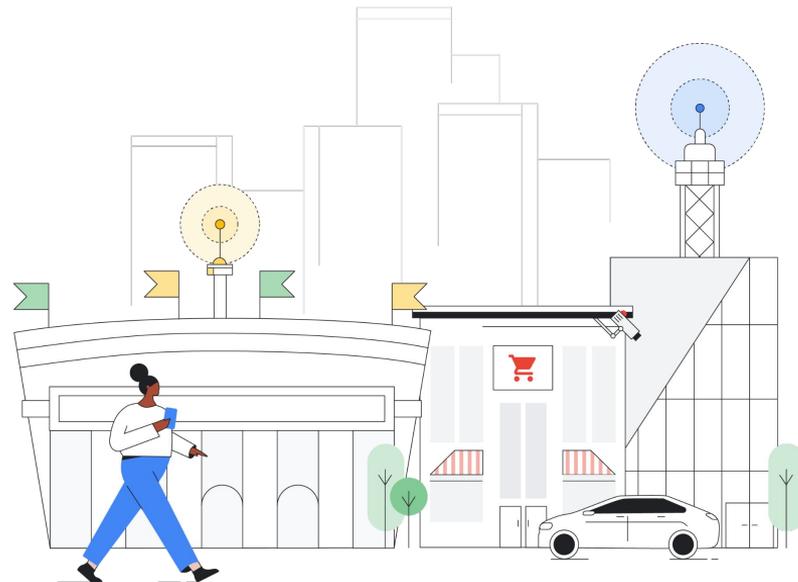


# 5G edge computing: The CSP opportunity

Directions for 2022 and beyond

February 2022



# Executive summary

5G edge is emerging as a powerful way to catapult enterprises to the next level of digital engagement. And its services are enriching and diversifying the portfolios of Communication Service Providers (CSP).

Shifting business models and customer expectations are driving enterprises to accelerate their digital transformation. Why? Because enterprises are noticing the need for flexible tools that support agility, enrich knowledge, and reduce risk across public and private environments.

But how will CSPs deliver new insights and digital experiences to enterprises and their customers? Google Cloud partnered with Omdia on a joint study to understand how enterprises plan to use 5G edge.

Discover new insights examining:

- Size, scope and scale of edge investment to date
- How edge services are expected to create new value
- Which use cases are live or planned
- Barriers to adoption
- Industry snapshots
- Five key factors to consider for 5G edge success



