Enterprise Data Storage Market Insights
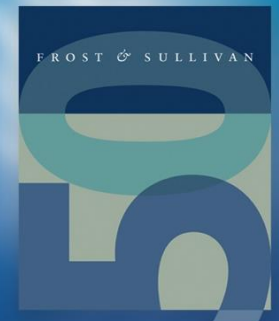
Future Technologies and Trends Will Drive Market Growth

P8CD-72
September 2015

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Contents

Scope and Market Overview

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Scope of the Study

Objectives

- To provide an overview of the global enterprise data storage market, focusing on the trends, technology, and business models of major market participants

- To understand the trends affecting the global storage market and the implications of these trends on the data center market

- Future technologies entering the storage market

- To gain a detailed understanding on the distribution structure and channel partner program for key storage vendors EMC and NetApp

- To provide an understanding of the business model for ODM/OEMs in terms of service and support capabilities across regions; these include Foxconn and Supermicro

ODM: Original Design Manufacturer
OEM: Original Equipment Manufacturer
Source: Frost & Sullivan

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Market Overview

The enterprise data storage market is changing at a rapid pace. More data is being digitized than ever before and stored on disks of various size capacities. Globally, by 2020, there are expected to be about 26 billion connected devices. These devices would generate large amounts of data that need to be stored and analyzed at some point of time. Storage devices need to be agile, scalable, low cost, able to handle huge data loads, and durable to sustain the huge data growth. The global market is dominated by the top 5 participants: EMC, NetApp, Dell, HP, and IBM. These participants command more than 50% of the global market share.

Enterprises need to start embracing hybrid storage, as both flash storage and hard disks are here to stay. Hybrid storage helps enterprises gain the best of both worlds, and at an affordable cost. Hard disks cannot offer the performance of flash storage, which cannot offer the capacity offered by hard disks.

As the world is moving toward virtualized environments, storage vendors around the globe are taking advantage of the software available to make storage systems easy to manage and scale and also improve storage interface and networking performance. The move toward virtualized storage is propelled by cost, simplicity, and swiftness in deployment.

Hyper-scale data centers drove the growth of the data storage market globally in 2014 and are expected to continue doing so in 2015 as well. Small storage vendors are coming up with several innovative storage solutions and putting pressure on large storage vendors by constantly gaining market share.
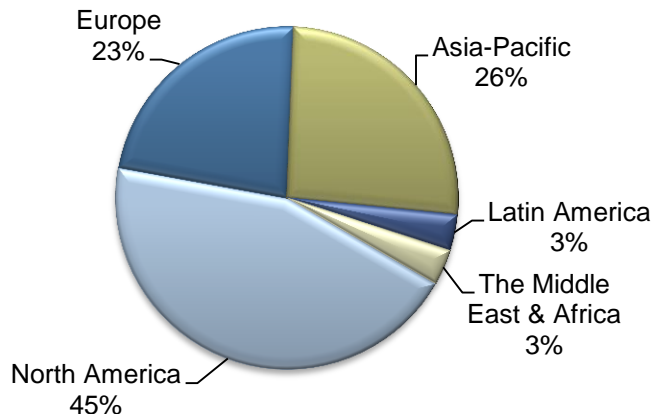
Source: Frost & Sullivan

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Market Overview (continued)

Key Takeaway: The storage market is expected to grow at a CAGR of 3.2% during 2014–2018 to reach a revenue in excess of $41 billion.

Storage Market: Spending*, Global, 2012–2018

3.2%

2012	2013	2014	2015	2016	2017	2018
34.3	35.0	36.4	37.7	39.1	40.2	41.4

Year
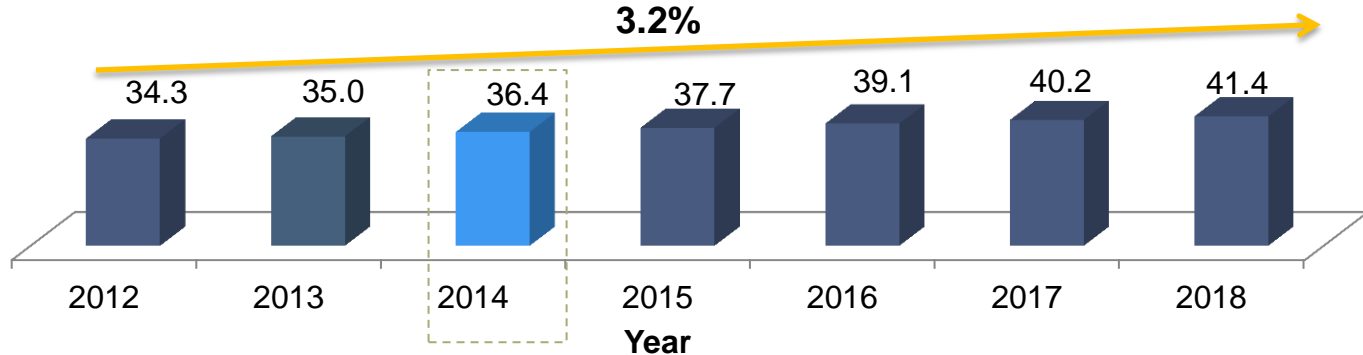
Storage Market: Revenue by Region, Global, 2014

- Europe 23%
- Asia-Pacific 26%
- Latin America 3%
- The Middle East & Africa 3%
- North America 45%

Key Insights

- The global data traffic is expected to almost triple to 9.1 zettabytes (ZB) per annum by 2018, from 3.3 ZB per annum in 2013.
- North America continues to dominate the global storage market, with 45% market share in 2013.
- Asia-Pacific has emerged as one of the fastest-growing markets given the rise of the amount of data being generated in the region.

*Values are in $ Billion

Note: All figures are rounded. The base year is 2014. Source: Frost & Sullivan

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Enterprise Storage Market Trends

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Cloud Storage Gains Prominence

- Cloud has played a very important role in making storage available to enterprises at a lower price while offering high scalability and better encryption. An increasing number of enterprises are using cloud for storage. In 2015, cloud computing vendors are expected to further lower prices and offer better technology and infrastructure to enterprises.

- Many enterprises still do not prefer to keep their data on cloud. The reasons for this resistance is due to security of the data, complexity of migrating data to cloud, performance of cloud storage, and data governance regulations. Most enterprises have started using cloud as a secondary backup option instead of front-line loads. Most of these issues are expected to be resolved and pave the path to increased adoption of cloud storage solutions.

Cloud Storage
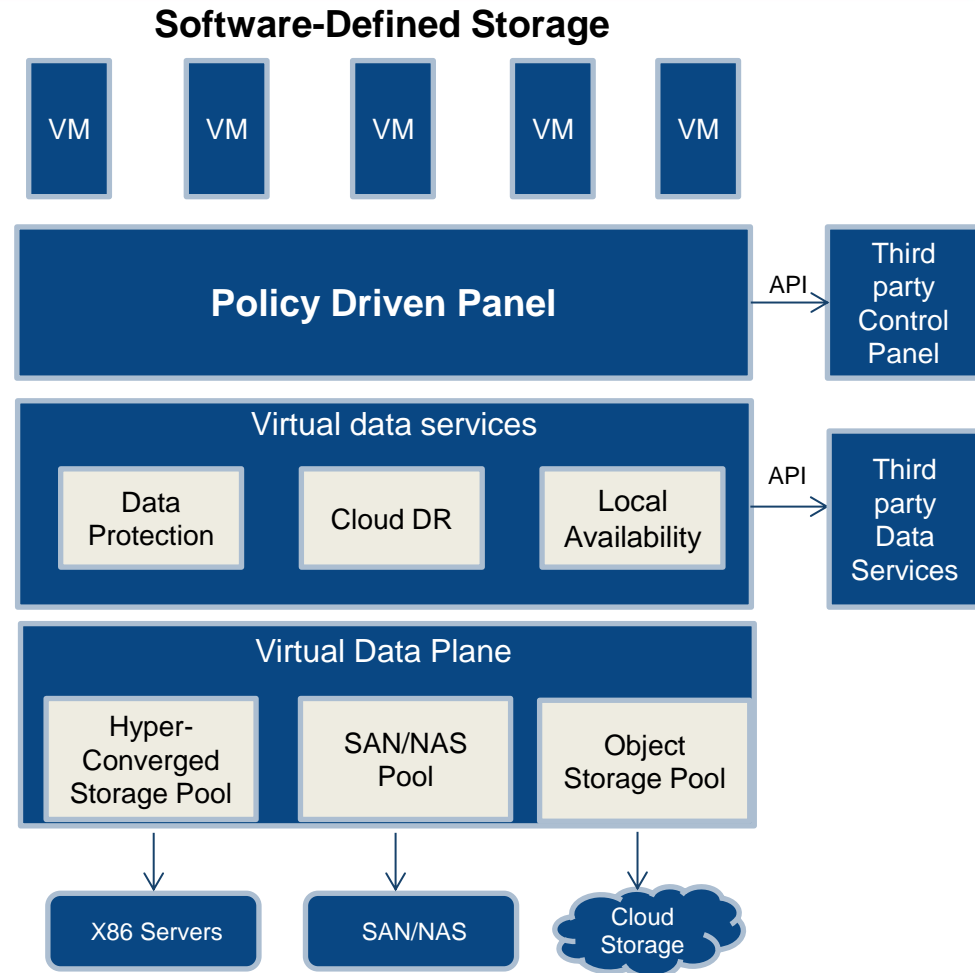
- Large enterprises favor using top-tier vendors for their cloud storage usage due to failure of startup cloud storage providers. Companies are also contemplating creating new service-level agreements (SLAs), which would include the provision for data transfer between cloud service providers in case of failure.

