

OpenInfra Day Turkey 2022

Broadcom: Company overview and Ethernet products

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Agenda

- **General Information**
 - Broadcom at a Glance
 - Organization Overview
 - Ethernet NIC Overview (Controllers, Adapter Cards)

Broadcom at a Glance



FY21 net revenue
of **\$27.5B**



\$4.9B investment
in R&D in FY21

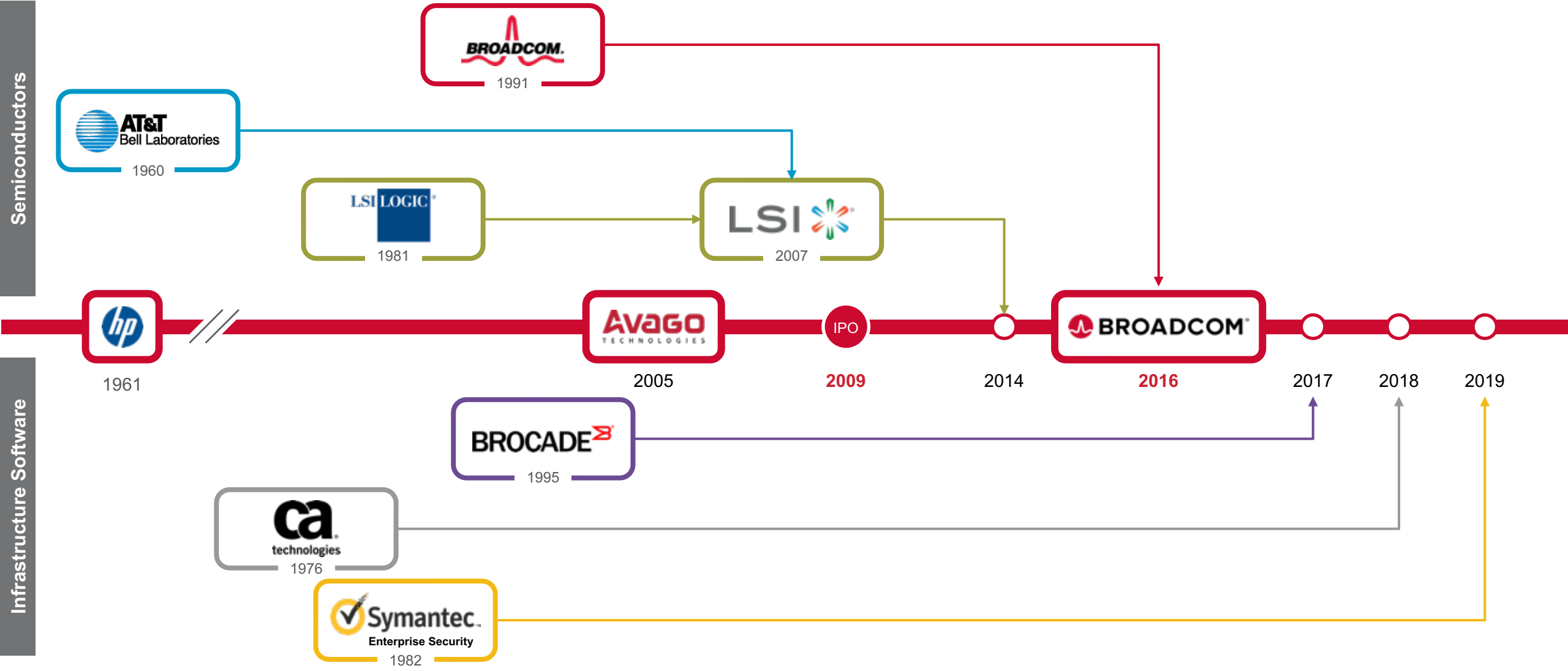


