

# Hyperscaler Cloud Service Providers Top 10

Excerpt for Infosys

March 2021

### **HFS Research authors:**

Joel Martin, Research VP Cloud Strategies Martin Gabriel, Associate Director, Research "The journey to Cloud Native is about a migration of the business to the cloud, not just the technology. These service providers are enabling companies to follow a cloud services value stream to achieve desired goals for their people, process, and culture while amplifying their customer's OneOffice."

Joel Martin, VP Cloud Strategies







# ntroductio

### What are hyperscaler cloud service providers, and why do they matter?

Hyperscaler cloud service providers bring global business solutions outsourcing and consulting capabilities to support and enable organizations to migrate, adopt, and build cloud-native offerings. These providers leverage their cloud professionals' experience and talent to consult on platform re-architecture, application development, data migration, and transitioning services from technology stacks into macro and microservices hosted in a data center on-premise, private cloud, public cloud (hyperscale), or any combination.

### Why is it important for companies to consider hyperscale cloud service providers now?

With an infinite increase of data, applications, connections, and workloads taxing an organization's ability to adapt and develop to new platforms, DevOps, testing, security, and governance requirements are hamstringing innovation, processes, and go-to-market efforts. As a result, organizations are working with partners to transition storage, computing, back-up, and hosting services to cloud-based platforms to leverage the scale and compute power they can provide.

### Hyperscale cloud service providers can help organizations in their adoption of cloud-native programs by:

- Supporting a mass migration to the cloud: The pandemic prompted enterprises to adopt public cloud services en masse, and we expect cloud services to be a priority for organizations—regardless of size—over the next decade as organizations desire to deliver end-to-end solutions using a combination of on-premise, hybrid, or public cloud platforms. Hyperscale cloud service providers bring experience with platform re-architecture using the latest Kubernetes, containers, and automated systems migration. They leverage partnerships with hyperscalers to choose the best fit for a purpose based on workload specifications, and they can offer industry-specific consulting on best practices to address internal and external governance, risk, and compliance requirements.
- Providing cloud migration value streams: Organizations have moved from developing in the cloud and subscribing to SaaS (software as a service) solutions to migrating their monolithic application stacks to hybrid and public clouds. This migration has revealed the vast amount of technology debt many have accumulated; thus, organizations are prioritizing services providers that demonstrate the capabilities to hasten the discovery, assessment, migration, automation, management, and governance of applications and processes and effectively move them to a hybrid or fully cloud-based platform.
- Addressing the war for talent: Cloud-native strategies have led to a talent war for hyperscaler services. New
  architecture, applications, and tools for leading cloud providers like Azure, AWS, and Google Cloud mean that service
  providers can augment their customers' skills. The flurry of acquisitions that began in late 2020 has continued into
  2021, and we expect it to continue as customer demand for service providers' support will likely outstrip supply by mid2021.

# Research methodology

This research is the result of data collected in 2020 through provider RFIs, structured briefings, client reference interviews, and from publicly available information sources. This information is supplemented by key findings from a large G2000 survey of enterprise leaders.

This report looks at service providers with a minimum of 10,000 cloud professionals, services across the cloud services value stream, and scale to provide global and cross industry services. Detailed analysis and profiles of hyperscaler cloud service providers with less than 10,000 professionals are covered in additional research provided by HFS.

Hyperscaler cloud service providers were assessed on the following three main dimensions with weighting of each provided:



33%

# Voice of the customer (weight) Ability to execute (weight)

 Candid feedback from client references and over 600 G2000 responses to the IT services satisfaction survey (100%)



- Scale, breadth, and reach (30%)
- Scarc, breadin, and reach (50%)
- Commercial models and pricing (25%)



33%



### Innovation capability (weight)

- Marketing and thought leadership (30%)
- IP and accelerators (15%)
- Investment roadmap (20%)
- Consulting and professional services (35%)