## Geography

### Americas

- US
- Brazil

### Europe

- France
- Germany
- UK

### Asia

- Australia
- Japan
- Singapore



## Industries



## Firmographics

### Turnover

\$100M to \$10BN+

### Employees

500 to 10,000+



## People (466)

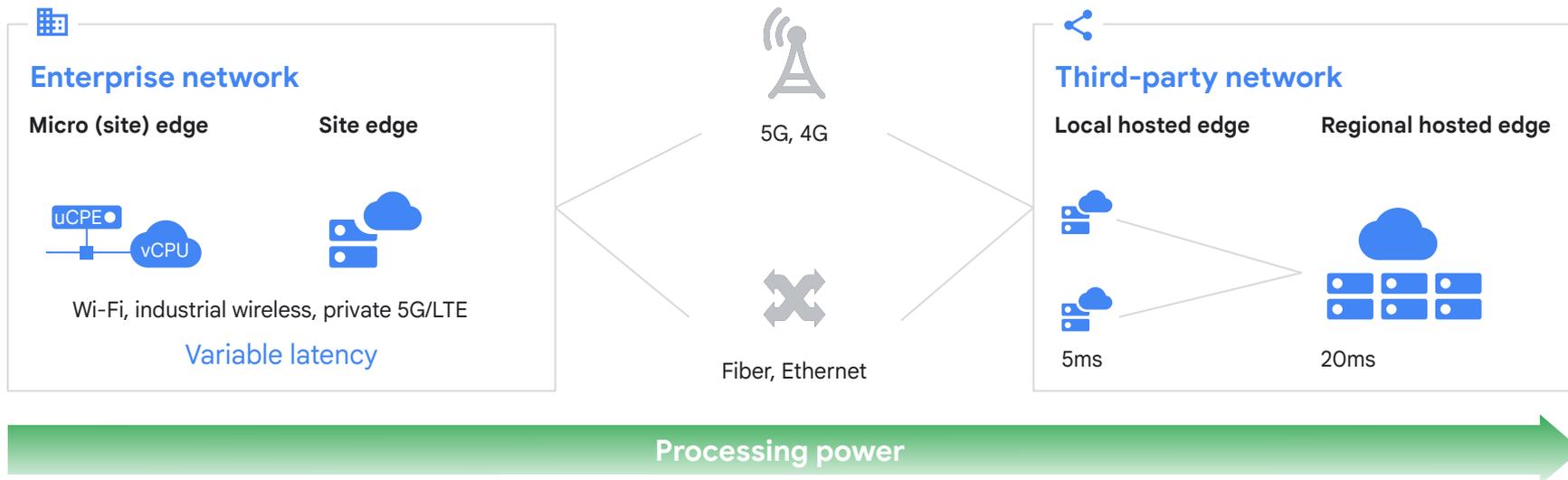
### Business leaders

Executive, line of business

### Tech Leaders

IT and operational technology

# Defining 5G edge



## Micro (site) edge

Maps processors or allocates containers inside a device not dedicated to edge compute (e.g., NFV appliance)

## Site edge

Dedicated servers located on-site

## Local hosted edge

Network hosting in a telco central office, radio base station, or cable head-end within 5ms round-trip latency of served sites (ie., far edge)

## Regional hosted edge

Network hosting in a data center within 20ms round-trip latency of served sites (ie., near edge)

# The 5G edge market is continuing to mature

**7 out of 10** enterprises expect to invest in edge within the next 12 months.

**8 out of 10** believe 5G is indispensable to gain edge benefits.

**Efficiency gains and improved safety** are near term investment drivers while new customer experience leads long term ambitions.

**Top edge barriers are skills:** internal and lack of expert partners.

## Experimentation and validation

**To 2021**

### How edge is used

Edge trials explore different outcomes across industries

Edge concepts become familiar to a wide enterprise audience

## Recovery and control

**2021-2022**

### How edge is used

Enterprise focus on uses that get their business (and network) in better shape

Attempt to regain lost ground due to COVID

## Innovation and disruption

**2023+**

### How edge is used

Enterprises build on greater insight and control over their environments to innovate

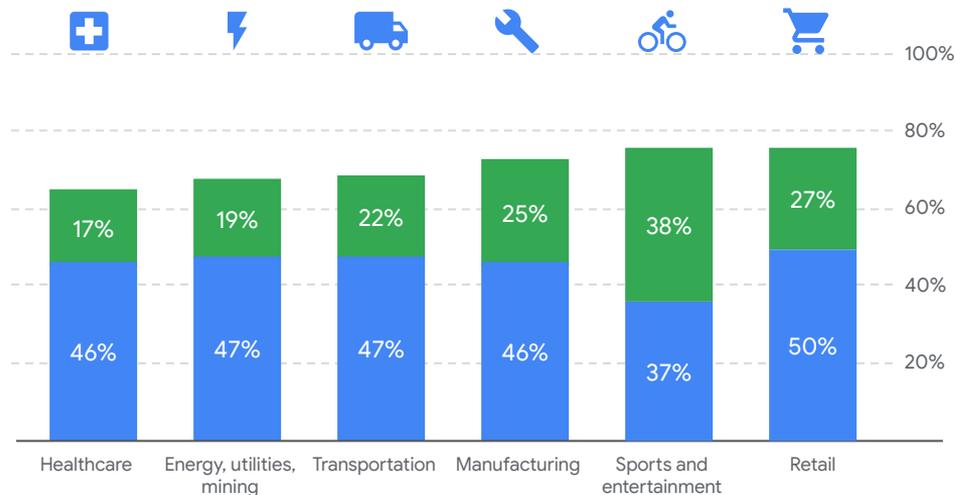
5G matures to support new experiences

# Edge is becoming mainstream, fast

## Industries are buying into edge

- It's not a question of who will deploy edge but when and with whom.
- Almost **70%** of enterprises expect to have deployed a form of edge **within the next 12 months**.
- The promised benefits are compelling.