Image Source: Wikimedia Commons. Source: Frost & Sullivan

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Software-defined Storage Coming out of Hype

- Software-defined storage (SDS) helps to virtualize storage and takes control of how the data is actually stored. It can be helpful in reducing storage waste, moving data using auto-tiering, combining multiple storage devices to look like one massive storage, and sharing resources transparently.

- The main drivers for SDS among enterprises are reduced cost by avoiding hardware lock-in, extended life of existing storage systems, and automation of storage systems.

- SDS can reduce costs for the enterprise by using policy-based automation, easy installation, agility, and simultaneously offering freedom from hardware dependence. Policy automation can also help in extending the life and automation of storage systems.

Software-Defined Storage

| VM | VM | VM | VM | VM |

Policy Driven Panel — API → Third party Control Panel

Virtual data services

| Data Protection | Cloud DR | Local Availability | API → Third party Data Services |

Virtual Data Plane

| Hyper-Converged Storage Pool | SAN/NAS Pool | Object Storage Pool |

| X86 Servers | SAN/NAS | Cloud Storage |

VM: Virtual Machine; SAN: Storage Area Network; NAS: Network-attached Storage, DR: Disaster Recovery; API: Application Program Interface

Source: Frost & Sullivan

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Flash and HDD Storage Both to Stay

- Flash arrays have changed the dynamics of the enterprise storage market. There are many reasons why flash storage is gaining prominence over hard disk drives (HDDs). The speed at which flash storage performs is much higher than that of the HDD. Flash storage has the ability to handle large workloads without losing its capability to perform. Flash storage devices are much more durable as they do not have moving parts. Lastly, they use less power than do HDDs.

- Although flash storage has many benefits, it is not realistic to assume that it will completely replace HDD. Flash is still in its infancy and a lot of research and development (R&D) is still going on in it. Flash storage is also quite expensive, has limited capacity, and the data can get permanently lost. With the Internet of Things (IoT) and Big Data, enterprises need high data storage capacity, and the HDD presents a better alternative in terms of cost and capacity.

**HDD (Hard Disk Drive)   SSD (Solid State Drive)**

- Hybrid flash array, which is a combination of flash memory and HDD, has gained prominence over all flash arrays due to its lower cost and better performance.

Image sources: Wikimedia Commons; Creative Commons
Source: Frost & Sullivan

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Hyper-converged Infrastructure Gains Interest

- Hyper-converged infrastructure (HCI) is gaining a lot of attention as a technology in which a combination of storage, computing, network, and virtualization can be obtained in a single hardware box from a single vendor.

- Ease of scale, centralized management, efficient use of resources, software-centric design, and single vendor are some of the advantages of hyper-converged infrastructure.
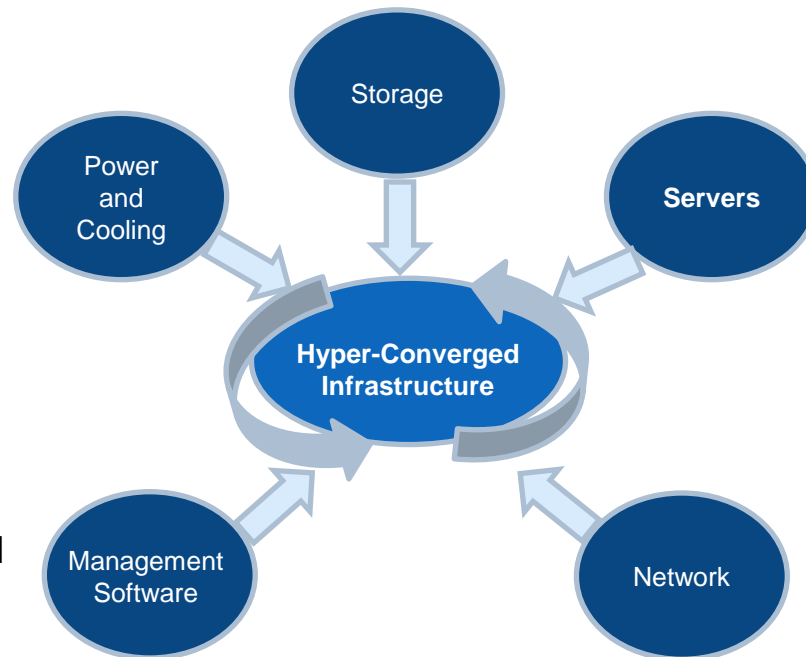
Hyper Converged Storage

- The software layer controls the storage, compute, and memory, which allows the hypervisor to optimize the resources properly.

- Managers of data centers are showing great interest in hyper-converged infrastructure as HCI is easy to manage and install, highly scalable, able to provide the expected performance, offers easy licensing and pricing, and reduces the total cost of ownership.

- Virtual desktop infrastructure (VDI) vendors are using HCI by reducing complexity and using fewer components.
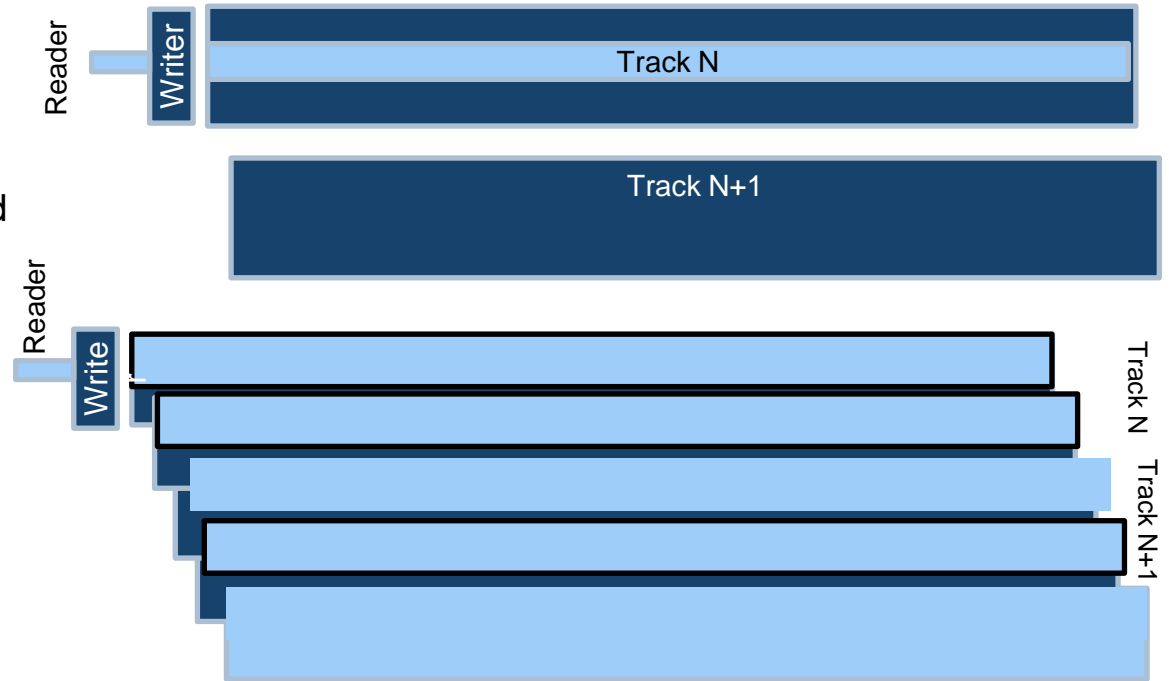
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Future Technologies in Storage

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Hard Disk Drives—SMR and TDMR

- Shingled magnetic recording (SMR) is a technique in which tracks on the disk are overlapped on each other to increase the density on the track. The increased density helps in increasing the capacity by approximately 25%. SMR technology does not require any significant investment from vendors to use it.

- Two-dimensional magnetic recording (TDMR) is an extension of SHR, and helps to increase the life of magnetic recording systems. Designers can use TDMR and SHR in conjunction for more control over areal density.

- A few companies around the globe have already started deploying this technology in HDDs.

Reader

Writer

Track N

Track N+1

Reader

Write

Track N

Track N+1

Shingled Magnetic Recording

Hard Disk Drives—HAMR and Helium-filled HDDs

- Heat-assisted magnetic recording (HAMR) is a magnetic storage technology in which the data is recorded by pointing the laser to an area of the disk. The heat changes the magnetic properties of that area for a small amount of time, thus helping in storing more data in a smaller area.

- HAMR is not deployed in any HDDs but is expected to enter the market by 2017.

- The helium-filled hard drive is another storage technology that helps increase the efficiency and life of hard disk drives. Helium, being less dense than air, reduces the mechanical issue in hard disk drives, thus helping to increase capacity and reduce power consumption in the drives.

