

YOUR FRIENDLY NEIGHBORHOOD CLOUD

An overview of the current challenges,
drivers and opportunities for Cloud
Service Providers



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SOLUTION SNAPSHOT

This IMDC solution overview sets out the key drivers and challenges influencing infrastructure strategies for Cloud Service Providers of all sizes, and their Cloud Channel Partners, with a particular focus on the role of colocation.

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INTRODUCTION

THE CLOUD COMES OF AGE

This has been the decade of the cloud, as a tectonic shift drives data from PCs and proprietary racks to mobile endpoints and virtualized public infrastructure. Cloud services convert capex to opex, eliminate unused capacity, save on staff, accelerate agility and innovation and enable instant up and down scaling.

Whether they offer end-to-end solutions based on third party clouds or whether they build their own, Cloud Service Providers (CSPs) of all sizes are on the march, deploying new infrastructure, offering new services, and growing world-beating businesses based on the cloud's massive economies of scale and compelling business case.

While there is considerable debate over market size and breakdown, Gartner estimates that public cloud services now account for approximately \$500 billion, or 10% of global corporate IT spend (up from 4% in 2017). Depending on which research house you follow, private cloud spend is about a quarter to a third of this. Public cloud apps (SaaS) generate almost \$200 billion per annum. The IaaS and PaaS markets are both worth over \$100 billion with the highest

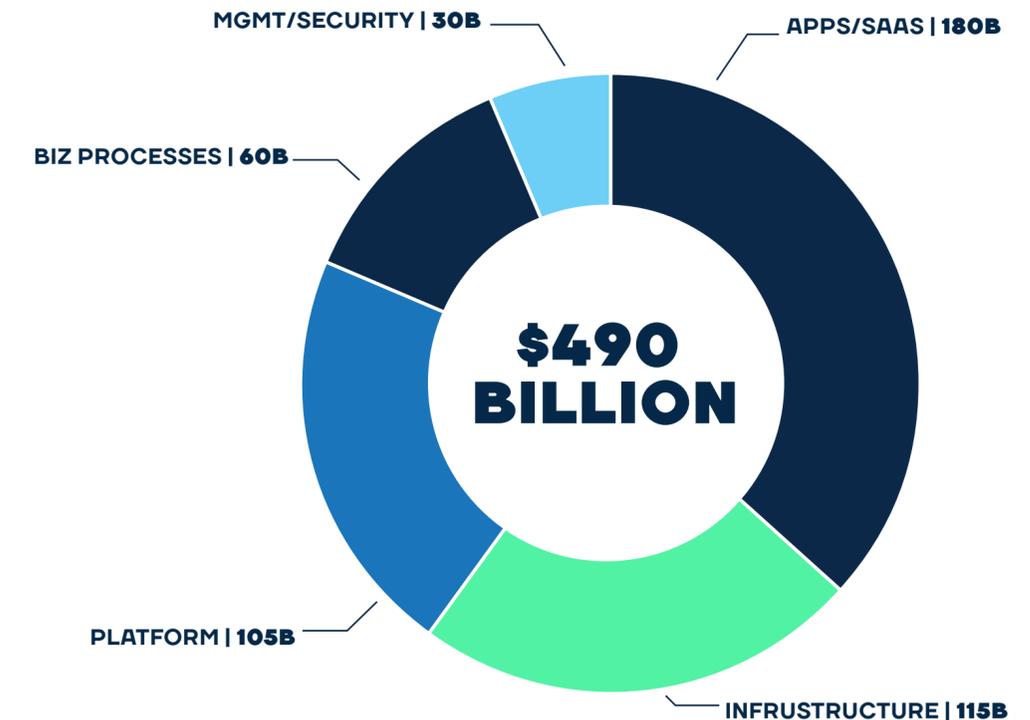
forecast CAGR. And business processes, security and management services are approaching \$100 billion and growing fast.

Over half of the IaaS market is held by just 9 companies - including three well-known leaders - but there is plenty of competition. Wisely, cloud providers continue to re-invest in innovation, cost reduction and efficiency, putting profits back into the business and developing new cutting-edge services and the enhanced compute capability and interconnection required to run them.

But the laws of physics apply. As a key differentiator and market opener, innovation is central to the cloud business, and deployment of AI helps this process for existing users. But as cloud providers know all too well, the cloud lives and grows in physical premises on the ground, and these decisions need to be taken in a more traditional way.