## Are you using or planning to use edge computing services?



Source: Omdia Google 2021 5G Edge Survey

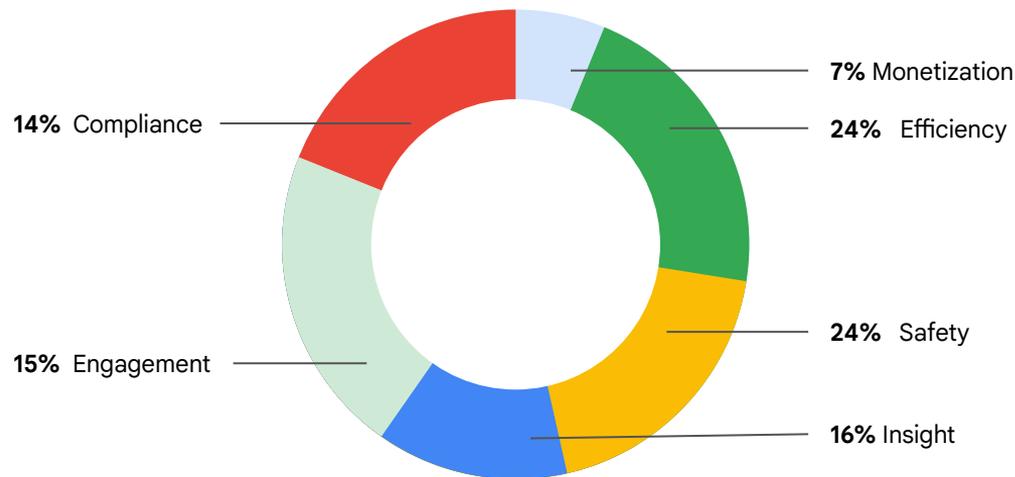
● Use today ● Next 12 months

# Better efficiency and safety are top goals of edge investment

## Key outcomes driving investment in analysis of 35+ edge use cases

-  **Efficiency**  
Help remote / field workers respond
-  **Compliance**  
Identify and fix problems faster
-  **Insight**  
Access to real-time situational data and intelligence to improve decision making and response

Is your organization using or considering the use of edge computing to address your greatest challenges?



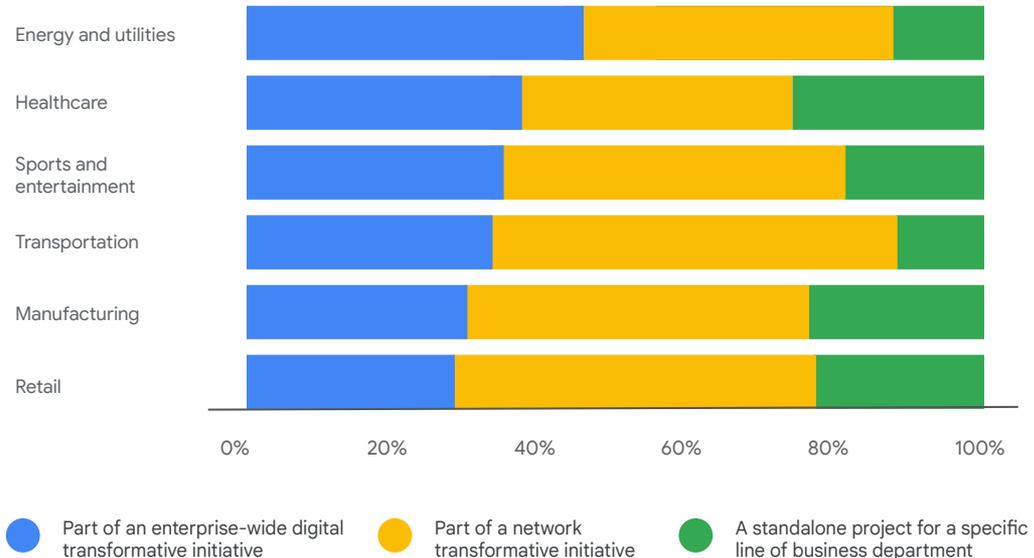
Source: Omdia Google 2021 5G Edge Survey

# Enterprise network organizations are leading edge efforts

## Edge computing is part of a wider transformation

- **Almost 50%** say edge computing is part of a networking / connectivity transformation initiative
- **One third** say edge computing is part of an enterprise-wide digital transformation initiative
- **One fifth** say edge computing is part of a standalone project for a specific line of business department