- This technology is already deployed by a manufacturer, with a capacity of 10 TB; several global participants have shown interest in using the technology.
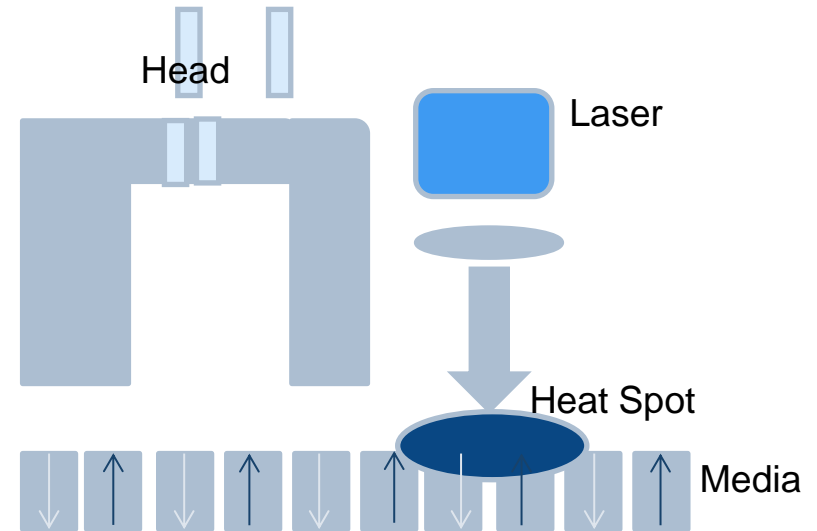
Heat-assisted Magnetic Recording

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Flash Storage-3D NAND and Triple Level Flash

- 3D NAND is a type of flash memory that mounts memory cells on top of each other. This vertical stacking of cells helps improve the capacity by increasing the density of the memory cells.

- 3D NAND could help increase the capacity of SSD to 10 TB, as claimed by a major technological company in a recent announcement.

- Many companies are coming up with new designs in 3D NAND technology that help increase the capacity and reduce the price of flash memory.

- Triple level cell flash (TLC flash) is a solid-state NAND flash memory that can store 3 bits of data per cell of flash media. This technology is gaining prominence in consumer devices.

- One of the major advantages of the TLC flash is that it helps reduce the cost of memory by 15%–20%. TLC flash has found more use in consumer devices, as the performance tends to drop with usage.

3D NAND

Image sources: Wikimedia Commons

Source: Frost & Sullivan

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Business Models of Vendors

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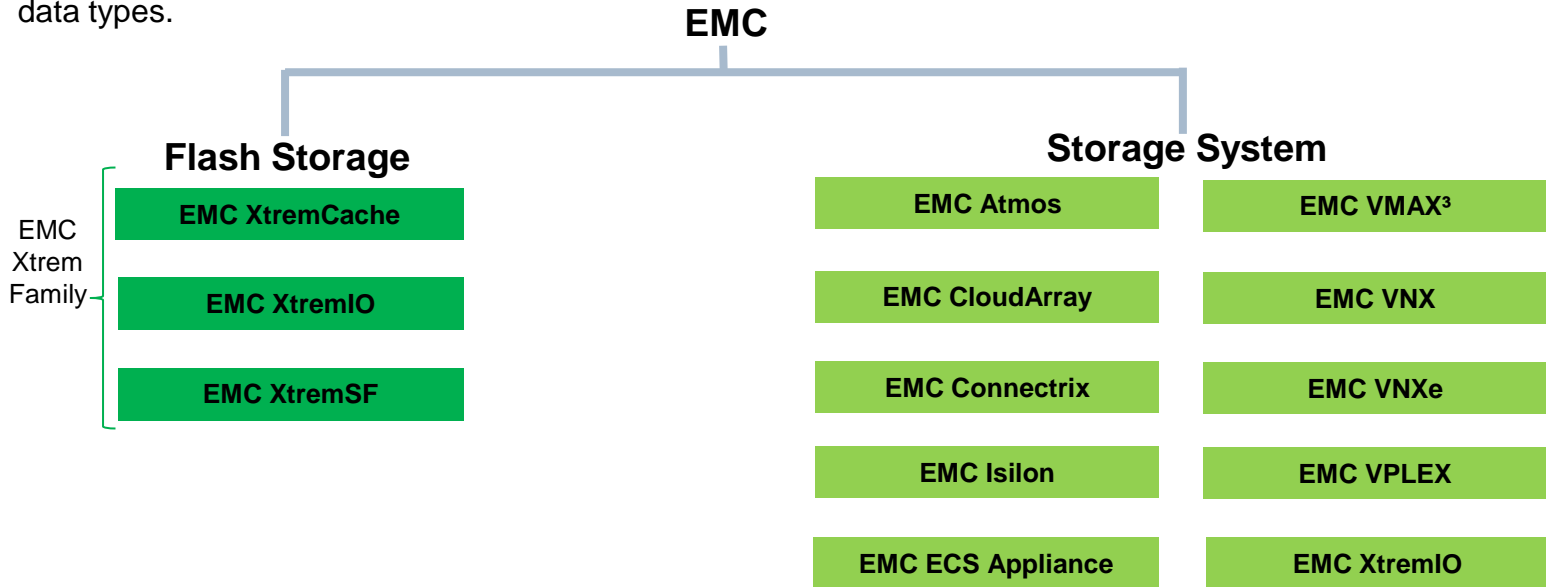
Key Profiles—EMC

Company Information		
Company Overview	Founded in 1979 by Richard Egan. In 1990, EMC introduced its Symmetrix product line, becoming the first company to provide information storage systems based on arrays of small, commodity hard disk drives (RAID). EMC is a global leader in enabling businesses and service providers to transform their operations and deliver information technology as a service (ITaaS). EMC employs approximately 60,000 people worldwide. It is a publicly traded company, listed on the New York Stock Exchange under the symbol EMC, and is a part of the S&P 500 Index.	
Business Unit Focusing on Storage	EMC offers two storage product lines, which help satisfy a broad range of customer workloads across different data types.	

EMC offers two storage product lines, which help satisfy a broad range of customer workloads across different data types.

EMC

Flash Storage

EMC Xtrem Family

- EMC XtremCache
- EMC XtremIO
- EMC XtremSF

Storage System

EMC Atmos	EMC VMAX³
EMC CloudArray	EMC VNX
EMC Connectrix	EMC VNXe
EMC Isilon	EMC VPLEX
EMC ECS Appliance	EMC XtremIO

Source: Frost & Sullivan

Key Profiles—EMC (continued)

Go To Market Strategy

Vertical Integration Strategy

The key for storage participants to succeed in the market is to provide a complete end-to-end solution. In this regard, EMC has been acquiring companies to strengthen its portfolio. Some of the notable acquisitions of the company are as follows:

| Company Name	Year of Acquisition	Value Chain Focus
VMware	2003	$635 million; helped EMC join different manufacturers' information technology into a single pool of available storage and computing resources (virtualization)
Kashya	2006	$153 million; enabled data virtualization and continuous data protection technologies (storage and management software)
Data Domain Corp	2009	$2.4 billion; improved disk-based backup and data archive (storage)
Isilon	2010	$2.25 billion; enabled specialized high scale-out clustered filers or object stores (storage)
XtremIO	2012	$430 million; complemented the EMC flash-based systems and software (storage)

Dependence on both Direct Sales and Agencies/Distributors

- In 2003, EMC launched an inside sales organization, starting with demand and lead generation. Then it added sales support, shadow quota to promote teamwork, and leveraged an inside-out selling model. Its goals: (1) to create massive demand for EMC; (2) to create opportunities that lead to revenue with its channel; (3) to develop the next generation of sales leaders in the company.

- EMC has traditionally operated a largely direct sales model in the enterprise sector, but is now giving its channel (agencies/distributors) the run of large accounts (2012, UK market), and other SMBs (since 2007). EMC removed the tools that allowed its direct sales representatives to quote kit prices to customers in 2014; this removes any sales conflict between its direct representatives and its legion of third-party sellers.

Source: Frost & Sullivan

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Key Profiles—EMC (continued)

Detailed Distribution Structure

EMC

Direct
(Revenue Contribution: 40%)

Indirect
(Revenue Contribution: 60%)
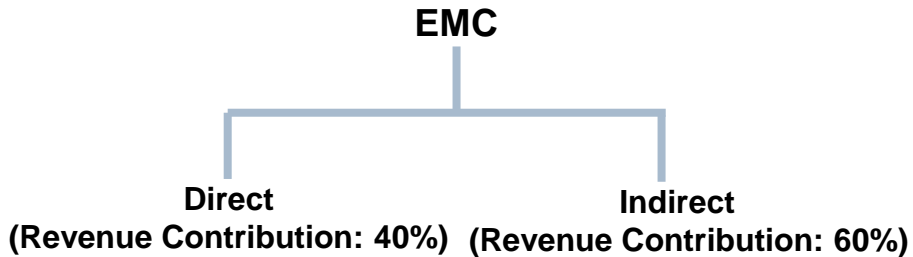
- EMC is supporting its channel distributors by giving the ownership of many large enterprise accounts and SMB accounts to its channel.

VaR*

Notable VaRs for EMC: International Computerware Inc. (ICI), GNAX Health, WestconGroup NZ, Computacenter, Proact

SIs

EMC network has relationships with several companies, including Cisco, TRaC Global, Applica, National Computer Systems, Kovarus, and Dimension Data

OEMs

Notable OEMs for EMC: Lenovo, Qlogic, Bull, Catalyst Telecom, Artesys International, Sword Insurance

Distributors

Notable distributors for EMC: Avnet Technology Solutions, TDAzlan, Arrow ECS, Ingram Micro, Tech Pacific

*VAR: Value-added Resellers

Source: Frost & Sullivan

Key Profiles—EMC (continued)

Channel Strategy

1. Benefits (Economical/Non-economical)

- Most of EMC's enterprise sales are now from one channel only; therefore, channel development is very important to the company.

- In 2014, more than 60% of the company's revenue is estimated to come from channel development.

- During 2008–2013, EMC made $9.1 billion in acquisitions of technology developers in the cloud, Big Data, and security markets. EMC also funded $11.5 billion to research and development. EMC's view about giving its channel partners a better chance of winning is very serious. EMC grew at a AAGR of 9% (2008–2013). The company has a wide range of ICT products and developers. By joining the channel program, the company can take advantage of various benefits provided by EMC channel partnership program.

