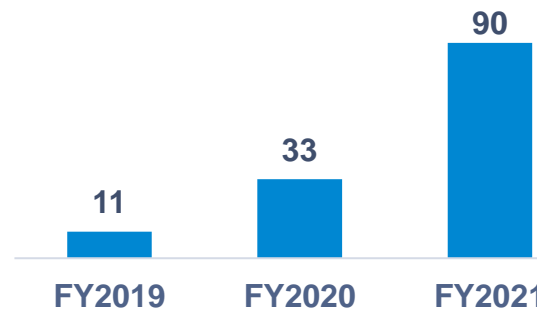
Adjusted EBITDA and Margin (US\$m)



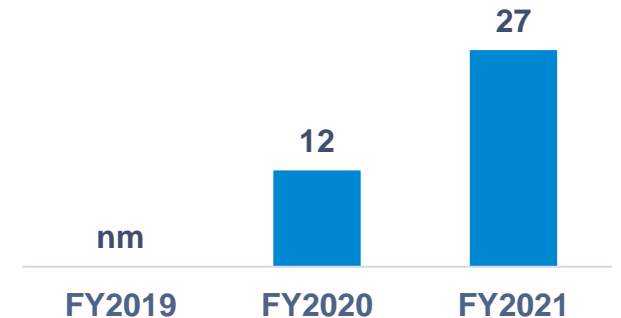
End Customers¹



Revenue (US\$m)



Pre-Tax Operating Cashflow (US\$m)



For definition of bookings, backlog and adjusted EBITDA see slide 94

¹ As reported in Q4 2022 trading update. Includes customers from OpenFive who were not already customers of Alphawave and who signed contracts over from 1st September 2022. Revenue generating customers will be reported at FY 2022 results

Financial Roadmap



Opportunities for Growth

- Expanded TAM leveraging core IP with new routes to market
- Monetise core technology through IP Licensing and Silicon
- Coherent DSP technology for optical applications



Operational Efficiency

- Integrate and deliver on synergies from acquisitions
- Leverage expertise across enlarged group