GLOBAL PUBLIC CLOUD SPEND

Source: Gartner



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DRIVERS

DRIVERS

CUSTOMIZATION

The increasing commoditization of cloud services is driving differentiation and diversification, pushing cloud providers into new service areas.

PARTNER & CHANNEL GROWTH

Customization and integrated vertical services, as well as perceived cloud complexity and safety concerns, are powering a huge growth in channels and new partnerships. This includes the development of industry clouds: vertically integrated platforms which mesh business solutions, ERP, CRM, workflows, and other services.

OUTAGES

There have been numerous major cloud outages in the last year. Costs per outage vary hugely, running from a few thousand up to \$1 million an hour. High profile outages damage reputations for both providers and their customers.

PUBLIC TO PRIVATE

Between 3.4 public and 3.9 private clouds are being deployed or tested per organization, According to many analysts post-Covid, the power dynamic between public and private clouds is equalizing to some extent, as regulatory requirements are firmed up and hybrid solutions become more practical.

DATA SOVEREIGNTY

With the rise of new regulations like GDPR, compliance on public servers is expected to increase cloud costs and reduce control.

LOCK-IN/CHURN

Linked to commoditization, for IaaS and PaaS providers there can be a perception that customers are somehow tied to their services, particularly considering the cost of data egress. New pricing structures and multi-cloud specialists are rising to this challenge.

LOCALIZATION/EDGE

Edge computing involves building localized data centers for computation and storage at or near where they are needed, adapting delivery to new dynamic users and devices. Edge Locations across the three leading CSPs alone exceeded 300 in Q2 2021, a year-on-year rise of almost 30%.

COMPLEXITY

Another growing customer issue for infrastructure providers. Companies like CloudFix, Cloudwiry and Zesty are now offering to help customers simplify and improve the efficiency of their cloud use.

TRUST/ESG

IDC's Cloud Pulse survey respondents in Q3 2021 revealed that post-Covid, the leading attribute for any single cloud platform is 'trust'. Trust used to be linked solely to service satisfaction levels, but in 2021 it also included elements such as reputational risk, environmental, social, and governance (ESG) profiles

SUSTAINABILITY

Worth a separate mention. According to Accenture, 44 percent of CEOs are already planning net-zero futures for their organizations. While the cloud is much more efficient and many CSPs have outstanding credentials in this area, sustainability will continue to be a vital purchasing factor.

SECURITY

As Google CEO Thomas Kurian put it when the company recently spent over \$5 billion on Mandiant, “the sophistication and severity of attacks that were previously used to target major governments are now being used to target companies in every industry”. Leadership in security is hotly contended.

EXPANSION PARTNERS

Pressure to deliver capacity faster than in previous years increases the need for collaboration with developers and service providers as companies look to build partnerships to create new delivery models.

INTEROPERABILITY/OS

Launched Q3 2021, Azure Purview is one example of a new breed of unified data solutions designed to support data management in multi-cloud environments. Reusing software stacks, libraries and components will create bridges between applications. This has been dubbed the ‘supercloud’ by Cornell - “a cloud architecture that enables application migration as a service across different availability zones or cloud providers.”

EDGE FRONT ENDS

Plans for the edge include the deployment of digital experience workloads - web front ends - as well as data-processing workloads in addition to the expected security service workloads such as DDoS protection and Web and API Protection (WAAP).

CHIP SHORTAGES

The global semiconductor shortage has hindered the supply of high-end PC components. Overall compute demand is exceeding chip manufacturing capabilities, and this in turn may limit infrastructure expansion.

5G/WI-FI 6E

As Sid Nag VP Research at Gartner put it: “While the cloud market will continue to grow, the real opportunity for providers comes from growth in cloud-adjacent technology markets such as edge, 5G and AI, as CIOs look to invest in technologies that address their complex and emerging use cases.” New interconnection standards and hyper-densification will change the nature of streaming data as mobile users experience the same play quality as FttH owners.

AI

AI powers cloud computing, managing data, revealing insights, and optimizing workflows. Cloud computing increases the impact and scope of AI. According to Statista, by 2025 the annual global market for AI is estimated to surpass \$89 billion.