## Research definitions

- Hyperscaler: Provides computing architecture to appropriately scale as customers increase system demand. Hyperscaling typically involves
  seamlessly provisioning and adding compute, memory, networking, and storage resources to a given node or set of nodes that comprise a larger
  computing, distributed computing, or grid computing environment. Examples of hyperscalers are Amazon AWS, Microsoft Azure, Google GCP,
  Alibaba AliCloud, IBM, and Oracle.
- **Hyperscaler cloud service providers**: Entities that consult, design, develop, build, manage, and orchestrate software, data, and applications provided by one or multiple hyperscalers.
- Hybrid cloud: A computing environment that combines an on-premises data center (also called a private cloud) with a public cloud, allowing data
  and applications to be shared between them.
- **Multi-cloud:** A cloud computing approach where multiple public clouds (from more than one cloud vendor, e.g., a hyperscaler) are leveraged to support single or multiple applications.
- Cloud services value chain: HFS framework that outlines a services provider's capabilities to support organizations in the assessment, discovery, migration, management, and governance of applications, data, and computing resources towards a goal of providing cloud native solutions and architecture.
- **Cloud native**: Cloud-native computing is a software development approach that utilizes cloud computing to "build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds."



# Hyperscale Cloud Service Providers covered in this report





























# Sources of data

This report relied on myriad data sources to support our methodology and help HFS obtain a well-rounded perspective on the 12 hyperscaler cloud service providers covered in our study.

Sources are as follows:



### **RFIs and briefings**

- RFIs—Each participating vendor completed a detailed RFI.
- Vendor briefings—HFS conducted briefings with executives from each vendor.



### Reference checks

 We conducted reference checks with active clients of the study participants via detailed phone-based interviews.



### Web and survey research

 HFS conducted in-depth research based on web research, past research notes and interviews, as well as data collected from a series of studies conducted throughout 2020.



### Other data sources

- Public information such as press releases and websites.
- Ongoing interactions, briefings, virtual events, etc., with in-scope vendors and their clients and partners.







### **Summary points**

The cloud market evolves with the major hyperscale incumbents

Global service providers provide a compelling narrative to grow

Communicate value stream, not a product narrative

Talent is key

Cloud is about the architect, not the developer

The hyperscaler cloud service market is, to a significant extent, governed by the roadmaps and growth strategies of the largest cloud firms. Most notably, the big three cloud platform providers—Amazon's AWS, Microsoft's Azure, and Google's Cloud Platform (GCP)—continue to battle each other for market share.

Rebadging discrete solutions into a "cloud ready" offering isn't enough; service providers must have a compelling story for both technology and business leaders on how their solutions have sustainable impact and meet robust security and governance requirements while accelerating a shift to becoming cloud native. Worth noting is that business leaders are more likely to consider traditional technology outsourcers as they are still focused on costs and efficiencies, while technology leaders look to GBS to provide business context to the cloud. The winning hyperscaler service providers will offer both.

Many of the companies we reviewed still offer discrete packages of products for tailor-made needs to discover, assess, migrate, automate, and manage. Enterprises are looking for a clear methodology from their partners on doing all this as one service for both core and contextual applications. Infosys' Cobalt and Accenture's MyNav are good examples of how this can be achieved.

As enterprises adopt and migrate more solutions to the cloud, service providers must be able to bring talent and experience working across leading platforms. Service providers will eagerly acquire smaller companies with this expertise to augment their abilities. Service providers will also offer many companies an option to re-patriate some of their resources to the provider to provide localized support and experience as they jointly adopt cloud native architectures.

Orchestration of multiple applications, databases, and processes across on-premise, hybrid, and public cloud is an architectural issue first.

DevSecOps, testing, quality assurance, and CI/CD managers are all important, but enterprises and service providers must start with the architecture in place and a vision for change. Failing to do so will create more technology debt, not reduce it. The goal of becoming cloud native must be to create technology wealth, and this begins with how you architect your systems to deliver value to the business.



### Hyperscaler cloud service providers: A summary of providers assessed in this report

Provider (alphabetical)	HFS point of view on hyperscaler cloud service provider capabilities
Accenture	Solution-rich provider leading with business-first innovation and bolstering talent through acquisitions
Atos	Mature systems-integration player with a wide range of tools and partnerships and a strong expertise in digital transformation efforts
Capgemini	Heavyweight cloud service player with industry-specific expertise and partner ecosystem
Cognizant	High-quality talent with a commitment to flexibility
DXC	Infrastructure heavyweight with a global delivery capability
EY	Provider of deep industry expertise and business strategy
HCL	Competitive cloud player with a focus on pragmatic solutions
IBM	A hyperscaler and provider with an evolving partner and product ecosystem for multi-cloud capabilities
Infosys	Robust provider with stack of solutions supported by a strong base of talent and tools
KPMG	Consulting heavyweight with a clear vision for enterprise cloud governance and risk management
TCS	Global delivery capability combined with deep contextual and domain knowledge
Wipro	Bringing a high-value toolbox to client engagements