## How is edge computing planned in your organization?



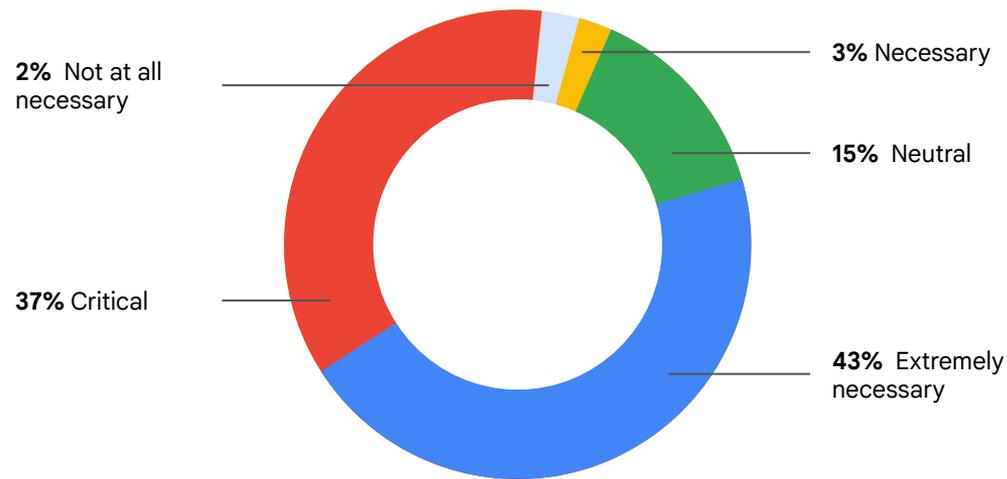
Source: Omdia Google 2021 5G Edge Survey

# Enterprises believe 5G and edge are better together

**Eight out of ten** enterprises believe that the availability of 5G is highly important to benefit from edge computing.



Is 5G necessary for you organization to benefit from edge computing?



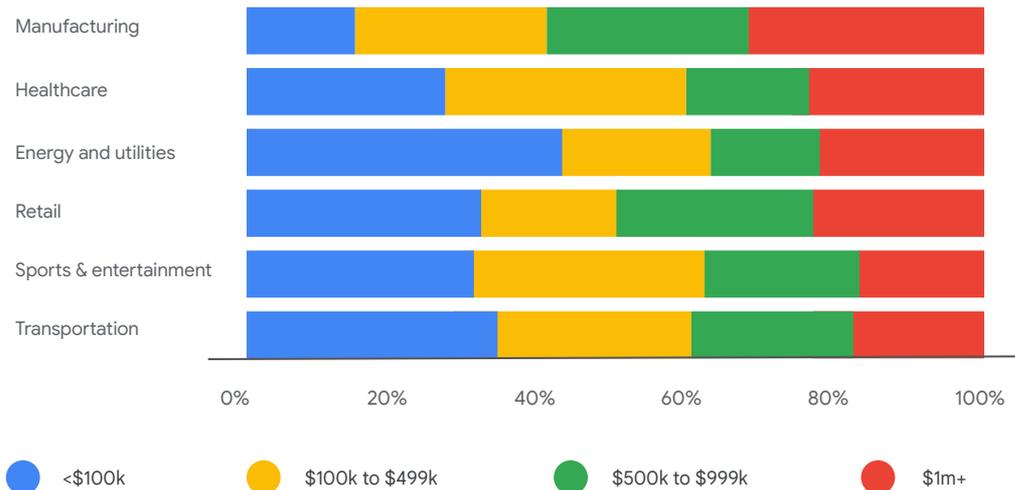
Source: Omdia Google 2021 5G Edge Survey

# Edge investment is gaining momentum across all industries

## Manufacturing clearly sees the edge opportunity, but others closely follow

- **Manufacturing, Healthcare and Retail** firms are anticipating the **biggest initial spends**
- **70%** of all firms expect to **spend \$100k or more** on edge during the first 24 months of deployment
- **Close to a quarter** of all industries are prepared to spend a **\$1 million or more**

How much do you expect to invest in edge computing hardware, software, managed and professional services during the initial 24 months of deployment?