- The following financial rewards are available to partners:
  - Value-based pricing (VBP): Aligns discounting benefits with EMC partner ties
  - Performance-based rebates: Earn cash rebates by meeting predefined revenue goals
  - Co-op funds: Provide financial assistance for the implementation of joint marketing and business development activities
  - Deal registration: Enables the realization of additional discount benefits by registering active sales campaigns
  - Incentive programs: Qualifies for higher levels of financial rewards for selling key EMC products and solutions

- Following are the non-financial rewards:
  - Early access to EMC product information and pre-launch technical training
  - Access to EMC product APIs
  - Streamlined operational support and alignment
  - Advance the company's technical expertise
  - Expand opportunity development and market reach
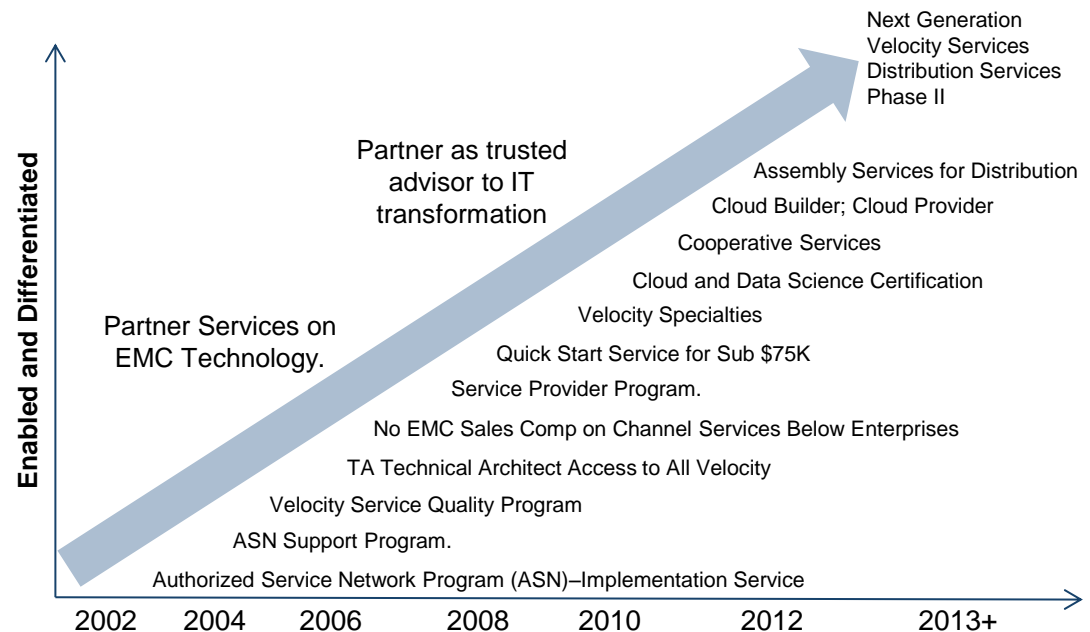
Source: Frost & Sullivan

Key Profiles—EMC (continued)

Channel Strategy

2. Variations in Benefits/Discounts

- EMC has value-added partners, system integrators, OEMs, as well as distributors, and created specific incentive schemes for all the categories.

- EMC provides margin and marketing support to all of its partners.

- The EMC Partner Program comprises tiers that provide incremental business benefits and rewards based on partner revenue, training, and accreditation achievements. For example, the EMC Velocity[2] Partner Program has the following revenue attainments:

  o Associate Partner—up to $499,999 revenue attainment

  o Advantage Partner—$500,000–$4.9 million revenue attainment

  o Premier Partner—$5 million–$9 million revenue attainment

  o Signature Partner—$10 million+ revenue attainment (highest attainable tier)

Partner Service Evolution

Enabled and Differentiated

Next Generation Velocity Services
Distribution Services Phase II

Assembly Services for Distribution

Cloud Builder; Cloud Provider

Cooperative Services

Cloud and Data Science Certification

Velocity Specialties

Partner as trusted advisor to IT transformation

Quick Start Service for Sub $75K

Service Provider Program.

Partner Services on EMC Technology.

No EMC Sales Comp on Channel Services Below Enterprises

TA Technical Architect Access to All Velocity

Velocity Service Quality Program

ASN Support Program.

Authorized Service Network Program (ASN)–Implementation Service

2002   2004   2006   2008   2010   2012   2013+

Source: Frost & Sullivan

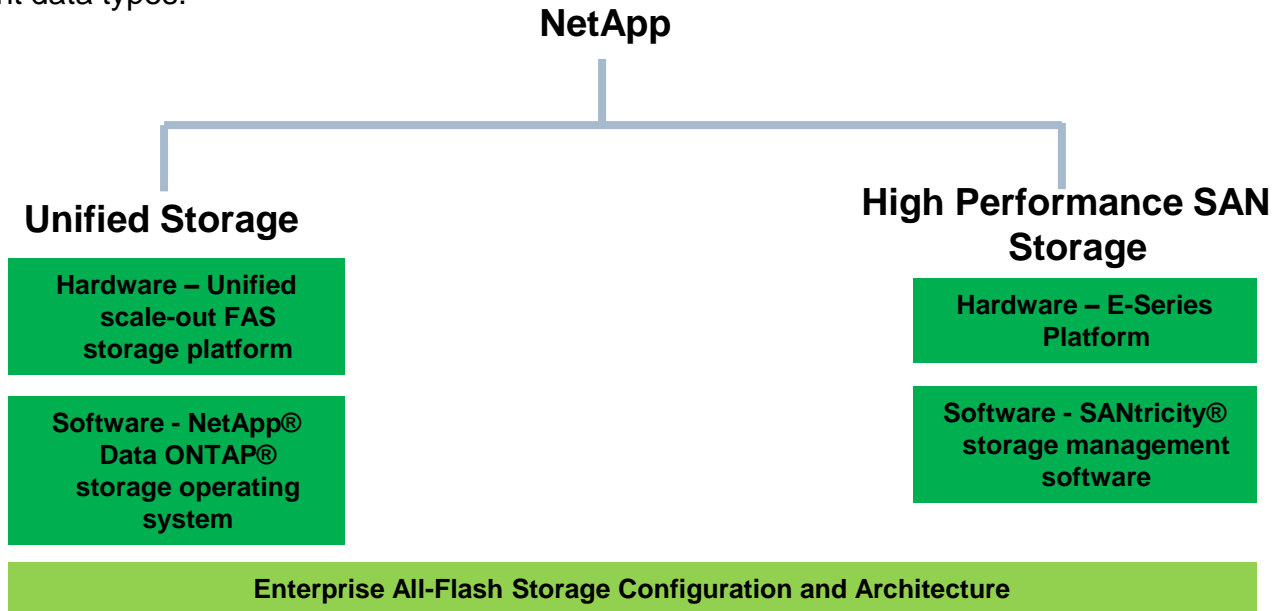FROST & SULLIVAN

Key Profiles—NetApp

| Company Information	
Company Overview	NetApp is a leading global provider of innovative storage and data management software, systems, and services, and offers an array of solutions from high-end products designed for large enterprise customers to entry-level products designed for medium-sized enterprise customers.
Business Unit Focusing on Storage	NetApp offers two storage product lines that help to satisfy a broad range of customer workloads across different data types.

NetApp

Unified Storage

> **Hardware – Unified scale-out FAS storage platform**

> **Software - NetApp® Data ONTAP® storage operating system**

High Performance SAN Storage

> **Hardware – E-Series Platform**

> **Software - SANtricity® storage management software**

Enterprise All-Flash Storage Configuration and Architecture

Source: Frost & Sullivan

Key Profiles—NetApp (continued)

Go To Market Strategy

Vertical Integration Strategy

- NetApp's customer base spans a number of vertical segments, including energy, financial services, government, high technology, Internet, life sciences, and healthcare services, major manufacturing, media, entertainment, animation and video postproduction, and telecommunications.

- The company has introduced the NetApp Partner Program for Vertical Solution Integrators, which offers benefits to businesses that build NetApp storage into their unique solutions for particular industries. The program focuses on businesses operating in the following industries:

  o Communications

 o Energy

  o Healthcare

  o Telco
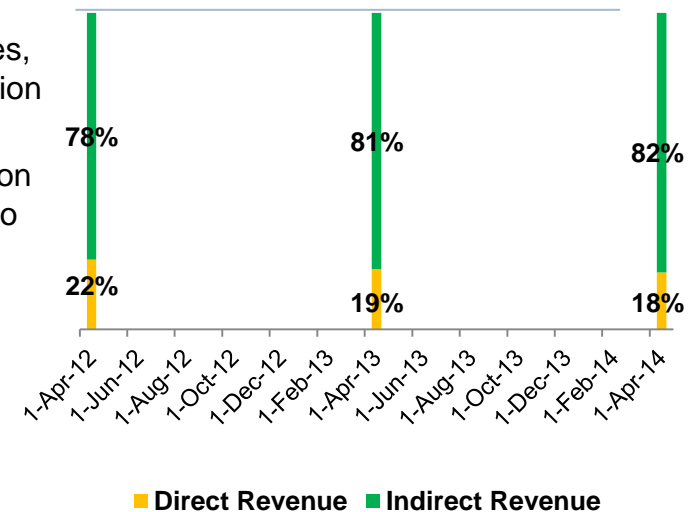
Dependence on both Direct Sales and Agencies/Distributors

- As of 25 April 2014, NetApp's global sales and marketing functions consisted of approximately 5,640 managers, sales representatives, and technical support personnel. The company has field sales offices in approximately 50 countries.