# HFS Top 10 hyperscaler cloud service providers rankings

				Execution			Innovation					
Rank	Overall HFS Top 10 position	Partnerships	Talent and development	Breadth, scale, and reach	Pricing and commercial models	Overall execution	Marketing and thought leadership	IP and accelerators	Investment roadmap	Consulting and professional services	Overall innovation	Voice of the customer
#1	accenture	accenture	accenture	IBM	HCL	IBM	accenture	IBM	accenture	accenture	accenture	IBM
#2	IBM	wipro	Infosys	accenture	Cognizant	accenture	IBM	accenture	IBM	IBM	IBM	accenture
#3	Infosys	Infosys	IDM	HCL	wipro	Infosys	Cognizant	Infosys	Infosys	EY	Infosys	Cognizant
#4	Cognizant	IDM	TATA CONSULTANCY SERVICES	Infosys	CONSULTANCY SERVICES	HCL	Infosys	CONSULTANCY SERVICES	wipro	Capgemini	Cognizant	Infosys
#5	HCL	Cognizant	HCL	CONSULTANCY SERVICES	Infosys	CONSULTANCY SERVICES	CONSULTANCY SERVICES	Cognizant	Cognizant	CONSULTANCY SERVICES	CONSULTANCY SERVICES	HCL
#6	wipro	CONSULTANCY SERVICES	Cognizant	DXC.technology	Capgemini	wipro	KPMG	wipro)	Capgemini	Infosys	Capgemini	KPMG
#7	CONSULTANCY SERVICES	HCL	wipro	wipro	IDM	Cognizant	EY	HCL	HCL	KPMG	wipro	EY
#8	Capgemini	Capgemini	Capgemini	Cognizant	DXC.technology	DXC.technology	Capgemini	Capgemini	CONSULTANCY SERVICES	wipro	EY	Capgemini
#9	KPMG	DXC.technology	EY	Atos	Atos	Capgemini	wipro)	DXC.technology	KPMG	Cognizant	KPMG	Atos
#10	EY	Atos	Atos	Capgemini	EY	Atos	HCL	KPMG	EY	Atos	HCL	wipro



### Notable performances in HFS Top 10 hyperscaler cloud service providers

	HFS Podium Winners  Top three providers overall across execution, innovation, and voice of the customer criteria								
	#1.			#2		#3.			
a	ccenture	9		IBM		Infosys			
Execution powerhouses  Top three providers on execution criteria				vation champi viders on innov		Outstanding voice of the customer Top three providers on voice of the customer criteria			
#1	#2	#3	#1	#2	#3	#1	#2	#3	
accenture	IBM	Infosys	accenture	IBM	Infosys	IBM	accenture	Cognizant	

### Other notable performances

- EY for its strong talents and developments alongside effective consulting and professional services
- Capgemini for delivering consulting and professional services with a correspondingly robust talents and development initiatives
- Wipro for its massive partnership ecosystem, and bringing high value IP and accelerators to the clients

Note: Notable services providers that did not participate in this report include Deloitte and PwC



### HFS's cloud services value stream heat map

As organizations move toward a cloud native business model for their technology and business, they must consider how to effectively migrate their technology assets, data, and workloads into private and public networks. Service providers can play a large role in this migration and offer talent, methodologies, and solutions to assist and sustain these efforts. The following table outlines HFS framework for the services that should be used to enable this migration.

### Governance

Cloud governance is an organizational framework consisting of establishing, enforcing, and overseeing the activities and guidelines needed to establish policies for cloud use. This should compliment existing business and technology governance

### **Discovery**

Discovery and planning focus on the iterative efforts needed to identify applications, workload, connectors, data sources, and compatibility for migration towards a cloudcentric deployment.

### **Assessment**

Assessment identifies and focuses teams on systems that are or are not compliant with the new architecture required to deploy, support and manage in context of cloud native requirements and the organization's governance policies.

Assessment will often lead to prioritizing efforts to adapt, re-code, or replace with cloud compliant solutions.