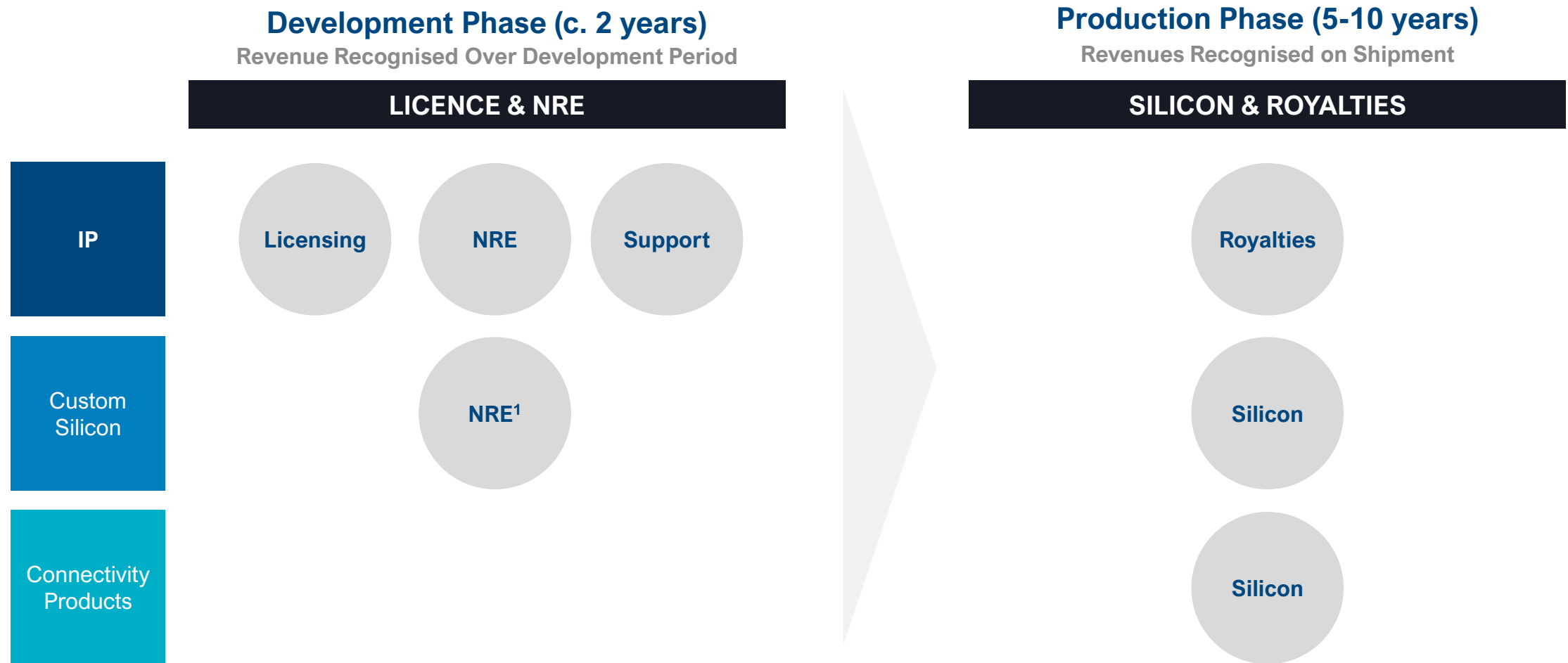
Disciplined Capital Allocation

- Targeted investments in organic growth
- Optionality to pay down debt



Monetise Core IP Through Licensing and Silicon

Design Wins Lock in Long Tail of Royalties or Silicon Revenues



¹ Includes IP, engineering, and masks & tooling

Revenue Trends

Increased Visibility to US\$500m Revenue Run Rate in the Medium-Term

Development Phase (c. 2 years)

Revenue Recognised Over Development Period

LICENCE & NRE

IP

- Typical pay-per-use IP licence US\$5m-US\$10m
- Multiple larger recurring revenue deals in pipeline
- Continuing momentum at 5nm and 3nm
- Acquisition synergies through bundled IP

Custom
Silicon

- Typical opportunity US\$20m+
- Executing on acquired pipeline
- Leveraging our IP to target higher value opportunities

Connectivity
Products

- New business opportunity
- Self-funded - no revenues during development phase

Production Phase (5-10 years)

Revenues Recognised on Shipment

SILICON & ROYALTIES

- First royalties paid in 2022
- Expected to contribute to earnings in 2023 and 2024
- Executing on acquired backlog of over US\$150m¹
- Long-tail of silicon revenues
- Strategic focus on high-end silicon opportunities
- First revenues expected in 2024
- Engagement with major US hyperscaler
- First design win in Q4 2022

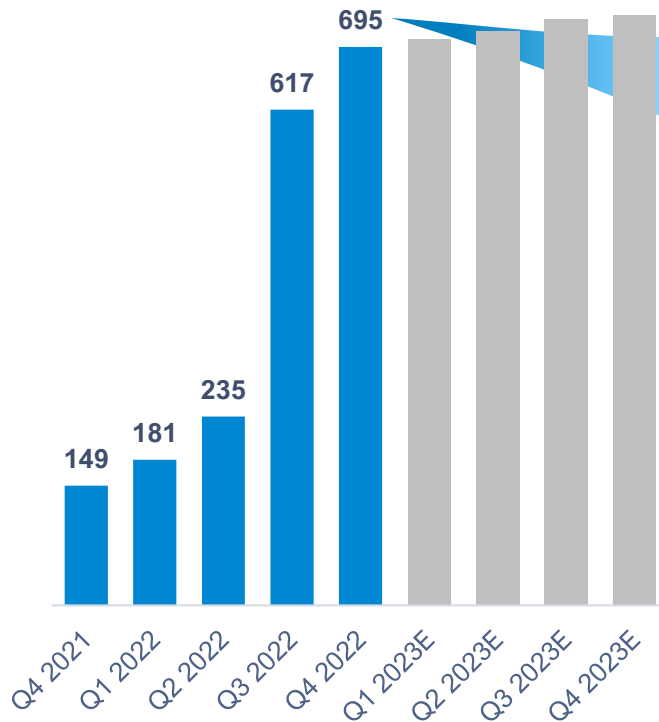


¹ Estimate, subject to purchase price accounting and acquisition accounting adjustments