One of the industry's
broadest IP portfolios with
>19,000 patents in FY21



22 Category-Leading Semiconductor and Infrastructure Software Divisions

Heritage of Innovation



Server/Storage Connectivity: On-Premises and Cloud

Enterprise



Hyperscale Data Center



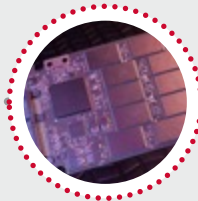
Fibre Channel HBAs



Fibre Channel SAN Fabric



RAID Adapters



SSD/HDD Controllers / Preamp



Ethernet NIC

Networking: High-Performance Connectivity

Enterprise



Service Provider



Hyperscale Data Center



Switching



Routing





















Physical Layer

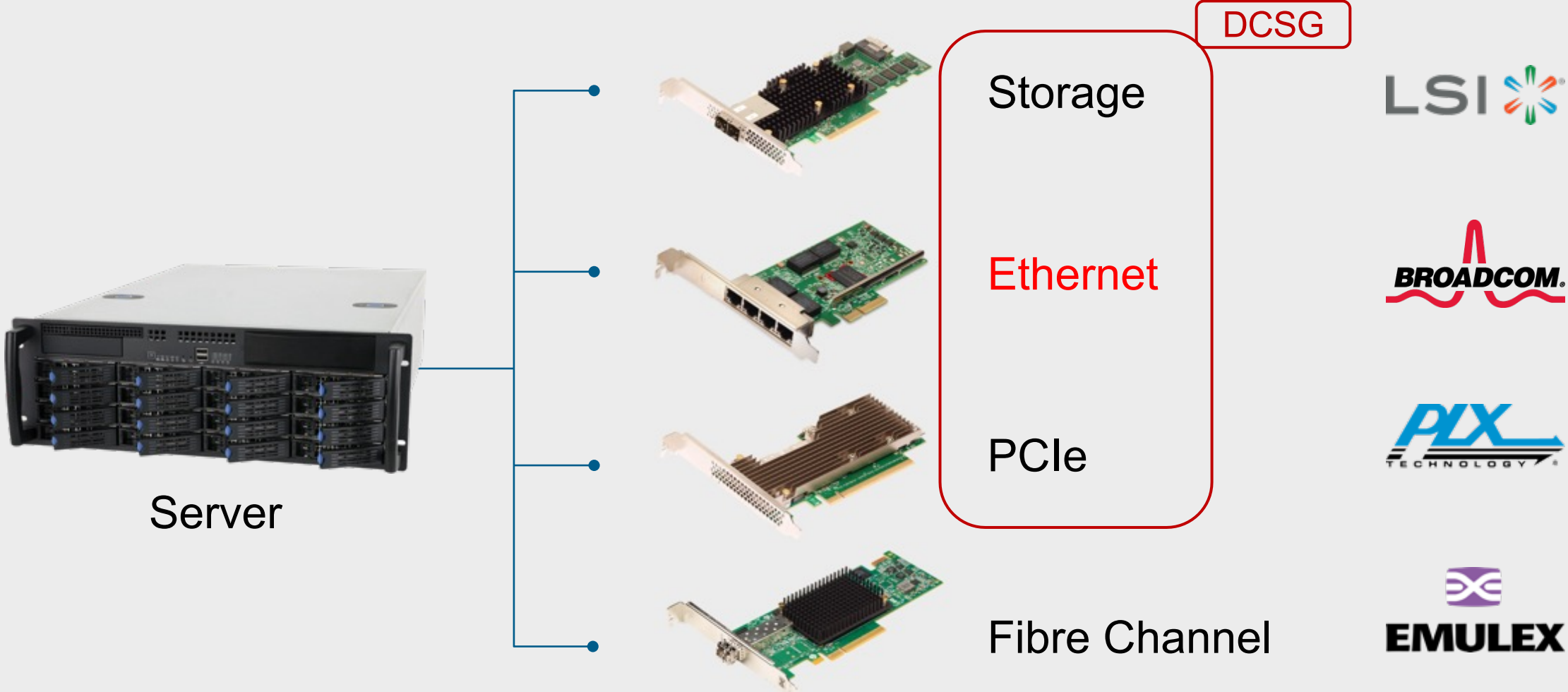


Optical Interconnect

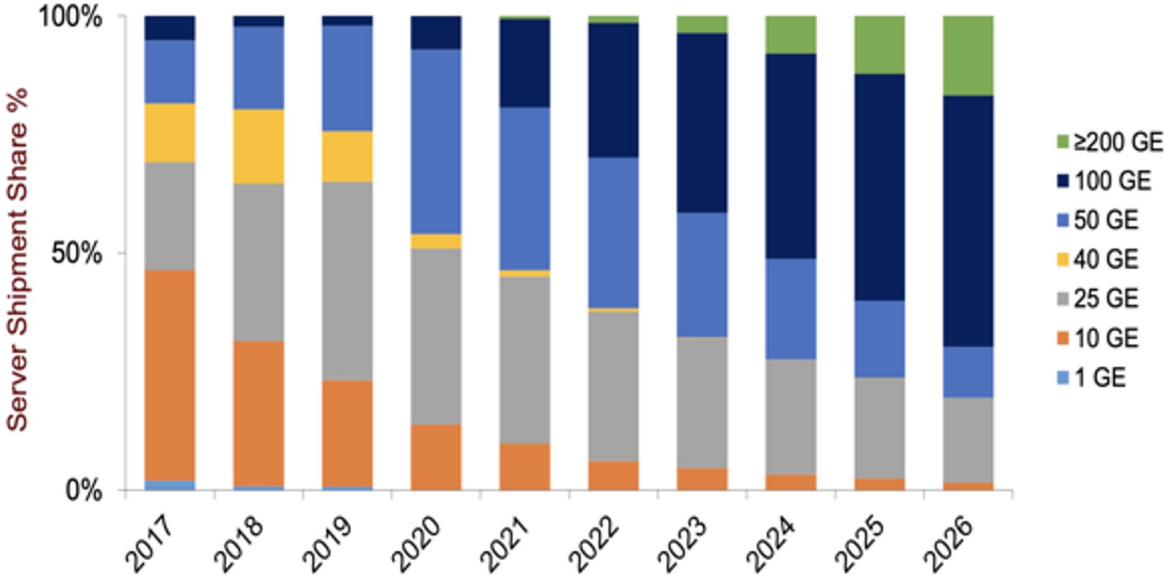
Leader in Server Connectivity

	 BROADCOM®	 intel	 NVIDIA.	 Microsemi.	 MARVELL™
 Storage					
 Ethernet					
 PCIe					
 Fibre Channel					