DATA FABRICS

Data fabrics use APIs to knock silos down, offering organizations consolidated data access, management and security across cloud providers.

AR/VR

Together with 5G networks the cloud is now positioned to compute, render and distribute high-bandwidth user experiences to more people. The cloud is investing heavily in the gaming space. Look for real-time displays, new games and smaller and cheaper headsets.

BLOCKCHAIN

Information permanence could transform the cloud, enabling major steps forward in security and data management.

CLOUD-NATIVE APPS

Cloud-native architecture is maturing and consolidating. More and more apps will be adopted by key players creating more agile software and data.

KEY INFRASTRUCTURE CONSIDERATIONS

1 GLOBAL PARTNERSHIPS

The number of hyperscale data centers globally has nearly doubled since 2016. Increasingly, hyperscale and cloud companies are turning to partners for colocation and build-to-suit options as well as constructing their own facilities. Securing locations, supply chain and power capacity management, standards and skills can be outsourced to keep pace and maintain competitive advantage. For smaller specialist providers the ease of access to a global footprint also makes a winning proposition when pitching to ambitious or international clients.

In the current state of the market, key considerations should be:

UPTIME, RESILIENCE, SECURITY: Tier 3 facilities with redundant and resilient infrastructure and failproof configuration are non-negotiable. Comprehensive physical and data security layers should guard your vital assets. In some cases extreme security is required: for maximum physical security underground facilities offer even greater protection from intrusion and natural disasters.

REMOTE CAPABILITIES: A mix of dedicated and colocated infrastructure increases speed and taps into valuable skills and ecosystems. By moving to a full-service colocation model which offers cross connects, builds and installs, smart hands and migration management via a web interface, cloud providers can become more location independent, freeing up more time for R&D, additional expansion and customer-facing work. Operators can also use virtualized control surfaces with distributed monitoring from satellite or home locations.

EFFICIENCY & STANDARDS

Build, ethical and operational standards need to be consistent across continents. From ecosystems to uptime, sustainability to edge expansion, the key to making data center decisions that will power the next generation of cloud platforms and services is the mix of reliability, reach, and investment in growth which make for a productive long-term partnership. A broad checklist of multi-sector third party certifications is a good indicator of quality. Look for ISO 27001, SSAE18 SOC 2 (Type II)/SOC 3*, PCI-DSS, ISO -50001. Region-specific certifications are also key; in North America, NIST SP 800-53*, FISMA HIGH, FedRAMP and HIPAA (Type I); OSPAR in Asia; ISO 450001 and 9001 in EMEA.

SUSTAINABILITY

Trust is a defining factor, a strand from end-user to service provider. As data levels rise, sustainability is critical to long-term value and should be integral to standards. For instance, last year IMDC became the only colocation provider to offer simultaneous, global ISO 50001 Energy Management and ISO 14001 Environmental Management certifications. These standards should be extended to cover all new builds; both core and edge. Energy should be sourced or offset with renewable generation. Demand 100% renewables, providers should be able to offer this by now. And go a step further if possible. Look for a carbon credit scheme like IMDC Green Power Pass for CSR reporting, and, if the site is suitable, renewable generation as close as possible to the point of use. It should also soon be possible to match site by site electricity use with local clean power generation every hour, every day to achieve 24/7 clean power - so far IMDC hourly tracking covers 75% of the company's annual electricity consumption. For both efficiency and impact reduction, also check that IT asset lifecycle optimization and recycling, remarketing and secure disposal are available.

2 EDGE ENABLEMENT

To reach end users that are further out or in need of increasingly low levels of latency, providers are deploying smaller increments of cloud infrastructure in close proximity with 5G connectivity. These deployments can be as small as a few dozen racks and will live in colocation data centers, NSP aggregation points and other strategically-placed locations. According to The Linux Foundation the global power footprint for infrastructure edge deployment will grow from 1 GW in 2019 to 40 GW by 2028.

Provider capability in location-sourcing, capacity and power planning must be up to providing timely space and operational support for core and partner servers and connections. For edge developments, expertise on the ground and access to space are critical in working with utilities, regulators, logistics, contractors and staff.

APP LATENCY: The edge is a moving target. The most useful metric for defining required locations and capacity is latency. These can be useful subdivided into four categories by application.