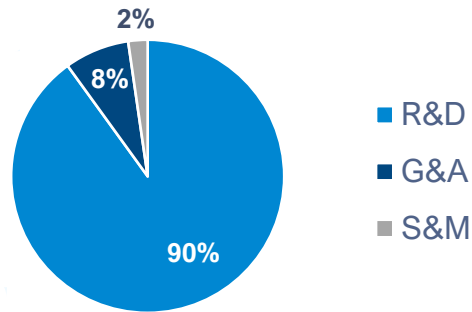
Headcount Increase Driven by M&A and Organic Recruitment

Technology Led Organisation – 90% Employees in R&D / Engineering

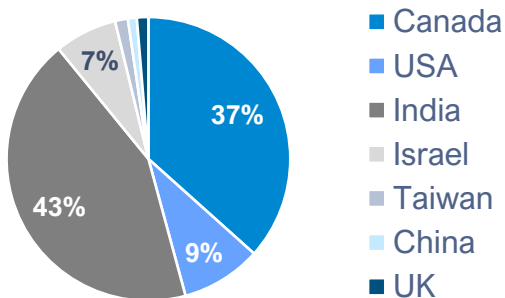
Number of Employees



By Function¹



By Region¹



¹ Due to rounding, percentages may not precisely reflect the absolute figures

- Focus on critical hires to support growth opportunities
- Targeting <10% headcount growth in 2023