Largest Enterprise Server Connectivity Portfolio

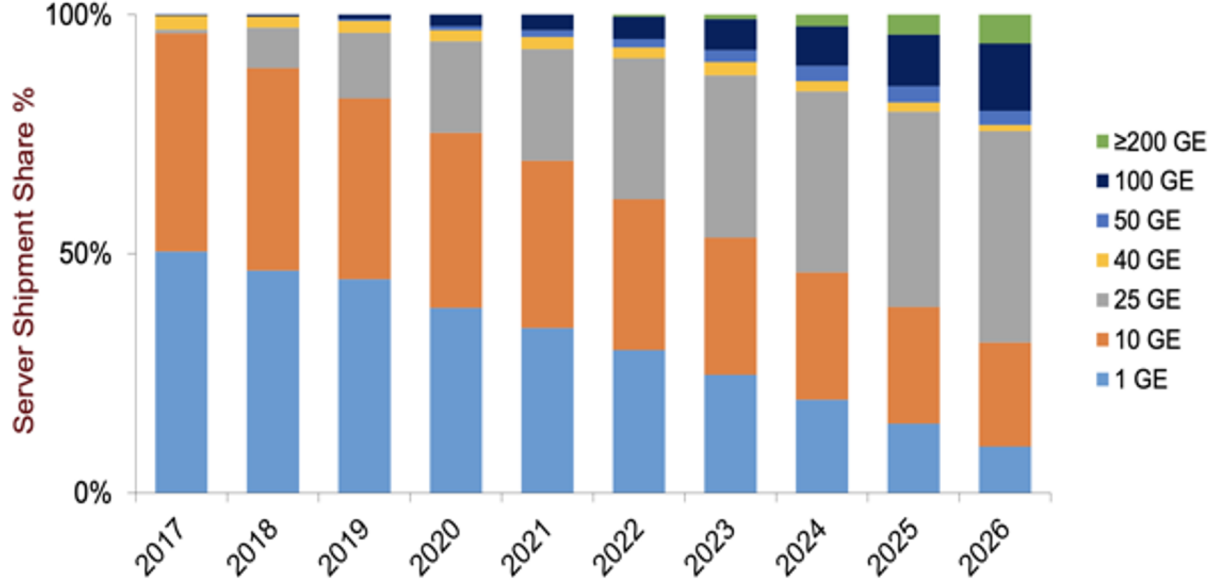


Link-Speed Trends



Cloud Link-Speed Forecast

Cloud: All about 100G+



Enterprise Link-Speed Forecast

Enterprise: All about 10G & 25G

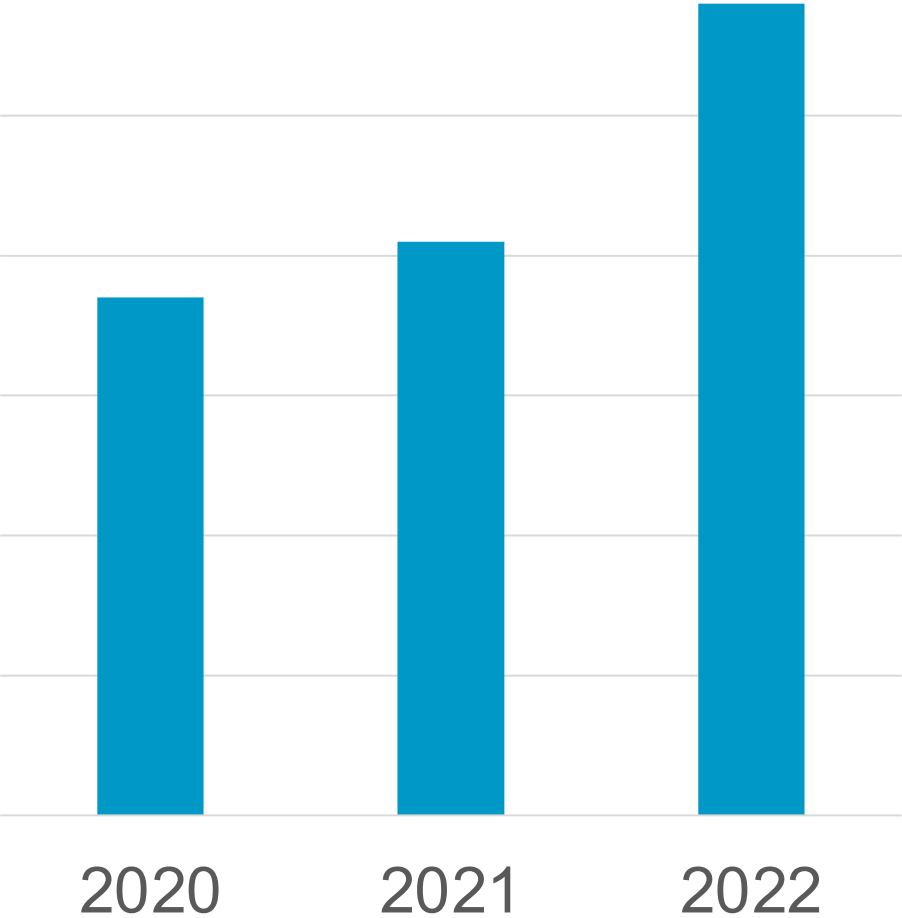
Source: Dell'Oro Group Inc. – Ethernet Controller and Adapter Market Update 4Q21