- The total expense for sales and marketing, research and development, and general and administrative is $3,096.5 million, down 1% as a percentage of net revenue compared to fiscal 2013. This reflects cost-control programs implemented in fiscal 2014, partially offset by an increase in incentive compensation due to higher achievement against plan.

Source: Frost & Sullivan

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Key Profiles—NetApp (continued)

Detailed Distribution Structure

Netapp

Direct (Revenue Contribution - 18%)

Indirect* (Revenue Contribution - 82%)
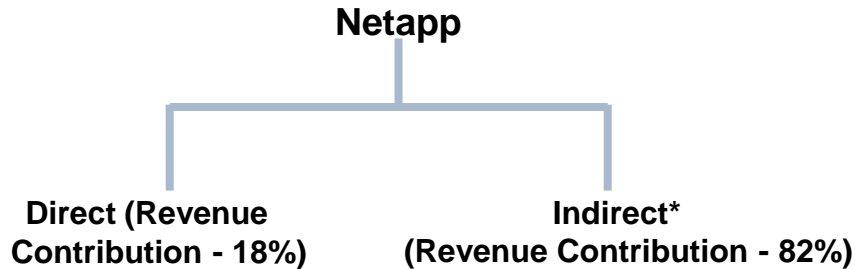
- NetApp is focused on diversifying its multichannel distribution strategy to increase market share. The company is continuously strengthening existing partnerships and investing in new partnerships with SIs and cloud service providers.

Distributors — Distributors help to bring key resources to selling partners. Sales to two distributors, Arrow Electronics, Inc. and Avnet, Inc., accounted for 22% and 16% of the net revenue, respectively, in fiscal 2014.

SIs — SIs integrate NetApp products into solutions for large enterprises, including managed services and outsourced solutions. SIs include Dimension Data, Wipro, HP, IBM, Verizon, Accenture, etc.

OEMs — NetApp has OEM relationships with several companies, which collectively accounted for 9% of the net revenue during fiscal 2014, compared to 12% the previous year. OEM customers include HP, IBM, Fujitsu, and Quantum.

Value-added Resellers — Resellers build and sell their own offerings based on NetApp's products, solutions, and services. Resellers include CDW Logistics, Computacenter, and Datalink.

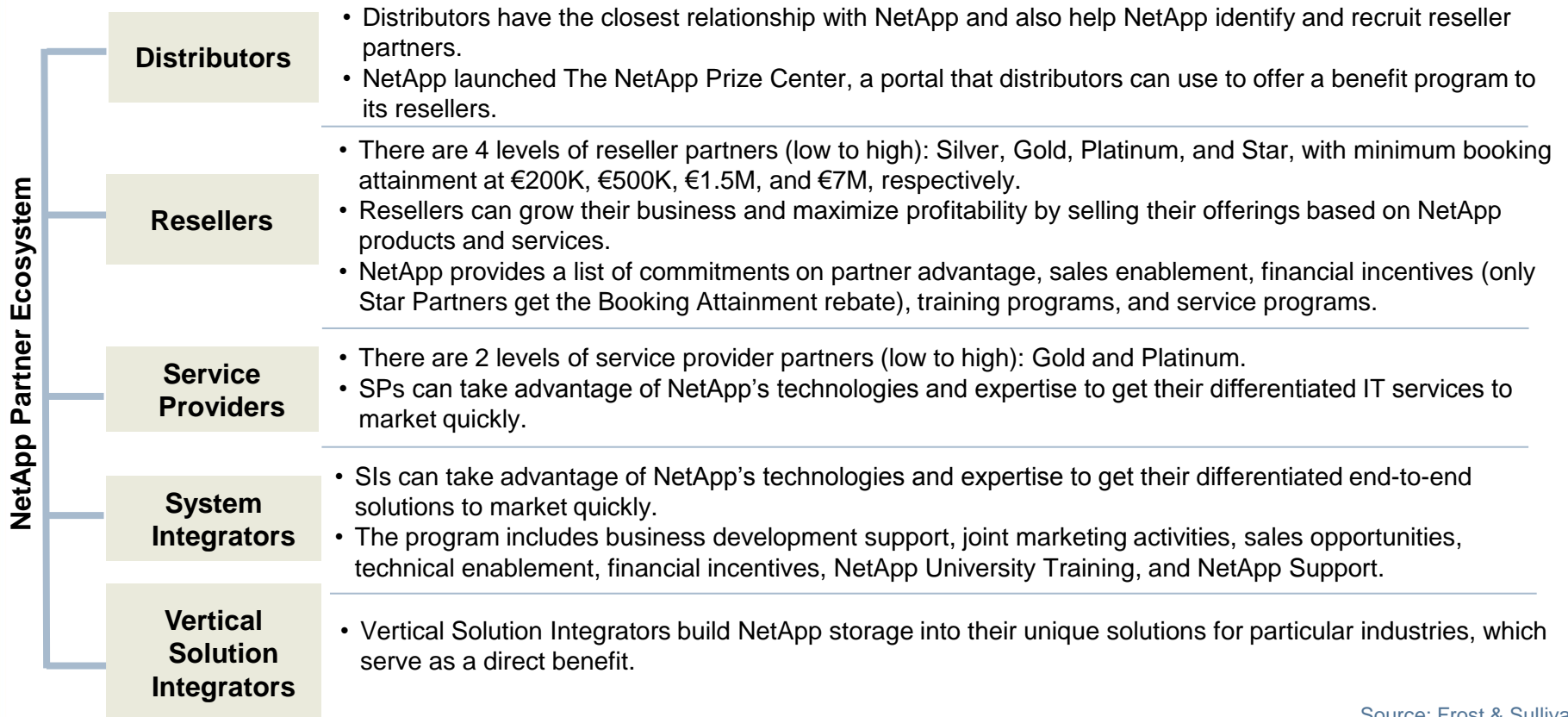*Segmentation for Indirect Revenue source is based on NetApp's 2014 Annual Report.

Note: NetApp's online Partner Directory provides a full list of partner names for different channel categories.

Source: Frost & Sullivan

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Key Profiles—NetApp (continued)

Channel Strategy

- NetApp launched a new unified partner program in August 2013 to focus on partners' changing customer needs.
- Partners also can differentiate their business by getting NetApp's certifications on Specialization, Professional Services, and Support Services.

NetApp Partner Ecosystem

Distributors
- Distributors have the closest relationship with NetApp and also help NetApp identify and recruit reseller partners.
- NetApp launched The NetApp Prize Center, a portal that distributors can use to offer a benefit program to its resellers.

Resellers
- There are 4 levels of reseller partners (low to high): Silver, Gold, Platinum, and Star, with minimum booking attainment at €200K, €500K, €1.5M, and €7M, respectively.
- Resellers can grow their business and maximize profitability by selling their offerings based on NetApp products and services.
- NetApp provides a list of commitments on partner advantage, sales enablement, financial incentives (only Star Partners get the Booking Attainment rebate), training programs, and service programs.

Service Providers
- There are 2 levels of service provider partners (low to high): Gold and Platinum.
- SPs can take advantage of NetApp's technologies and expertise to get their differentiated IT services to market quickly.

System Integrators
- SIs can take advantage of NetApp's technologies and expertise to get their differentiated end-to-end solutions to market quickly.
- The program includes business development support, joint marketing activities, sales opportunities, technical enablement, financial incentives, NetApp University Training, and NetApp Support.

Vertical Solution Integrators
- Vertical Solution Integrators build NetApp storage into their unique solutions for particular industries, which serve as a direct benefit.

Source: Frost & Sullivan

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Business Models of OEMs/ODMs

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Key Profiles—Foxconn

Company Information	
Company Overview	Hon Hai Precision Industry Co., Ltd., trading as Foxconn Technology Group, is a Taiwanese multinational electronics contract manufacturing company headquartered in Taiwan. It is the world's largest electronics contractor manufacturer, and the third-largest information technology company by revenue. The company's products cover the spares parts, modules, and system assemblies for 3C electronics.
Product Offering Relevant to Storage	• Foxconn won many orders to make servers and storage for US companies, including Facebook and Hewlett Packard. • In April 2014, Foxconn announced a joint venture with HP to create a new line of cloud-optimized servers specifically targeting service providers. • Later in October 2014, it again formed a joint venture, Smart Time Technologies Limited, with 21Vianet Group, to build and develop a global supply chain for the Internet data center (IDC) and cloud computing infrastructure markets. The joint venture would be responsible for data center planning, design, construction, project financing, operations and maintenance (O&M), customization, design-build, technical support, and other services.
Key Highlights of the Business Model	• Foxconn is famous for its eCMMS model, which stands for eEnabled Components, Modules, Moves, and Services. eCMMS is a vertically integrated one-stop shopping business model with mechanical, electrical, and optical capabilities. It covers solutions including molding, tooling, mechanical parts, components, modules, system assembly, design, manufacturing, maintenance, and logistics. Through the eCMMS model, Foxconn's Shenzhen campus is not only the world's largest 3C manufacturing base, it is also the shortest supply chain. • The key competitive advantages of Foxconn are the eCMMS model, a continuous cost-down culture, leading industrial engineering (IE) technology, and strong support from the local government.

Source: Frost & Sullivan

Key Profiles—Foxconn (continued)

Current Status of Service Support

☑ **Self-Support**

☐ **Outsourced-Support**

Service Coverage	**Software Upgrade**	**Online Support**	**Repair and RMA***	**DOA** Replacement**
Human Resources Size	• Taken care by customers to download the latest software for respective products	• Taken care by a call center in China to solve customers' questions timely by phone, email, or online chat	• Taken care by 19 service centers around the world, spanning China, Asia-Pacific, Europe, Russia, the Middle East-India-Africa, South America, and North America	

Additional Information

- Foxconn has a Channel Service Division (CSD) as a business unit under Foxconn Personal Computer & Enterprise Product Business Group (PCEBG).