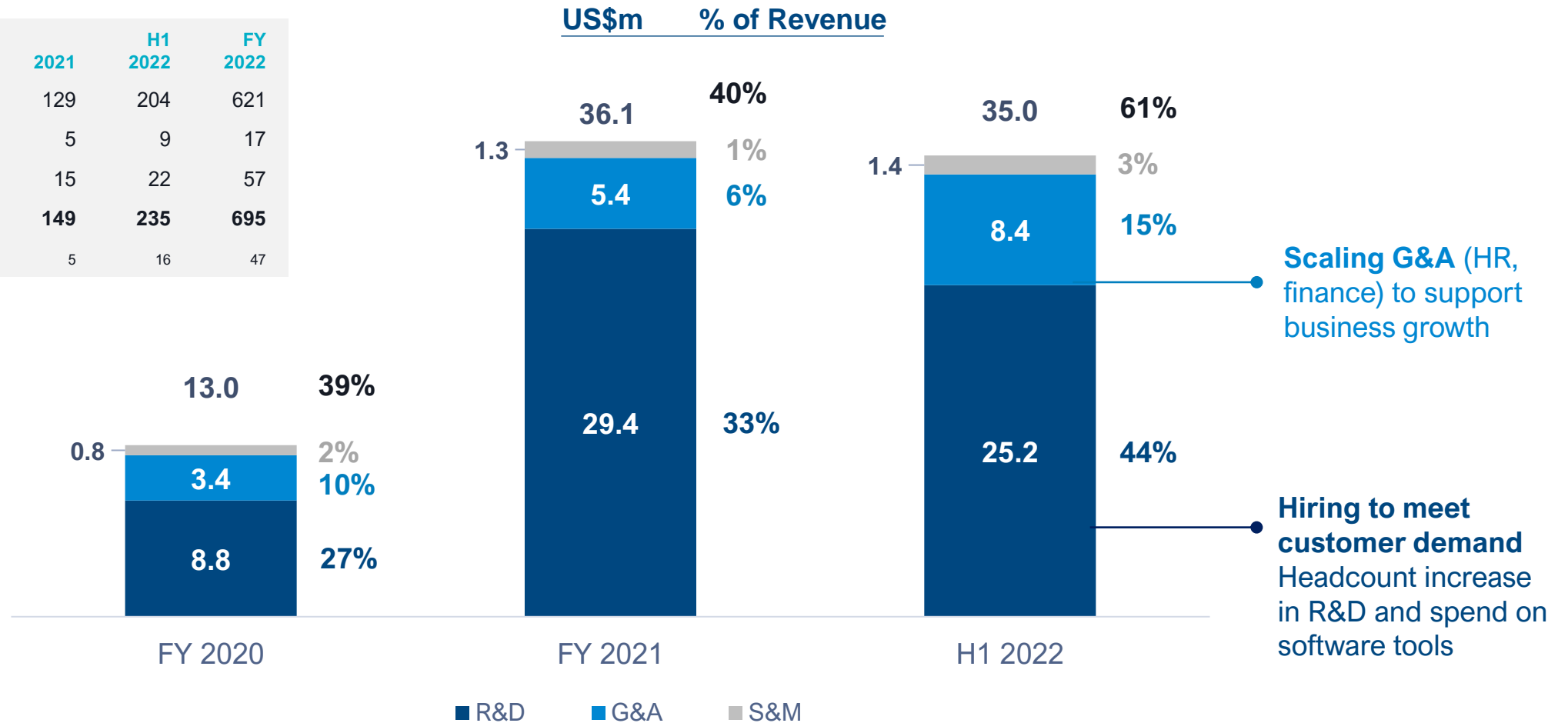
Main Locations



Strong Focus on Operational Efficiency

Targeting 30% Medium-Term Opex % of Revenue

Closing Headcount	2020	2021	H1 2022	FY 2022
R&D	65	129	204	621
S&M	2	5	9	17
G&A	4	15	22	57
Permanent	71	149	235	695
Interns	1	5	16	47



Operating expenses include depreciation and exclude IPO-related expenses, one-time M&A related expenses, share-based payments and FX gains and losses

Disciplined Capital Allocation

Targeted Capital Deployment Over the Next Two Years



Organic Growth

- Focus on critical hires/expertise to support growth opportunities
- Investment in own product development and prototyping



Debt Repayment

- Optionality to pay down debt with cash on hand
- Strategy driven by USD/GBP exchange rates and interest rates