DCSG Supply Assurance and Scale Initiatives

Strategy	Initiatives
1. Newer process node (16nm) migration	40/28nm → 16/5nm
2. Multiple board factories	Ethernet NIC 1 → 3 factories
3. Multiple source focus	27 projects
4. Increased test capacity	2 to 3x increase
5. Significant component buffer stock	High Investment

DCSG Production Capacity



Broadcom Ethernet NIC Portfolio

Controllers



Adapters



OCP 2.0



OCP 3.0



OEM Mezz



PCIe NIC

Markets



Cloud



Enterprise



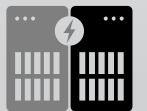
Telco SP



Embedded



Machine Learning

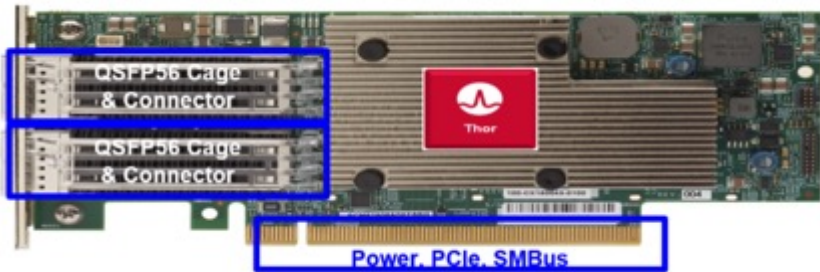


Storage

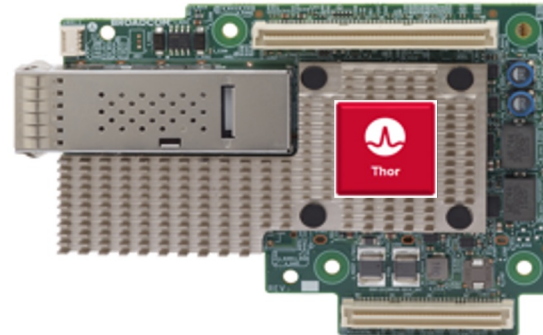
20+ years of proven software leadership: Consistent and Simplified
Features, management, security, performance

Ethernet NIC Form Factors

Specification	PCIe	SMBus	NC-SI	Multi-Host	USB	UART	Notes
PCIe CEM	X	X					
OCP Mezz 2.0	X	X	X	X			PCIe Gen3 OK, Gen4 ready
OCP NIC 3.0	X	X	X	X	X	X	PCIe Gen4 OK, Gen5 ready