- CSD is based in ShenZhen, China, with global sales and marketing teams in Taiwan, Dubai, the Netherlands, the United Kingdom, Russia, and the United States to cover global market. Major IT channel participants, including Synnex China, Avnet Europe, Korea PC Direct, India Esys, and US Newegg, are among its strategic customers. CSD offers strong capability with vertical integration from components to systems, from supply chain to manufacture to meet customers' needs with quality, speed, flexibility, and cost. Major vendors Intel and AMD are key partners that work closely during the product development.

- Two specific Web sites for channel business and support services, respectively, are foxconnchannel.com and foxconnsupport.com

*RMA–Return Merchandise Autorization
**DOA–Dead On Arrival
Source: Frost & Sullivan

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Key Profiles—Supermicro

Company Information	
Company Overview	Since it was established in 1993, Supermicro has driven high-efficiency server/storage technology and green computing innovation. Supermicro has developed high-performance solutions based on an innovative, modular, and open-standard architecture. Supermicro's headquarters are located in California and has subsidiaries in Taiwan, the Netherlands, and China. As such, Supermicro has increased utilization of its overseas manufacturing capacity. It sells products through distributors, VARs, system integrators, OEMs, and a direct sales force.
Product Offering Relevant to Storage	- Supermicro's offerings are complete server, storage, blade, workstation and full rack solutions to networking devices and server management software, which can be used by distributors, OEMs, and end customers. - Supermicro product lines include the following: - Super Storage Bridge Bay: Features a fully redundant, fault-tolerant "cluster-in-a-box" system - Storage servers: With 2U, 3U, and 4U form factors, Supermicro storage servers are designed to meet the requirements of sophisticated enterprise data centers and high-performance applications with new levels of storage performance, scalability, and reliability. - Supermicro scale-out storage: This is ideal for a broad range of applications such as cloud, virtualization, contents distribution, data archiving, Big Data analytics, and Hadoop.
Key Highlights of the Business Model	- Supermicro has developed and provided high-performance server/storage solutions based on an innovative, modular, and open-standard architecture. - Its in-house design competencies and control of the design of components have enabled it to rapidly develop, build, and test server storage systems. - Supermicro works with Ablecom, a supplier of contract design and manufacturing support to reduce the cost of sales. Outsourced manufacturing services enable Supermicro to focus on quickly meeting customer demand and rapidly introducing new products to the market.

Source: Frost & Sullivan

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Key Profiles—Supermicro (continued)

Current Status of Service Support

☐ **Self-Support**

☑ **Outsourced-Support**

Supermicro Service Support

Service Coverage

System Integration/Configuration/ Installation/	Onsite Service and Support	RMA (Return/Repair)

- Supermicro resellers are in charge of system integration and configuration.

- Supermicro works with reseller channels to solve technical issues and provide RMA services. All end users contact vendors directly and Supermicro resellers have complete access to Supermicro technical support and RMA teams.
- The company strongly recommends purchasing exclusively from its authorized SIs to receive its guaranteed local technical support and RMA services.
- Basic warranty services, more comprehensive services, and premium services are offered.

- For hardware maintenance support, customized SLA for remote helpdesk and onsite support is provided.
- Onsite Service program offers a 4-hour onsite response time option for mission-critical uptime or any tailored solutions.
- It performs the planning, identifies service requirements, creates and executes the project plan, and conducts verification testing, training, and provides technical documentation.

- The RMA department can only service Supermicro servers/systems entirely assembled in a Supermicro facility.
- Supermicro fixes and returns the system/server to the customer in the same fashion or packaging in which it was received.
- Available warranty is applied to the RMA cost of the server.

Source: Frost & Sullivan

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Business Models of Distributors
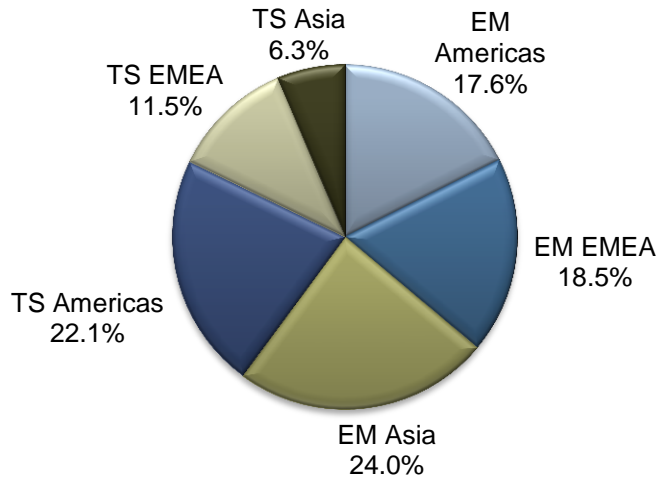
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Overview—Avnet

Current Status of the Distributor

Avnet has two primary operating groups—Electronics Marketing ("EM") and Technology Solutions ("TS"). Both operating groups have operations in each of the 3 major economic regions of the world: the Americas; Europe, the Middle East and Africa, and Asia-Pacific. EM markets and sells semiconductors; interconnect, passive, and electromechanical devices ("IP&E"); and embedded products, while TS focuses on the value-added distribution of enterprise computing servers and systems, software, storage, services, and complex solutions. Avnet had an annual revenue of $27.5 billion (June 2014). Of this, 60% was earned from electronics marketing and 40% from technology solutions. The company has about 800+ suppliers and 100,000 customers, and employs 18,000+ employees worldwide.

Regional Contribution of Business Units by Region
Asia-Pacific is the highest revenue contributor for EM. For TS, Americas is the highest revenue contributor.

Revenue by Region and Business Unit, Global, June 2014

- TS Asia 6.3%
- EM Americas 17.6%
- EM EMEA 18.5%
- EM Asia 24.0%
- TS Americas 22.1%
- TS EMEA 11.5%

Revenue Contribution by Product
Semiconductor and computer products constitute more than 80% of the company revenue.

Revenue by Product, Global, June 2014

- Computer Products 38.4%
- Connectors 2.9%
- Passives, Electromechanical, and Other 10.8%
- Semiconductors 47.9%
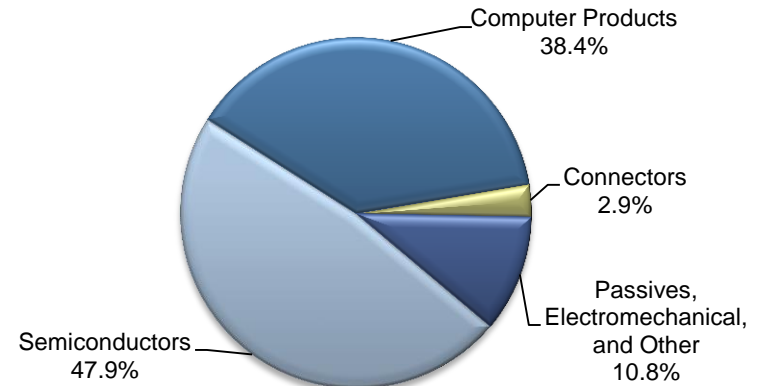
Note: All figures are rounded. The base year is 2014. Source: Frost & Sullivan

Capabilities—Avnet

Distribution Structure Analysis	
Criteria	**Description**
Key Customers	Avnet has about 100,000 customers globally. Its customers consist of OEMs, Electronic Manufacturing Services (EMS) providers, ODMs, SIs, ISVs, and VaRs.
Key Vendors	The company has more than 800 suppliers across the globe with IBM being its largest vendor. IBM products constituted about 13% ($3,574.9 million), 12% ($3,055.0 million), and 11% ($2,827.8 million) of the total revenue for 2013, 2012, and 2011, respectively.
Role of the Distributor	Avnet creates a vital link in the technology supply chain that connects the world's leading electronic component and computer product manufacturers and software developers with a global customer base. It distributes electronic components, computer products and software, as received from its suppliers or through a customized solution, and offers assembly and other value-added services. It also provides engineering design, materials management and logistics services, system integration and configuration and supply chain services customized to meet the specific requirements of customers and suppliers.
Margin Structure	Avnet's overall gross margin has remained almost flat in the last 3 years. Its gross margin stood at 11.73%, 11.70%, and 11.87% for 2014, 2013, and 2012, respectively. EM gross profit margin remained flat year-over-year, with increases in the Western regions being offset by declines in the Asia region primarily due to a higher amount of high-volume fulfilment-type sales compared to fiscal 2013. TS gross profit margin also remained flat year-over-year. The overall increase in Avnet gross profit margin was due primarily to increases in sales and gross profits at EM EMEA, driven in part by a recent acquisition.
Major Technical Support Companies by Region	Avnet has a company named Avnet Integrated, which is a technical call centre in Tampa, Florida.

Source: Frost & Sullivan

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Capabilities—Avnet (continued)

Services Insights

Avnet offers a broad range of services to its reseller partners: it operates through two groups (Electronics Marketing and Technology Solutions) and provides specific services for each operating segment.

Electronics Marketing

EM Design Chain Services: These provide engineers with a host of technical design solutions that serve as an extension of their sales force and make it economically viable to reach a customer segment that seeks complex products and technologies.

EM Supply Chain Services: These provide end-to-end solutions focused on OEMs, EMS providers, and electronic component manufacturers, enabling them to optimize supply chains on a local, regional, or global basis.