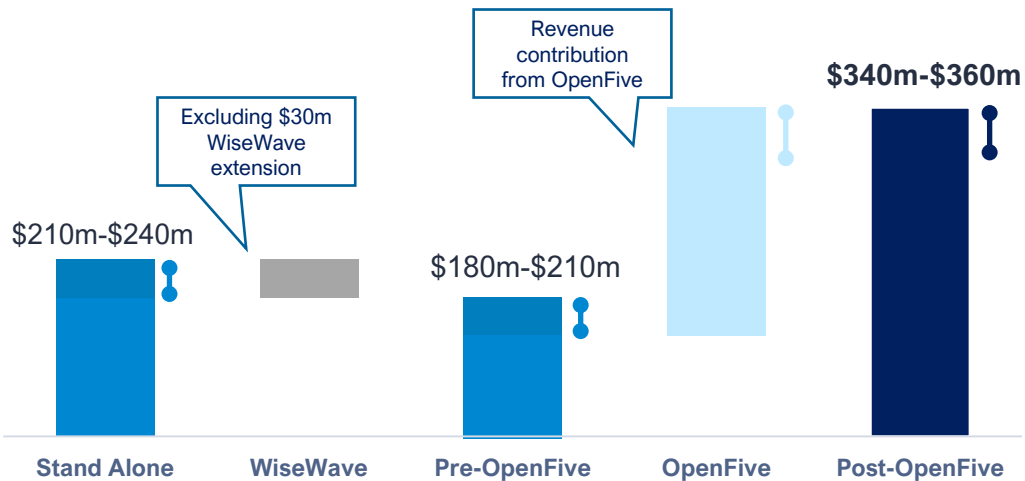
M&A

- No significant M&A planned



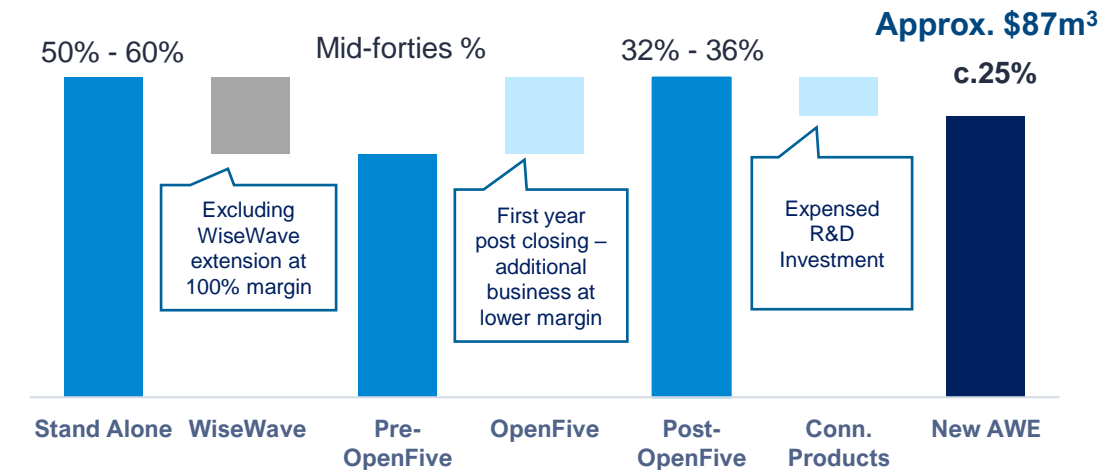
2023 Guidance Post-Banias

Revenues¹ (US\$m)



- Lower end of revenue guidance increased given strong performance in Custom Silicon and early realization of synergies
- Banias acquisition not expected to generate revenues until 2024

Adjusted EBITDA^{1,2} (US\$m) and Margin



- Tail of profitable but lower margin custom silicon revenues acquired
- Product R&D investment expected to be partially capitalised under IAS38 given commercial and technical feasibility



1 Charts not drawn to scale

2 For the definition of adjusted EBITDA see slide 94

3 At the mid-point of the guidance range, assuming 25% adjusted EBITDA margin

Medium-Term Operating Model

US\$	2023	2025
Revenues	\$340-360m	\$500m
Gross margin		c.60%
Opex %		c.30%
R&D %		<i>Below 20%</i>
Adjusted EBITDA¹	Approx. \$87m	Approx. \$150m
Adjusted EBITDA %	c. 25%	c.30%
Capex (exc. Cap R&D)	c. 12%	c. 10%

- 2023-2025 revenue CAGR of approximately 20%
- Operating expenses as a percentage of revenue gradually decreasing towards 30%
- Adjusted EBITDA growing faster than revenue over the period resulting in 5% improvement in adjusted EBITDA margin
- Capex increase driven by investment in own products

¹ 2023 assumes mid-point of the guidance range and 25% adjusted EBITDA margin; 2025 assumes US\$500m revenue and 30% adjusted EBITDA margin



Key Takeaways

- Capital deployment in 2022 accelerated our transition to a vertically integrated business
- Creates significant further opportunities for growth and TAM expansion
- Continued disciplined financial management and increased operating efficiency
- Capital allocation focused on debt paydown and targeted organic investment