BCM957508-P2100G



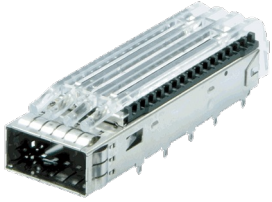


BCM957504-M1100G16

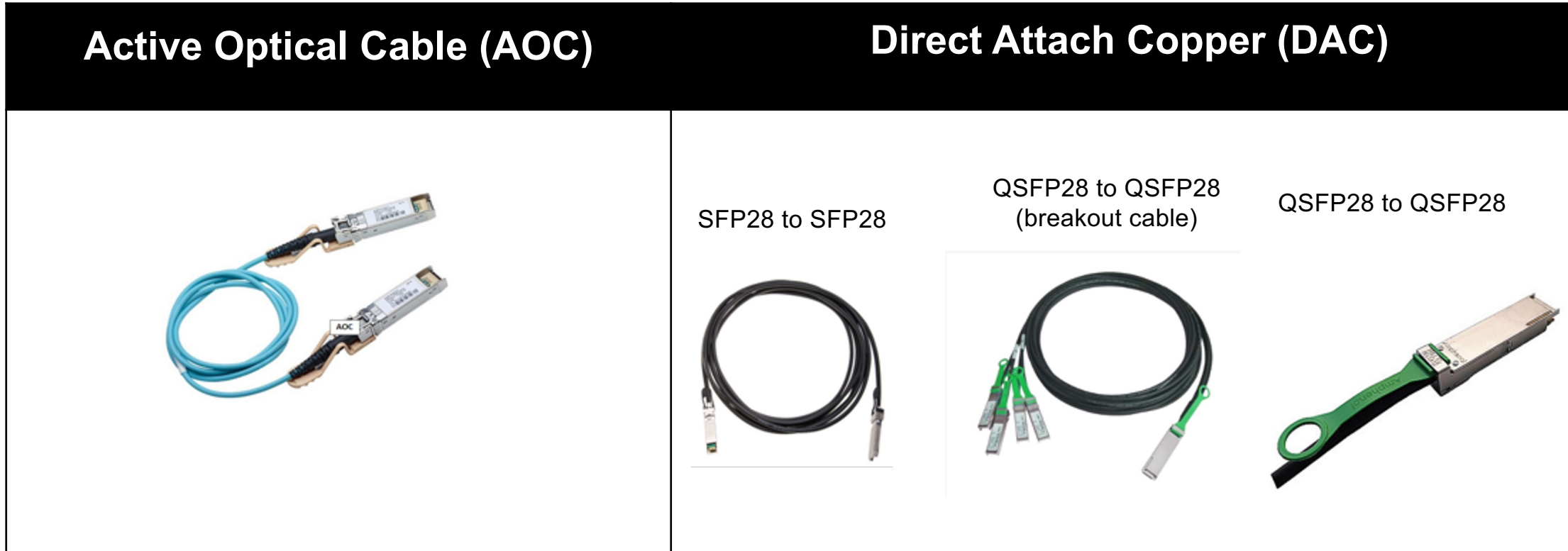


BCM957504-N1100G

Port Connector Types

	RJ45	SFP	QSFP
			
Types	Cat5e for 1GBASE-T Cat6e for 10GBASE-T	DAC, AOC, Optical transceiver	
Speed	10G 1G 100M 10M	SFP56: 50G SFP28: 25G SFP+: 10G SFP: 1G	QSFP56: 200G QSFP28: 100G QSFP+: 40G
Lanes/Pairs per connector	4 TRD pairs	1 MRS lane	4 MRS lanes

Types of cable and interconnects



QA'ed transceivers and cables:

https://techdocs.broadcom.com/us/en/storage-and-ethernet-connectivity/ethernet-nic-controllers/bcm957xxx/1-0/installation_3/connecting-the-network-cables.html



Ethernet NIC Roadmap



NIC Controller ASIC

Device Name	NX1		Whitney+			
Product	5720	5719	57412	57414	57416	57417
Bandwidth	2G	4G	25G	50G	25G	50G
Ethernet ports	2	4	2	2	2	2
1GBASE-T / 10GBASE-T	1GBT	1GBT	-	-	✓	✓
Primary Link-Speeds	2x 1G	4x 1G	2x 1/10G 1x 25G	2x 1/10/25G 1x 50G	2x 1/10GBT 2x 1/10G	2x 1/10GBT 2x 1/10/25G
Network Serdes	1G	1G	28G NRZ	28G NRZ	28G NRZ	28G NRZ
PCIe Host Interface	Gen2	Gen2	Gen3 x8	Gen3 x8	Gen3 x8	Gen3 x8
Multi-Host	No	No	No	No	No	No
NPAR	-	-	x16	x16	x16	x16
RoCE v2	-	-	✓	✓	✓	✓
Silicon Root of Trust	-	-	✓	✓	✓	✓
Attestation	-	-	-	-	-	-
IEEE1588 PTP	-	-	T-TSC	T-TSC	T-TSC	T-TSC
TLS / kTLS HW offload	-	-	-	-	-	-
ASIC power (Typical)	1.7W	2.9W	4W	5W	8W (10GBT)	8W (10GBT)
Process	65nm	65nm	28nm	28nm	28nm	28nm
Package Type/Size (mm)	FCBGA 17x17	FCBGA 17x17	FCBGA 14x14	FCBGA 14x14	FCBGA 23x23	FCBGA 23x23
Availability	In Production	In Production	In Production	In Production	In Production	In Production
EOL	2031	2031	2036	2036	2036	2036
Part Number	BCM5720	BCM5719	BCM57412	BCM57414	BCM57416	BCM57417