Embedded Solutions

Avnet Embedded provides embedded computing solutions including technical design, integration, and assembly to developers of application-specific computing solutions in the non-PC market. Customers include OEMs targeting the medical, telecommunications, industrial, and digital editing markets.

EM Sales and Marketing Divisions: Each of EM's regions has sales and marketing business units that focus on a specific customer segment, particular product lines, or a specific geography. The business units offer access to one of the industry's broadest line cards and convenient one-stop shopping with an emphasis on responsiveness, engineering support, on-time delivery, and quality.

Technology Solutions

Avnet Services: This is a global business unit within TS that specializes in, but is not limited to, infrastructure and application management, business commerce and analytics, cloud enablement, Big Data, aftermarket and IT lifecycle services, and multilingual vendor accredited training.

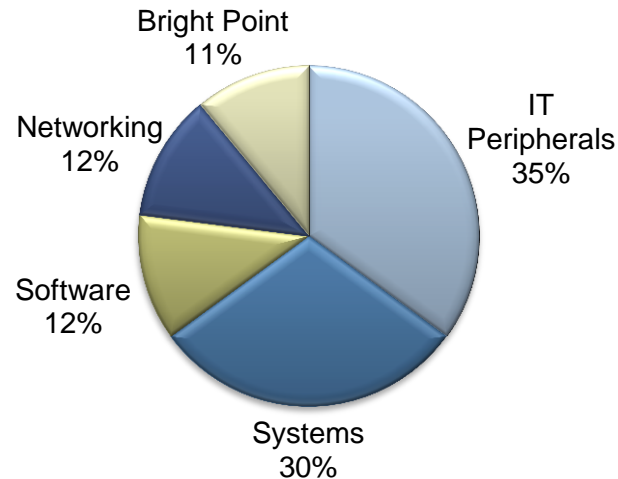Source: Frost & Sullivan

Overview—Ingram Micro

Ingram Micro is the world's largest distributor of technology products, by revenue. It works with more than 1,400 suppliers including Acer, Apple, Cisco, Citrix, HP, IBM, Lenovo, Microsoft, Samsung, Symantec, and VMware; and has more than 21,000 employees across the globe. It operates 132 distribution centers across the globe, each at least 5,000 square feet in size, has a local presence in 39 countries, and serves over 200,000 customers. It has been focusing on the SMB segment to help drive higher margins and is also enabling eRetailers by managing the logistics direct to the end user. Specific focus areas to drive future growth include the data center market, enterprise computing, storage solutions, virtualization, enterprise software, unified communications, networking, and security. Ingram Micro grew its revenue by 12.7% in 2013 to $42.6 billion.

Regional Contribution by Products
IT peripherals and systems drivers contribute more than 65% to the overall revenue.

Revenue by Product Segment, Global, 2013

- Bright Point 11%
- Networking 12%
- Software 12%
- IT Peripherals 35%
- Systems 30%

Note: All figures are rounded. The base year is 2014. Source: Frost & Sullivan

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Capabilities—Ingram Micro

Distribution Structure Analysis	
Criteria	**Description**
Key Vendors	Acer, Apple, Cisco, Citrix, HP, IBM, Lenovo, Microsoft, Samsung, Symantec, VMware. HP was the largest partner and accounted for 15% sales in 2013. However, this is declining year-on-year, as the company is expanding in newer technologies and working with new vendors as well. HP's share has declined from 21% in 2011 to 15% in 2013. No other vendor accounted for more than 10% of its sales in 2013. Apple accounted for about 10% sales in 2012. Key storage vendors include HP, Buffalo, Adaptec, EMC, Alacritec, Emulex, Nimble Storage, Iomega, Hitachi Data Systems, IBM, Quantum, Nutanix and Lacie.
Role of the Distributor	Ingram Micro is a versatile distributor. It has gone much beyond the traditional distributor model and offers significant support and services for its resellers. It focuses on creating sales opportunities for its vendor and reseller partners through unique marketing programs, outsourced logistics services, technical support, financial services, and product aggregation and distribution. It has a strong team of sales and technical staff that assists its resellers with product specifications and solution design, system configuration, new product/service introductions, pricing, and availability. In addition, it endeavors to keep resellers updated on new technologies and markets to assist them in expanding their business. Specific to the storage segment, Ingram Micro offers the following services to its resellers: • Solutions training on storage sales, implementation, and support • Technical support for multi-manufacturer storage solutions • Solutions assistance from Ingram Micro's technology solution engineers • Implementation services to free the staff for strategic work • Services delivery through the Ingram Micro Services Network (IMSN) • Infrastructure Technology Solutions (ITS) division to assist with mid-range solutions

Source: Frost & Sullivan

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Capabilities—Ingram Micro (continued)

Distribution Structure Analysis	
Criteria	**Description**
Margin Structure	Ingram Micro's gross profit margins stood at 5.9% in 2013 compared to 5.4% in 2012. North America, Asia-Pacific, and Latin America witnessed an increase in margins, while Europe witnessed a slight decline. Selling, general, and administrative costs were at about 4.5% for 2013. Storage margins for Ingram Micro are estimated at about 10%–12% for 2013. Ingram Micro's resellers make about 20%–30% margin.
Major Technical Support Companies by Region	Ingram Micro offers technical support either on its own or in conjunction with its vendor partners. It also supports VaRs in offering technical and support services across the globe.

Source: Frost & Sullivan

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Capabilities—Ingram Micro (continued)

Ingram Micro offers the following broad range of services to its reseller partners:

- **Supply-chain Services:** Product procurement, inventory management, order management and fulfillment, postponement, reverse logistics, transportation management, call center and customer care, credit and collection management services, enterprise IT asset disposition, data destruction, and eWaste recycling services.
- **Integration Services:** Compatibility assurance, order configuration, drop ship to end users.
- **Technical Support:** Real-time, multi-vendor support; certified technical expertise; technology helpdesks; pre-sales consultative support.
- **Training Services:** Manufacturer-certified, self-study, and instructor-led training courses for resellers and end users.
- **Financial and Credit Services:** Credit lines extended to resellers and to end users on behalf of resellers and end-user leasing programs.
- **Marketing Services:** Targeted marketing activities including direct mail, external media advertising, telemarketing campaigns, national and regional trade shows, Web-based marketing.
- **eCommerce Services:** Electronic data interchange- (EDI-), extensible mark-up language- (XML-) and Web-based electronic links to reseller customers to enable electronic transactions, eCommerce fulfillment services.
- **Managed Services through both In-house and Third-party Products:** Helpdesk services, remote infrastructure management, hosting services, security services, business continuity, and domain name management.
- **Cloud Services through both In-house and Third-party Products:** Communication and collaboration services, security services, infrastructure services, business applications and platform services, cloud management services.
- **Managed Print Services:** Automatic supplies replenishment, remote printer maintenance monitoring, helpdesk, equipment lease options.
- **Professional Services:** IT staffing solutions, warranty services, virtualization and wireless assessment, search engine optimization, and Web design.
- **Mobility Logistics Services:** Procurement, inventory management, software loading, kitting and customized packaging, fulfillment, credit services, receivables management, call center services, activation services, Web site hosting, eFulfillment solutions; repair, refurbish, and recycle services; reverse logistics; transportation management; sale of prepaid airtime. These services account for less than 10% of Ingram Micro's annual revenues.

Source: Frost & Sullivan

Implications of Storage Trends on Data Centers

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Software-defined Storage Effect on Data Centers

Data Center and Software-defined Storage

Data centers have evolved in the last couple of years, and software-defined data centers have evolved from a concept into reality.

Software-defined storage (SDS) technology, part of software-defined data centers, is expected to transform the way data is stored in data centers.

Implications of Software-defined Storage on Data Centers

Software-defined storage does not care about what kind of hardware is beneath. This can help data center vendors reduce cost, as they are not bound to buy hardware from a single vendor.

Software-defined storage helps in improving efficiency by offering more control over the performance and capacity clusters of storage. This can improve the overall efficiency of a data center.

Software-defined storage helps in creating a strong hybrid storage platform that allows for maximum extraction from physical hardware through a virtual platform and also makes data distribution easy.

Source: Frost & Sullivan

Flash Memory Technology Effect on Data Centers

Flash Memory and Data Centers

Data centers have traditionally used HDD for most of their storage needs, but the need for speed in enterprises is changing the dynamics of storage.

Due to recent technological changes, flash memory is making headway into the data centers in different variants such as all flash memory or hybrid flash memory.

Implications of Flash Memory on Data Centers

All-in flash arrays can provide very high speed for reading and saving data. Data center vendors can improve their efficiency and create a strategic differentiation for themselves by using all-in flash arrays.

Many data center vendors consider flash costly, and have started using hybrid flash arrays. These offer better performance than HDD and cost less than 50% compared to all-in flash.

Although several vendors have started using all flash or hybrid flash arrays, globally HDD still dominates the market due to its lower price and high storage capacity.

Source: Frost & Sullivan

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Hyper-Converged Infrastructure Effect on Data Centers

Hyper-converged Infrastructure and Data Centers

Data center traditional architecture has been buying storage, compute, and network components from different vendors, but this trend is changing.

Hyper-converged infrastructure is bringing key components of data centers in one box controlled by a software layer.

Implications of Hyper-converged Infrastructure on Data Centers

The software-centric design of hyper-converged infrastructure would help data center vendors to enable automation and have better control over infrastructure components.

Centralized management would help data center vendors manage virtual environments globally through a single interface. This will help improve the overall efficiency of all data centers.

Hyper-convergence is the future of data centers, as it will allow them to be more innovative in hardware and software. Data centers would also be able to integrate their resources properly.