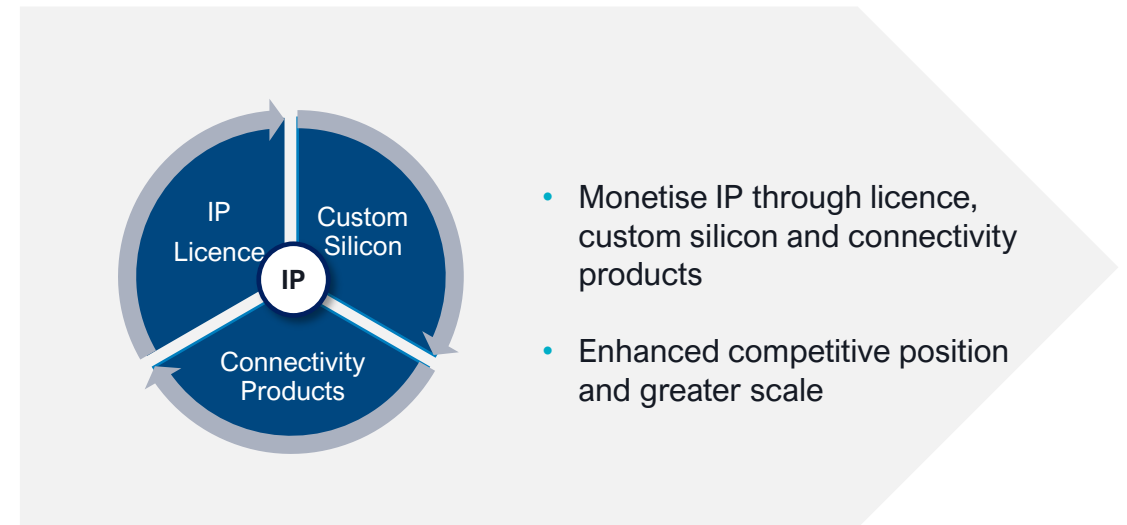
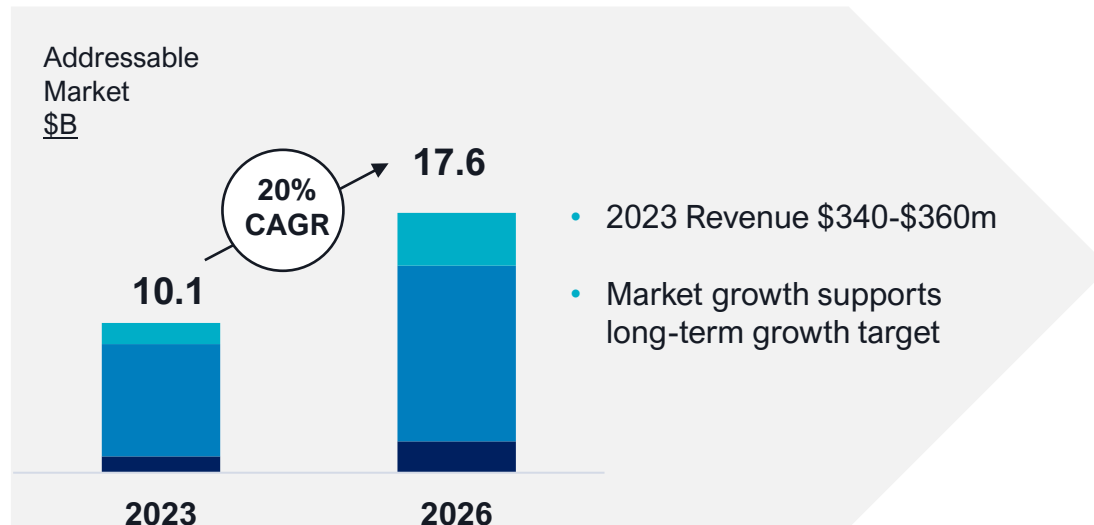


QA Session

Greater Scale of Vertically Integrated Model

Delivering Accelerated Revenue Growth

- High-growth expanded addressable market accessible by vertically integrated business
- Wider offering of connectivity silicon IP, custom silicon and opto-electronic products focused on data centers and wireless infrastructure
- Supports our long-term ambition of \$1 billion revenue run rate by 2027