Locations & Latency		
Latency (ms)	Data Center Type	Typical Applications
> 60	Core	Core compute and cloud apps, orchestration, backup
40-60	Network Edge	Consumer VR/AR, Hosted Desktops, Remote Data Processing
< 5	Metro Edge	Ultra HD and AR. IoT Gateways, Telecom NFV, Cloud Gaming, Cloudlets, AR
< 1	Outer Edge	5G processing, Industry 4.0 (drones, robots)

FRESH FOOTPRINT: Colocation partners are racing to the edge and providers will need to be flexible and well-resourced to respond. There are a variety of edge propositions. For instance, in addition to 20 core data centers in North America, EMEA and APAC, Iron Mountain has, over the past 70 years, built a portfolio of 1400+ facilities worldwide. 695 of these facilities are located close to city centers or airports in the sub-5ms zone - the Metro Edge. Spread across 50 countries, they provide a valuable source of potential Network Edge and Metro Edge PoPs for local zones. IMDC is rolling out a proprietary highly secure and customizable modular edge solution.

SECURITY: Standards and security count as much at the edge as the core. A good indicator of security at smaller edge facilities is whether the facility complies with US government SCIF (Sensitive Compartmented Information Facility) standards.

3 PLUG-IN ECOSYSTEMS

Strategic cloud-based partnerships improve competitiveness by broadening a cloud provider's portfolio and adding to their ability to manage larger workloads.

SEGMENT SOLUTIONS: In the last year, hundreds of new partnerships with industry-specific channel partners have been launched, all deepening vertical appeal. New app functionality can be bolted on almost instantly via a third party partner and an API. High value segments like healthcare, legislation or finance are highly regulated and require customized solutions that involve partners. These migrations encompass public, private and hybrid cloud environments, with the healthcare market alone forecast to reach \$76.8 Billion by 2026.

SPECIALIST LAYERS: The emerging generation of specialist cloud management and simplification layers, multi-cloud and cybersecurity overlays all require physical points of low-latency contact with their cloud hosts.

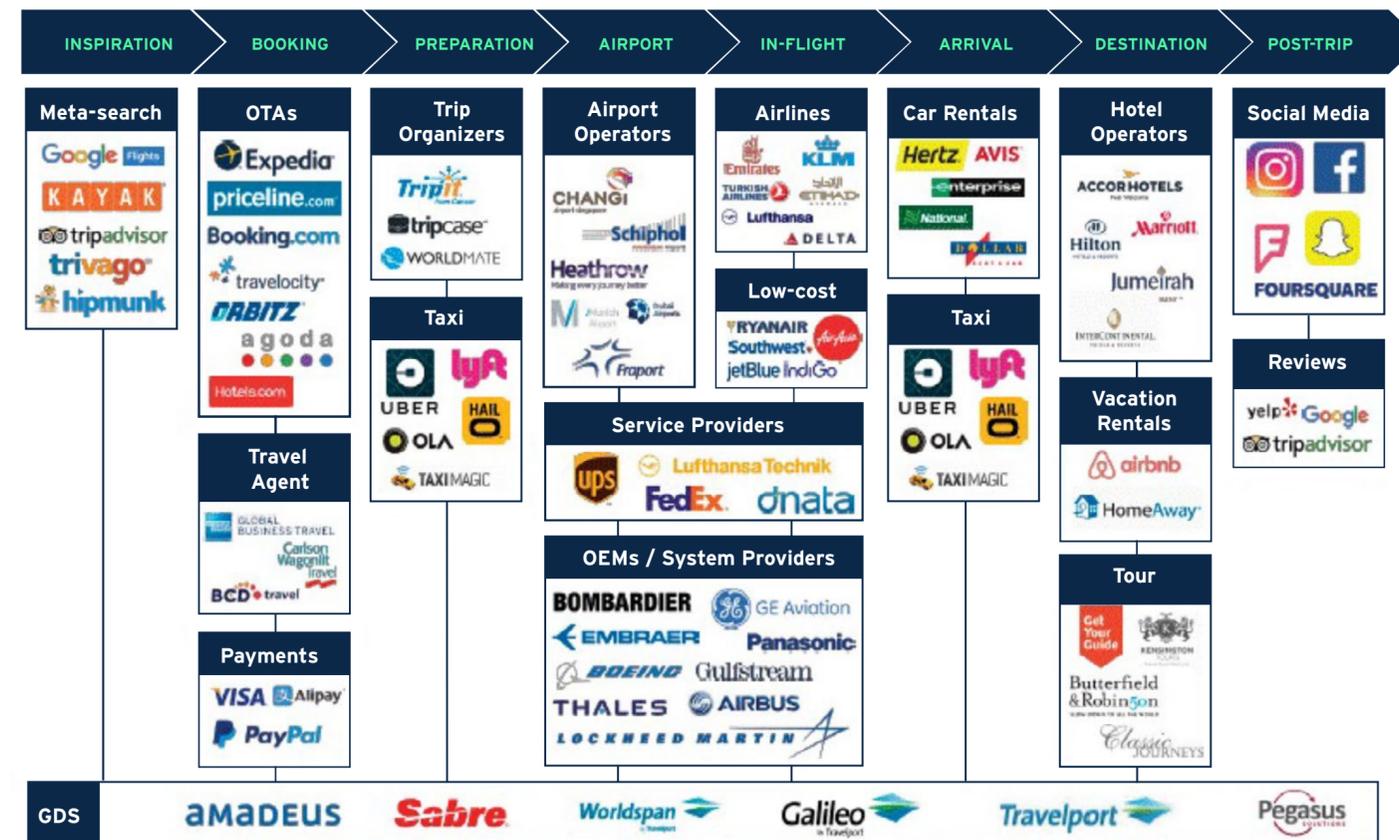
COLLABORATION ZONES: As these specialist solutions roll out to governments and private enterprises, larger cloud providers need both dedicated facilities for 'heavy lifting' and shared spaces or collaboration