### Migration

Migration is the step where moving digital assets to cloud platforms take place. Both automated and physical efforts, tools, and talent is applied to transition to a cloud architecture that can be hosted in private, hosted or public cloud platforms.

### Management

Cloud management brings tools, services, and talent to bare to sustain the efficiencies, scale, and compute power offered by adopting cloud native process and operating models. Organizations and partners will provide tools to monitor, develop, improve, deliver, and continuously innovate.



and policies.

# Additional Research: Market analysis of disruptive Hyperscaler Cloud Service Providers

- As organizations invest in becoming cloud native, we are seeing a group of disruptive vendors taking center stage in many deals. These vendors compete on industry, geography, and specific cloud skills, offering compelling reasons for companies to consider them for their hybrid and multi-cloud needs.
- These vendors have, or are developing, deep relationships with the
  hyperscalers and bring their own cloud value stream solutions to meet
  customer needs for assessing, migrating, and managing solutions. What often
  sets these vendors apart from those covered in more detail in this research is
  their cloud practice is typically smaller (<5,000 professional dedicated
  globally, revenues in the \$100 million range, and often their certification as a
  percentage of cloud professionals may be higher than larger firms).</li>
- In a second report titled: Market Analysis Disruptive Hyperscaler Cloud Service Providers, HFS profiles each 11 of these vendors, their solutions, and summarizes why the market is ripe for these vendors to have an impact.

**Vendors covered:** 





























# Robust provider with stack of solutions supported by a strong base of talent and tools



Dimension	Rank
HFS Top 10 position	#3
Ability to execute	# 3
Talent and development	# 2
Partnerships	#3
Breadth, scale and reach	# 4
Pricing and commercial models	# 5
Innovation capability	# 3
Marketing and thought leadership	# 4
IP and accelerators	# 3
Consulting and professional services	# 6
Investments and roadmap	# 3
Voice of the customer	# 4

### Strengths Opportunities

- IPs and accelerators: Infosys offers a wide array of platforms and solutions, such as vision analytics and open network
  automation platforms, IoT-based solutions, and cloud migration accelerators. Polycloud is an in-house platform which
  includes features like security, compliance, and governance templates. The platform has been implemented in several
  industries in various forms.
- Talent and capability: Infosys has been relentlessly investing in its talent through training and reskilling. Infosys trains
  5,000 hyperscale professionals each month. The firm invested in training centers in Mysore and Indianapolis, designing
  the curriculum with academia; it also has other learning platforms and certification courses.
- **Robust client engagements**: Infosys constructs deals driven by end-to-end ownership, starting from consulting, optimization, cloud subscription, transformation, and operations. Clients can benefit from the hyperscale subscription point; Infosys commits to cost optimization across their customers, so its pricing is highly competitive.
- Partnership: Infosys has partnerships with major hyperscalers, and it has a wide range of technology partners for assessment, migration, development, and operations to provide holistic support.
- Infosys Cobalt: Infosys launched Cobalt, a set of services and solutions to support the enterprise cloud journey. Infosys re-positioned itself as a leading player in the cloud services space by coalescing many services with clearly branded messaging.

**Develop expertise across cloud vendors:** Overall, Infosys sizeable pool of cloud professionals. Its continuous investment in developing talents is worth mentioning. However, Infosys' expertise significantly relies on Azure and AWS. The firm is catching the pack with its expertise in GCP. Infosys needs to focus more on developing its expertise in GCP, Oracle, IBM, and

Alibaba cloud and continuing its role as a major competitor in the market.

Talent pool

 Focus on project management: Infosys has a strong track record of delivering complex cloud migration engagements. However, a challenge facing all providers now, least of all one of the largest like Infosys, is ensuring staff are trained to handle the project management aspects of the engagement. Infosys should continue to build these skills into its ongoing training investments.