NIC Controller ASIC

Device Name	Thor			Thor2
Product	57502	57504	57508	57608
Bandwidth	50G	100G	200G	400G
Ethernet ports	4	4	4	4
1GBASE-T / 10GBASE-T	-	-	-	-
Primary Link-Speeds	4x10G, 2x25G 1x 50G	4x 25G, 2x50G 1x 100G	4x 50G 2x 100G, 1x 200G	4x 100G 2x 200G, 1x 400G
Network Serdes	28G NRZ / 56G PAM4	28G NRZ / 56G PAM4	28G NRZ / 56G PAM4	112G PAM4
PCIe Host Interface	Gen4 x8	Gen4 x16	Gen4 x16	Gen5 x16
Multi-Host	1, 2 and 4 hosts	1, 2 and 4 hosts	1, 2 and 4 host	1, 2 and 4 hosts
NPAR	x16 (NPAR1.2)	x16 (NPAR1.2)	x16 (NPAR1.2)	x16 (NPAR1.2)
RoCE v2	✓	✓	✓	✓
Silicon Root of Trust	✓	✓	✓	✓
Attestation	✓	✓	✓	✓
IEEE1588 PTP	T-TSC / T-BC / T-GM	T-TSC / T-BC / T-GM	T-TSC / T-BC / T-GM	T-TSC / T-BC / T-GM
TLS / kTLS HW offload	-	-	-	✓
ASIC power (Typical)	10W	11W	13W	~14W
Process	16nm	16nm	16nm	5nm
Package Type/Size (mm)	FCBGA 21x21	FCBGA 21x21	FCBGA 21x21	FCBGA
Availability	In Production	In Production	In Production	Samples: 2023
EOL	> 2036	> 2036	> 2036	TBD
Part Number	BCM57502	BCM57504	BCM57508	BCM57608

NX-E Adapters Portfolio: OCP Mezz 2.0 Adapters

Form Factor	Mktg Name	Ports	I/O	ASIC	IC	Sample	GA	Part Number
OCP 2.0	M210TP	2x 10GBT	RJ45	BCM57416	Wh+	Yes	Yes	BCM957416M4163C
OCP 2.0	M210P	2x 10G	SFP+	BCM57412	Wh+	Yes	Yes	BCM957412M4123C
OCP 2.0	M125P	1x 25G	SFP28	BCM57412	Wh+	Yes	Yes	BCM957412M4122C
OCP 2.0	M225P	2x 25G	SFP28	BCM57414	Wh+	Yes	Yes	BCM957414M4142C
OCP 2.0	M150P	1x 50G	QSFP28	BCM57414	Wh+	Yes	Yes	BCM957414M4143C
OCP 2.0	M1100G16	1x 100G	QSFP56	BCM57504	Thor	Yes	Yes	BCM957504-M1100G16

Broadest Portfolio of OCP 2.0 Adapters

NX-E Adapters Portfolio: OCP NIC 3.0 Adapters

Form Factor	Mktg Name	Ports	I/O	ASIC	IC	Sampling	GA	Part Number
OCP 3.0 Small	N41T	4x 1G	RJ45	BCM5719	NX1	Yes	Yes	BCM95719N1905C
OCP 3.0 Small	N210tp	2x 10GBT	RJ45	BCM57416	Wh+	Yes	Yes	BCM957416N4160C
OCP 3.0 Small	N210p	2x 10G	SFP+	BCM57412	Wh+	Yes	Yes	BCM957412N4120C
OCP 3.0 Small	N225p	2x 25G	SFP28	BCM57414	Wh+	Yes	Yes	BCM957414N4140C
OCP 3.0 Small	N425G	4x 25G	SFP28	BCM57504	Thor	Yes	Yes	BCM957504-N425G
OCP 3.0 Small	N1100G	1x 100G	QSFP56	BCM57504	Thor	Yes	Yes	BCM957504-N1100G
OCP 3.0 Small	N2100G	2x 100G	QSFP56	BCM57508	Thor	Yes	Yes	BCM957508-N2100G