zones with ready-made ecosystems for partner and customer interconnection.

Directly connecting to partners and providers within the same data center eliminates latency and increases efficiency, cutting a huge amount off network costs

and accelerating connections to new services. Global interconnections and direct cloud connections will support data transit and core flows. A range of network, SDN, and internet exchange services will also help keep data costs competitive.

END-TO-END ECOSYSTEMS (TRAVEL)



Source: World Economic Forum/Accenture analysis

As customer expectations rise, data levels increase and applications become more sophisticated and multi-functional, processing proximity matters more and more. Plug and play API-driven services can be tested and rolled out faster under one roof.

CONCLUSION

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COLLABORATIVE CORE & EDGE

It is a challenging time for cloud providers of all sizes as the industry's rate of growth continues unabated and new markets and users open up. The broader market is maturing, creating more opportunities for specialist service providers and a new list of demands from customers. New service opportunities are opening up on all fronts along with new delivery architectures, and this is driving a more sophisticated and collaborative phase in the growth of the cloud. The impact of this on infrastructure is that partnerships of all types will be required to enable both physical reach and service provision; for build-out; new service layers; new tailored solutions.

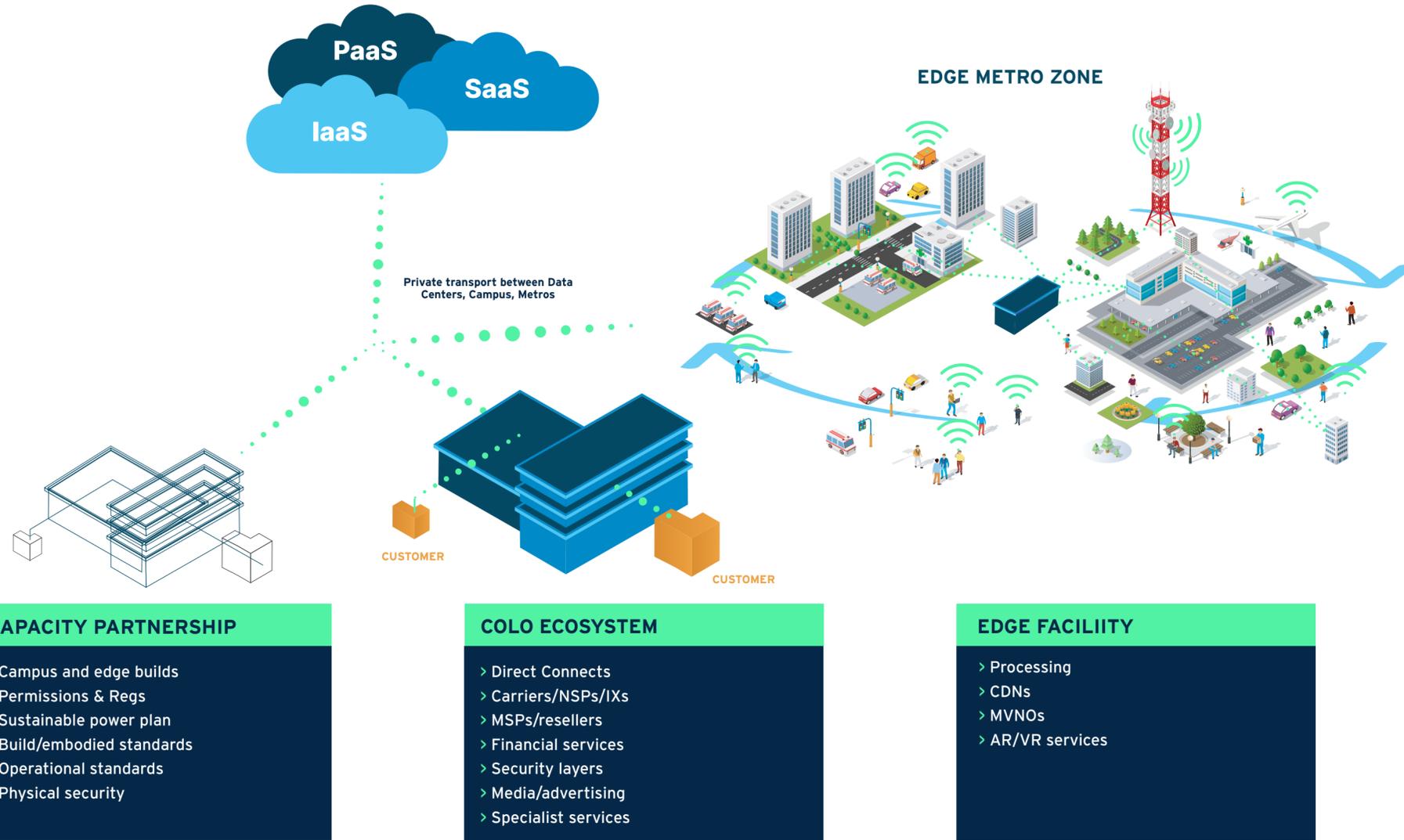
EDGE AMBITIONS

On the geographical side, many more locations and interconnections are needed, particularly at the edge. Flexible, reliable, strategic partners, who can deliver to the highest standards are needed to support cloud service providers, both internationally in large new builds and on a smaller scale in discrete compute-rich local zones at the emerging edge.

OWNED ECOSYSTEMS