### **Key clients**

Key partnerships

Solution overviews

BSH, Dairy Farm, Australian Open, DNB ASA, large conglomerate in the Philippines, healthcare company in the US, leader in the renewable energy industry

ı	Hyperscale partners: AWS,	• <b>Cobalt:</b> A set of cloud-enabled services, solutions, and platforms. Cobalt offers over 15,000 cloud assets and, perhaps most importantly, over 200 industry-specific cloud solution blueprints. Enterprises can leverage the full potential of the cloud ecosystem.	Cloud professionals:  Not disclosed
	Microsoft Azure, Google Cloud,	• <b>Polycloud</b> : Hybrid cloud management platform delivering smart catalogues, smart brokerage, developer empowerment, and governance in a cloud-agnostic manner while consuming resources from private and one or more public clouds.	<ul> <li>HFS estimates ~50,000–</li> <li>60,000 professionals</li> </ul>
	IBM, Oracle	• Cloud native development platform: Integrated platform for cloud native modernization/ development encompassing environment	
	Global strategic	provisioning, software provisioning, application automation, operational services, security, and open-source subscription management.	Certifications:
	partners:	• Infosys Media Platform: Automate, digitize, and transform content distribution with intelligent metadata workflows for mastering localization,	<ul> <li>HFS estimates half of</li> </ul>
	CloudAmize,	cataloguing, and delivery.	Infosys professionals hold at
	RedHat,	<ul> <li>JuniperX: Hyperscale data transfer to the cloud and across environments powering the data marketplace.</li> </ul>	least one cloud certification
	ServiceNow,	<ul> <li>Infosys DevOps Platform: Support development efforts across multi-cloud solutions.</li> </ul>	
	Atlassian	Data Cruise: Data migration, privacy, data testing.	





### Market trends: Avoiding multi-cloud technology debt

Enterprises seek to answer the multicloud question

Building agility into the next platform

Service orchestration is critical

Buyers are focused on building out multi-cloud infrastructure to offer the best return on investment. In some instances, this approach is a direct result of regulatory compliance, where enterprises are required to maintain a level of resiliency that hosting with a single provider won't accommodate. This approach could also result from a fear of lock-in or a quest for best-in-breed capabilities spread across hyperscale services.

Hybrid cloud solutions promise greater operational flexibility, agility, and cost efficiencies. An ideal IT operating model will be based on working with a services provider with an understanding of data orchestration across systems, regardless of platform using Kubernetes, microservices, and edge computing tools. The concern is how a next generation of technology debt may be created as applications, data, and workflows will reside on separate platforms. This is real concern as companies like SAP, ServiceNow, Salesforce, and Oracle are also pushing customers to use their clouds to deliver services.

Ever since hybrid and multi-cloud strategies started growing, optimizing and orchestrating existing cloud use remained a key challenge. Some enterprises could have utilized their cloud budget in more optimal ways. Customers seek service providers with the expertise to optimize their subscriptions and cloud usage and deliver solutions.

### Market dynamics: What do buyers want from providers?

# Bring flexibility and transparency

Strong negotiating ability with hyperscalers

**Access to talent** 

An innovative provider

Help with architecture

In the cloud services market, this extends to flexibility and transparency. In terms of flexibility, enterprises are looking for partners willing to bring resources to engagements to tackle the challenge whatever the challenge may be. Many enterprises advised that providers who are too sales focused quickly fall out of favor in a competitive market. Providers are bringing more innovative pricing strategies and cost-tracking methodologies to ensure enterprises have full oversight of their public cloud spending.

Enterprise buyers are scrutinizing the relationships providers have with hyperscale providers, in most cases to ensure they can lean on them to get the best deal and pricing out of engagements. In addition to this, CIOs and IT leaders are looking for providers collaborating closely with the cloud giants to ensure they build roadmaps that won't suddenly fall out of date when the cloud giants build out capability or plug in fresh solutions.

A major motivation is ensuring providers have the talent necessary to build out comprehensive and coherent cloud and infrastructure roadmaps. In an increasingly hostile talent war, enterprises want to work with providers that are somewhat insulated, with strict assurance that talent pools are deep enough to weather the fluid labor market.

Buyers are looking for speed-to-market tools and accelerators during their cloud journey, and also prefer to leverage providers' industry expertise and cloud experiences.

Providers must have such capabilities to accommodate in its offerings. If there is a business requirement, providers must be capable of setting co-innovative labs or hubs in association with buyers in different geographies.

Most organizations will have hundreds of systems connecting across thousands of APIs, connectors, and databases, which will be on multiple platforms, both on-premise and in the public cloud. Often custom code has been developed by people no longer in the business and development, support, and business users will often be siloed. Business and technology buyers want partners who can help implement change without risking their business. Partners should have strong platform architects that can work alongside teams to ascertain, define, and deploy solutions that will reduce the technical debt while driving up value.