Can be reconfigured for 1x200G



Broadest Portfolio of OCP NIC 3.0 Adapters: 1G to 200G

NX-E Adapters Portfolio: PCIe NIC Adapters

Form Factor	Mktg Name	Ports	I/O	ASIC	IC	Sampling	GA	Part Number
PCIe NIC	BCM5719-4P	4x 1G	RJ45	BCM5719	NX1	Yes	Yes	BCM5719-4P
PCIe NIC	BCM5720-2P	2x 1G	RJ45	BCM5720	NX1	Yes	Yes	BCM5720-2P
PCIe NIC	P210TP	2x 10GBT	RJ45	BCM57416	Wh+	Yes	Yes	BCM957416A4160C
PCIe NIC	P210P	2x 10G	SFP+	BCM57412	Wh+	Yes	Yes	BCM957412A4120AC
PCIe NIC	P225P	2x 25G	SFP28	BCM57414	Wh+	Yes	Yes	BCM957414A4142CC
PCIe NIC	P425G	4x 25G	SFP28	BCM57504	Thor	Yes	Yes	BCM957504-P425G
PCIe NIC	P150P	1x 50G	QSFP28	BCM57414	Wh+	Yes	Yes	BCM957414A4140C
PCIe NIC	P2100G	2x 100G	QSFP56	BCM57508	Thor	Yes	Yes	BCM957508-P2100G

Can be reconfigured for 1x200G



Broadest Portfolio of PCIe NIC Adapters: 1G to 200G

Why Choose Broadcom Ethernet?

Trusted Data Center Connectivity Partner

Ethernet ❖ Storage ❖ PCIe ❖ Fibre Channel ❖ Optics

Servicing Data Center Industry for 30 Years!

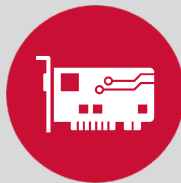
Portfolio
Longevity

Responsible
Power

Leading
Security

RDMA
Low Latency

Ethernet NIC



Connected by Broadcom

Ethernet Switch



Shifting from CPU Architecture to Connectivity Centric in the Data Center

Why Choose Broadcom Ethernet?

Broadcom Advantage	Customer Benefit
Ethernet Product Portfolio Breadth	<ul style="list-style-type: none"> • Support for 1GbE to 200GbE • Wide range of sku configuration options
Long-life Ethernet Availability	<ul style="list-style-type: none"> • End-of-life target is 2036 or later for most products • Design in with supply confidence
Advanced Features (TruFlow packet processing, RDMA)	<ul style="list-style-type: none"> • TruFlow/OVS offload (flow redirect, packet actions) • RoCEv2 (advanced congestion control) • Meeting the networking needs of broad market Cloud, Enterprise, and Industrial customers
Advanced Security (Secure Boot, Attestation)	<ul style="list-style-type: none"> • Prevents unauthorized firmware from running; Verifies platform boot integrity; Establishes HW RoT • Cryptographic proof of server device identity and verification of the state of platform components and configurations (SPDM1.2); Platform Active RoT
Superior Power Efficiency and Thermal Performance	<ul style="list-style-type: none"> • Lower power utilization and reduced cooling costs
High Network Throughput with Low and Deterministic Latency	<ul style="list-style-type: none"> • Excellent CPU utilization/efficiency • Reduction in host processing • Improved tail latency
PHY/NIC/Switch Shared-IP and support of open industry standards	<ul style="list-style-type: none"> • Improved ecosystem interoperability • Not held captive by proprietary solutions



BROADCOM®

connecting everything®



Backup