As IaaS, PaaS and SaaS develop more retail-style and sector-specific solutions they are also beginning to own the ecosystems they build, and this is now a factor in selection. Customers are not just interested in a vendor's cloud application stack and delivery models, they look at the whole ecosystem of providers that bring them value. These long-term alliances require shared values and in many cases - for guaranteed performance - shared space.





TRUST REDEFINED

The definition of 'trust' - the number one factor in vendor selection according to IDC's most recent Cloud Pulse Survey - is broadening. Climate change, diversity and data protection and sovereignty have come to the forefront of customer concerns, adding a new dimension to customer satisfaction.

In this new era of transparent collaboration and global scrutiny, reputation, openness (to change and to other vendors), and environmental, social, and governance (ESG) leadership matter more. This is a natural consequence of the increasingly dominant role of cloud infrastructure and application providers in the global economy.

Long-term partnerships with build-to-suit and retail colocation providers can improve speed to market, facilitate vertical and specialist service provision, and enable new local edge zones. Key selection factors are reach, reliability, standards and sustainability best practice.

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ABOUT

Iron Mountain Data Centers operates a global colocation platform that enables customers to build tailored, sustainable, carrier and cloud-neutral data solutions. As a proud part of Iron Mountain Inc., a world leader in the secure management of data and assets trusted by 95% of the Fortune 1000, we are uniquely positioned to protect, connect and activate high-value customer data. We lead the data center industry in highly regulated compliance, environmental sustainability, physical security and business continuity. We collaborate with our 2,000+ customers in order to build and support their long-term digital transformations within our 3.5M SF global footprint spanning 3 continents. For more information, visit www.ironmountain.com/data-centers

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