### Market trends: Hyperscaler overviews

AWS presents compelling proposition to more industries

Azure's efforts to play nice with others is winning loyalty

Google pursues a more aggressive strategy

Alibaba develops foothold in APAC

IBM's new leadership looks to cloud as the firm's growth engine

AWS continues its role as the leader of cloud compute offerings. From S3 to Lambda, Amazon continues to lead with infinite scaling and computing offerings. AWS Lambda pushes the current edge for organizations interested in where functional application services and serverless computing will drive innovation and value. With its new CEO coming from AWS, Amazon will continue to become a global behemoth for cloud solutions, data, application hosting, and development

Azure, Microsoft's cloud offering, has held somewhat of a privileged position among enterprises and providers alike. Foremost, many business are, in effect, largely composed of existing Microsoft technology, which makes migrating an easy choice for executives. Providers, similarly, have large benches of Microsoft and Azure certified talent which makes delivery provision a more palatable business. Microsoft's leadership is aware of this, and—fuelled by a refreshed commitment to building ecosystem-led business models—it makes the firm likely to continue its role as a trusted fabric of the modern enterprise.

Over the past year, Google has begun to pursue an aggressive business development strategy with a focus on winning over enterprise spending from its two larger rivals. The firm is well-positioned to ride a new wave of enterprise spending on AI and analytics technologies, all of which will need a cloud foundation to sit on. Services providers will need to communicate the value of joining GCP's ecosystem of applications, services, and development tools to convince more customers to move core applications to its platform.

While the big three cloud giants have developed a strong global footprint, they're finding themselves coming into conflict with Alibaba's cloud proposition, which holds an increasingly dominant position in the APAC region. The firm has launched an ambitious growth strategy, moving out of China, where it has a dominant cloud business, by acquiring and building out data centres and delivery capabilities in rapidly growing economics, such as Indonesia.

IBM has always had a conflicted position in the hyperscale market. The firm is, technically, one of the largest hyperscale firms in the market, but much of the firm's business stems from high-value IT services, which presents the firm as somewhat of a quandary when it comes to conflicting business interests with firms that would naturally ally to hyperscale firms. That being said, IBM's new leadership has renewed focus on cloud capabilities. Its acquisition of Red Hat and it's ubiquitous OpenShift technology means IBM is now a firm providers *have* to partner with, rather than one they *might*.



### **HFS Research authors**



Joel Martin
Vice President
Joel.martin@hfsresarch

Joel Martin is Vice President, Cloud Strategies at HFS. Joel's role is to aid organizations in making crucial decisions on designing, adopting, managing, and governing their growing Cloud Native endeavors.

Joel has worked in industry as a business leader and as an analyst/consultant for nearly three decades, leading teams and products that adopted cloud-based delivery solutions for global customers and product managing business applications, semiconductor design data, and research services for both high-tech and industry investors.



Martin Gabriel
Associate Director
Martin.gabriel@hfsresearch.com

Martin Gabriel is an Associate Director, Research at HFS, covering IT services, tracking global outsourcing deals in IT/BPO services, and participating in various research writings.

Martin has over five years of research, analytics, and market intelligence experience in TCS and Xchanging. In his TCS role, he worked on point-of-sale and consumer panel data and on analytical projects, providing business insights to clients. He was responsible for analyzing retailers and consumer behavior for various FMCG/CPG products to address diverse business issues and provide actionable recommendations for the future growth for clients. He performed extensive category reviews, brand management, and trend analysis based on point of sale and homes scan data along with information from secondary sources. At Xchanging, he was part of the market intelligence team that supports Xchanging's vertical heads, strategy team, and sales and marketing team.

### **About HFS Research**

The HFS mission is to provide visionary insight into major innovations impacting business operations, including automation, artificial intelligence, blockchain, Internet of things, digital business models, and smart analytics.
HFS defines and visualizes the future of business operations across key industries with our Digital OneOffice<sup>TM</sup> Framework.

HFS influences the strategies of enterprise customers to help them develop OneOffice backbones to be competitive and to partner with capable services providers, technology suppliers, and third-party advisors.

Read more about HFS and our initiatives on www.HFSresearch.com or follow @HFSResearch.