Source: Frost & Sullivan

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Cloud Storage Effect on Data Centers

Cloud Storage and Data Centers

Data centers have been offering storage and backup solutions mainly on-premise, but this trend is changing.

With improvements in storage technologies and increasing need for more storage, adoption of cloud storage has been on the rise globally.

Implications of Cloud Storage on Data Centers

By adopting the latest cloud storage technologies such as flash, hybrid flash, hyper-converged infrastructure, and SDS, data centers can provide efficient and reliable storage solutions to enterprises.

Data security has been one of the biggest bottlenecks in cloud storage adoption, but with new security technologies, data center vendors can provide cloud storage solutions with increased security.

With technologies such as Big Data and IoT, data storage needs are growing exponentially. Data centers need to be prepared to offer effective cloud storage solutions for the imminent data explosion.

Source: Frost & Sullivan

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The Frost & Sullivan Story

The Journey to Visionary Innovation

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The Frost & Sullivan Story

Visionary Innovation

Growth Partnership

Emerging Research

1961   1990   Today
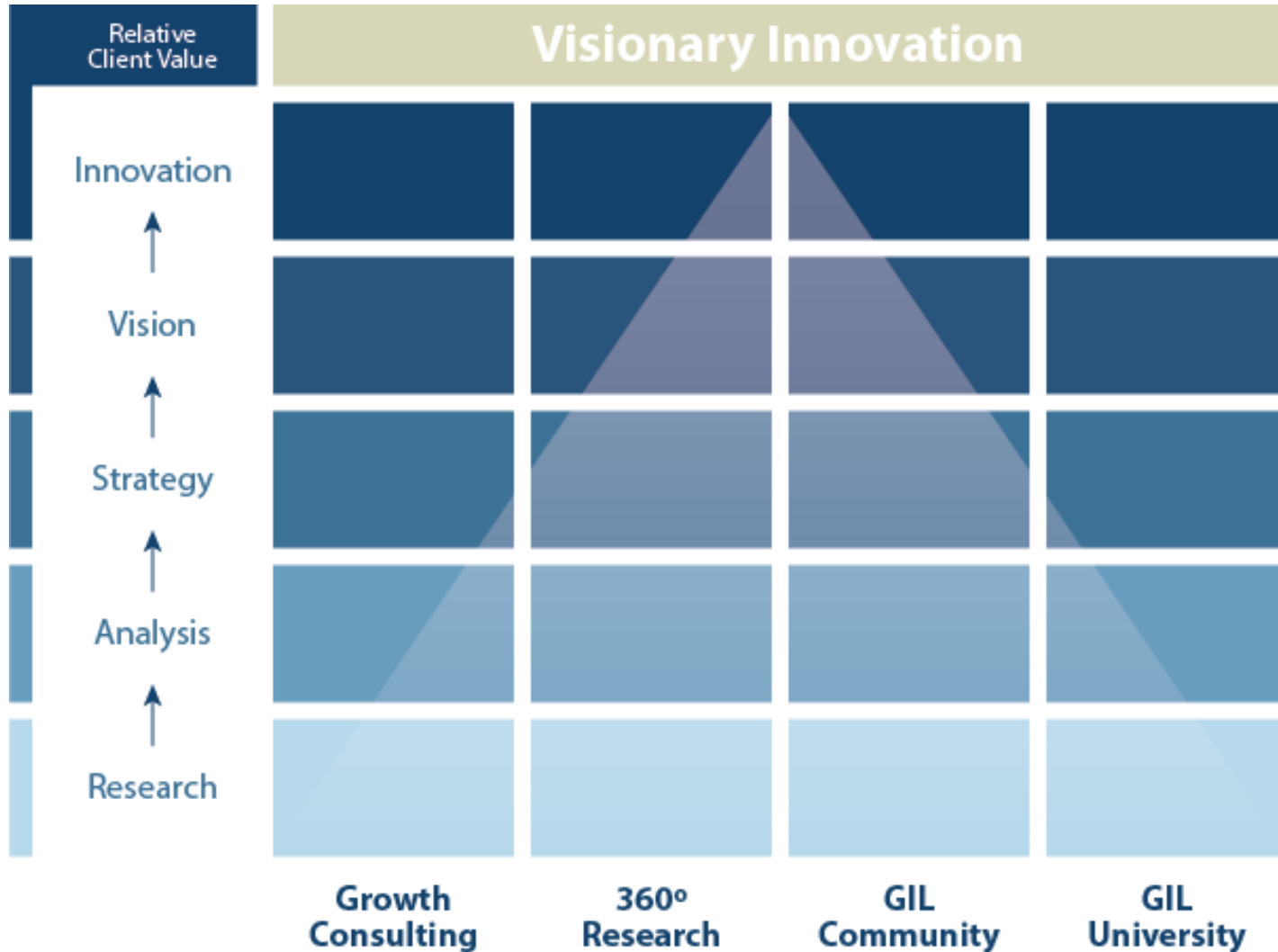
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Value Proposition: Future of Your Company & Career

Our 4 Services Drive Each Level of Relative Client Value

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Global Perspective

40+ Offices Monitoring for Opportunities and Challenges
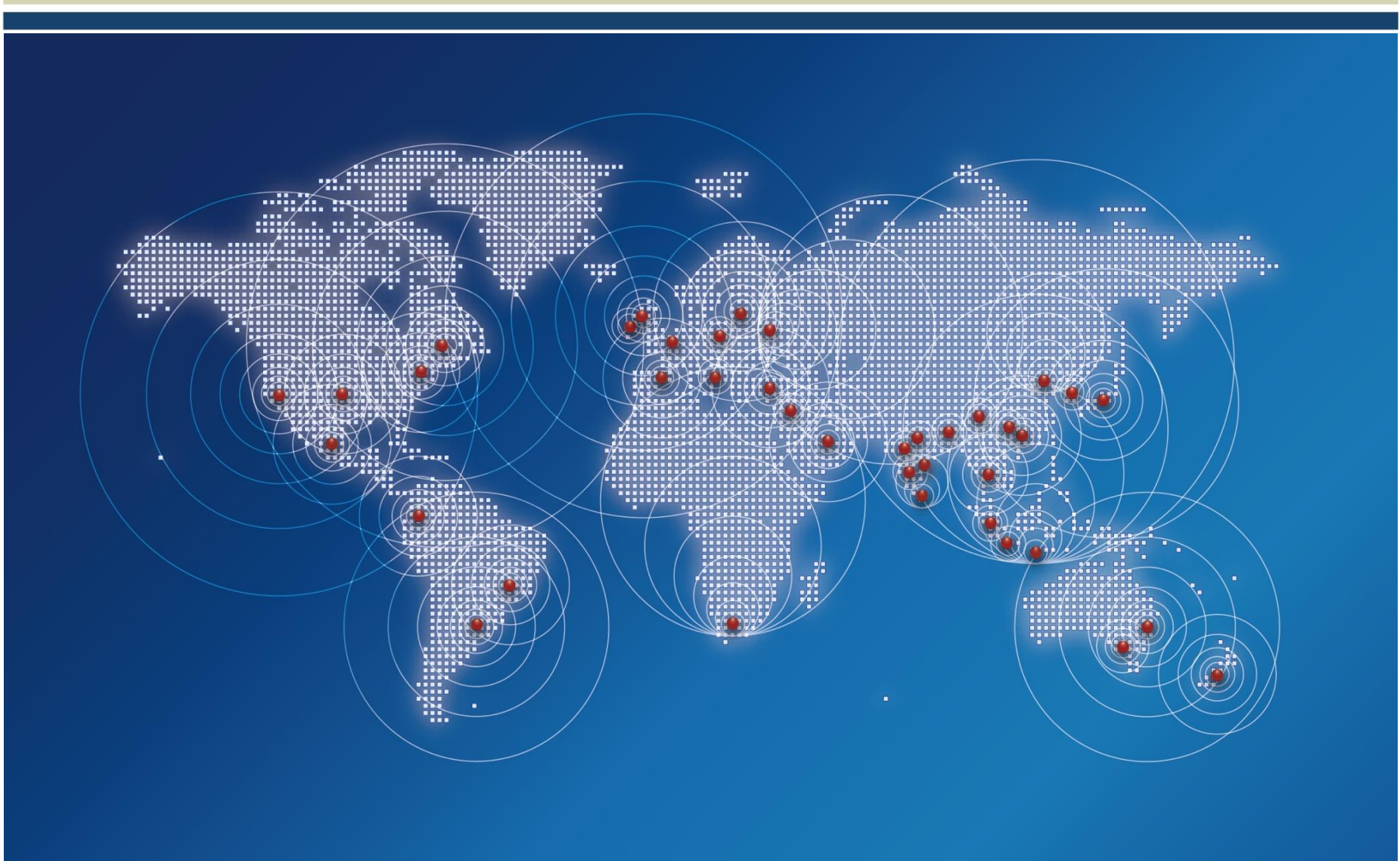
Industry Convergence

Comprehensive Industry Coverage Sparks Innovation Opportunities

Aerospace & Defense

Measurement & Instrumentation

Consumer Technologies

Information & Communication Technologies

Automotive Transportation & Logistics

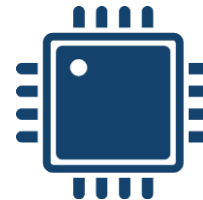**Energy & Power Systems**

Environment & Building Technologies

Healthcare

Minerals & Mining

Chemicals, Materials & Food

Electronics & Security

Industrial Automation & Process Control

360º Research Perspective

Integration of 7 Research Methodologies Provides Visionary Perspective

Implementation Excellence

Leveraging Career Best Practices to Maximize Impact

Our Blue Ocean Strategy

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