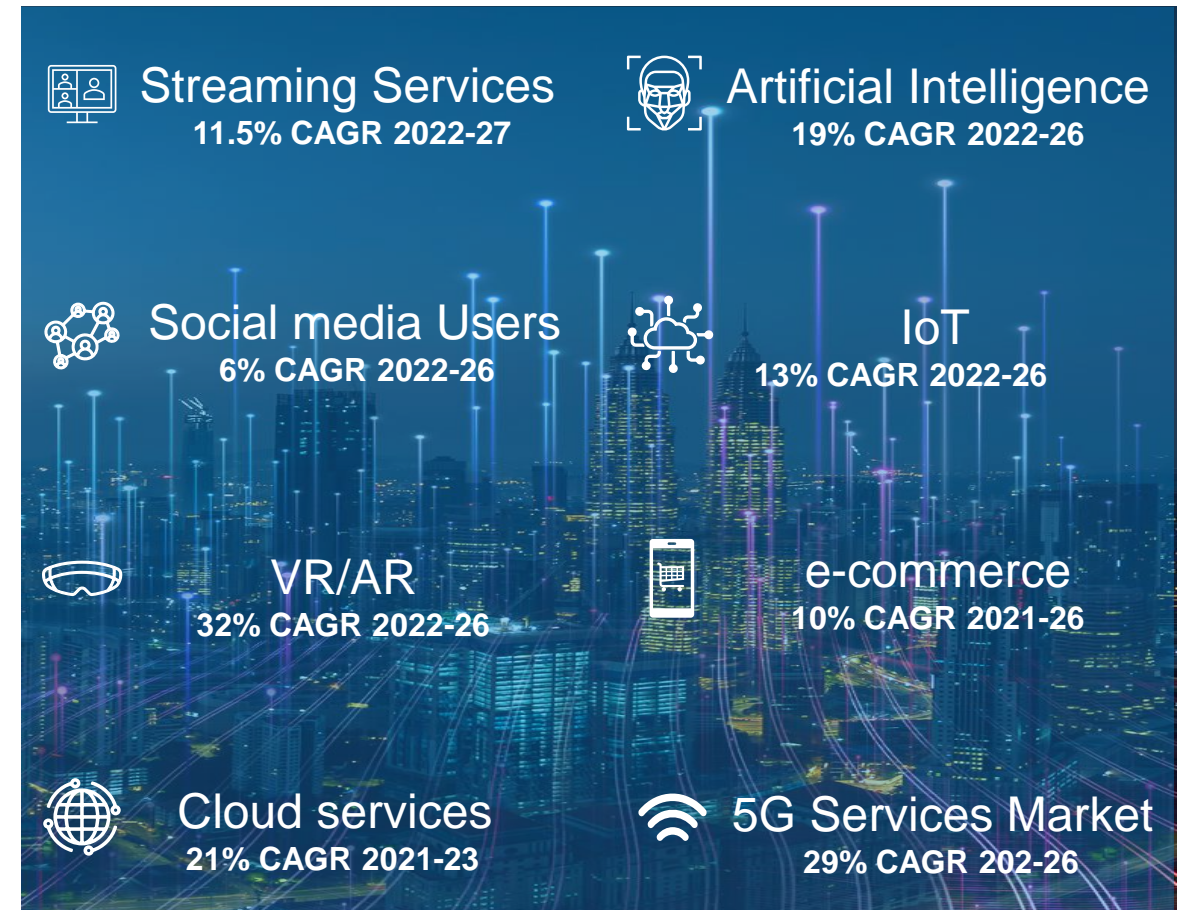




Thank You!

References Slides 15 and 32

- **Streaming Services** [Video Streaming \(SVoD\) - Global | Statista Market Forecast](#) Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 11.48%, resulting in a projected market volume of US\$139.20bn by 2027
- **Social Media Users** [Number of worldwide social network users 2027 | Statista](#) Number of users from 4.26 billion in 2021 to almost six by 2027
- **VR/AR** [IDC Spending Guide Forecasts Strong Growth for Augmented and Virtual Reality](#) The five-year compound annual growth rate (CAGR) for AR/VR spending will be 32.3%. Virtual reality will account for more than 70% of all AR/VR spending throughout the 2022-2026 forecast
- **Cloud Services** [Gartner Forecasts Worldwide Public Cloud End-User Spending to Reach Nearly \\$500 Billion in 2022](#) 2021:\$419m 2023 \$600m
- **AI** [IDC Forecasts 18.6% Compound Annual Growth for the Artificial Intelligence Market in 2022-2026](#)
- **IoT** <https://www.statista.com/statistics/1183457/iot-connected-devices-worldwide/>
- **e-commerce** [Global Ecommerce Growth Forecast 2022 | Morgan Stanley](#) Over the long term, the e-commerce market has plenty of room to grow and could increase from \$3.3 trillion today to \$5.4 trillion in 2026.
- **5G Services Market** [Global 5G Services Market Size is Anticipated to Reach \(globenewswire.com\)](#) The global size to grow from USD 53.0 billion in 2020 to USD 249.2 billion by 2026, at a Compound Annual Growth Rate (CAGR) of 29.4% during the forecast period.



Non-GAAP Metrics

See note 4. to the accounts **Alternative Performance Measures H1 2022 Interim Report and FY 2021 Annual Report** at <https://www.awaveip.com/en/investors/results-reports-presentations/>

- Bookings are a non-IFRS measure representing legally binding and largely non-cancellable commitments by customers to license our technology. Bookings comprise licence fees, non-recurring engineering, support and, in some instances, our estimate of potential future royalties.
- Backlog is a non-IFRS measure representing our bookings less revenues recognised to date.
- Adjusted EBITDA excludes IPO-related non-recurring costs, foreign exchange adjustments, share-based payments, M&A-related expenses and one-time legal fees associated with WiseWave.