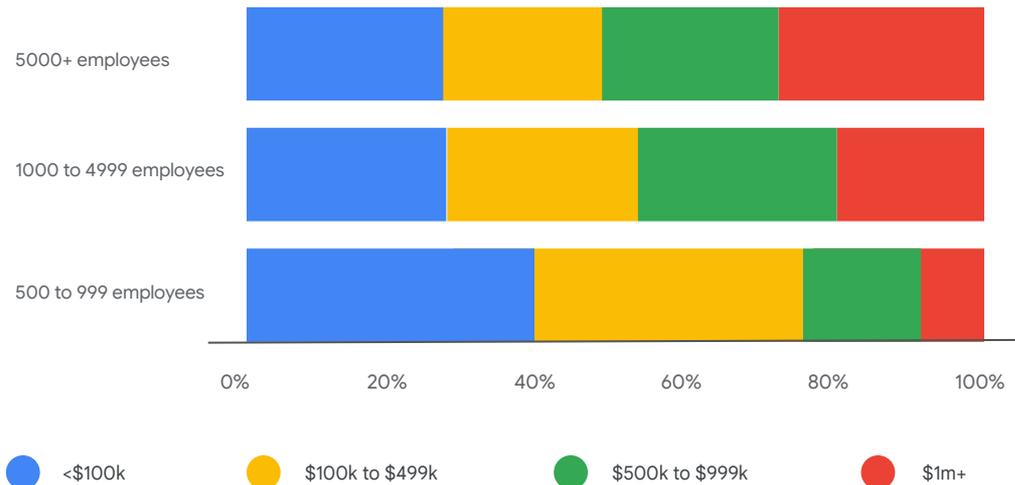
Source: Omdia Google 2021 5G Edge Survey

# Regardless of size, enterprises are investing in 5G edge

## Midmarket enterprises are the sweet spot for 5G edge services

- Midmarket enterprises are making significant edge investments: **Two thirds expect to spend \$100k or more** in their first 24 months
- Large enterprises are heavily investing in edge: **One third expect to commit at least \$1 million** in the first 2 years of their edge deployment
- Small enterprises are **investing proportionally** in edge

How much do you expect to invest in edge computing hardware, software, managed and professional services during the initial 24 months of deployment?



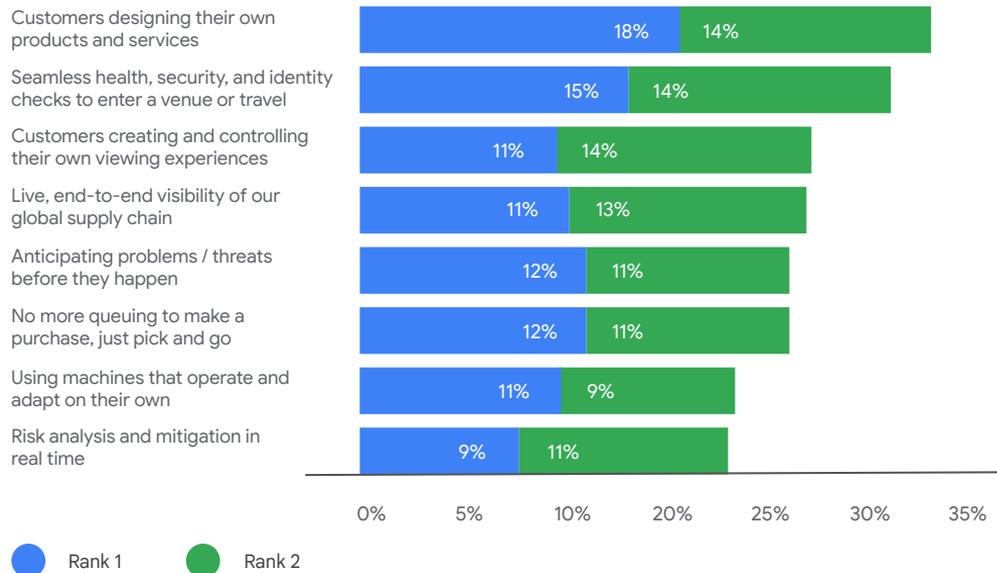
Source: Omdia Google 2021 5G Edge Survey

# Enterprise are prioritizing a new era of transformation

## Personalization and customer experience are top priorities

- **Small deviations** occur between the highest and lowest ranked concepts, indicating that **multiple drivers could emerge**
- The edge pitch **must be nuanced** to address immediate concerns as well as transformational goals

## Which of these concepts could be most transformational for your organization?



# Real-time insights from cognitive analytics are driving 5G edge adoption

## Enterprises are ramping investments in planned deployments

- Business intelligence and automation deployments will **more than double** in the next 12 months
- **Surveillance and transactions** cognitive analytics are the **most widely deployed and planned**
- Data storage/site mirroring continues to **gain momentum**

What is or what do you expect to be the primary function of your organization's edge computing applications?



Source: Omdia Google 2021 5G Edge Survey

# Triggers for edge investment vary by industry

## Improving safety and efficiency are important issues for many industries

- Motivations to invest in edge are **unique to each industry**
- Monetization is **not** a dominant priority across any industry

Is your organization using or considering the use of edge computing to address the following issues?



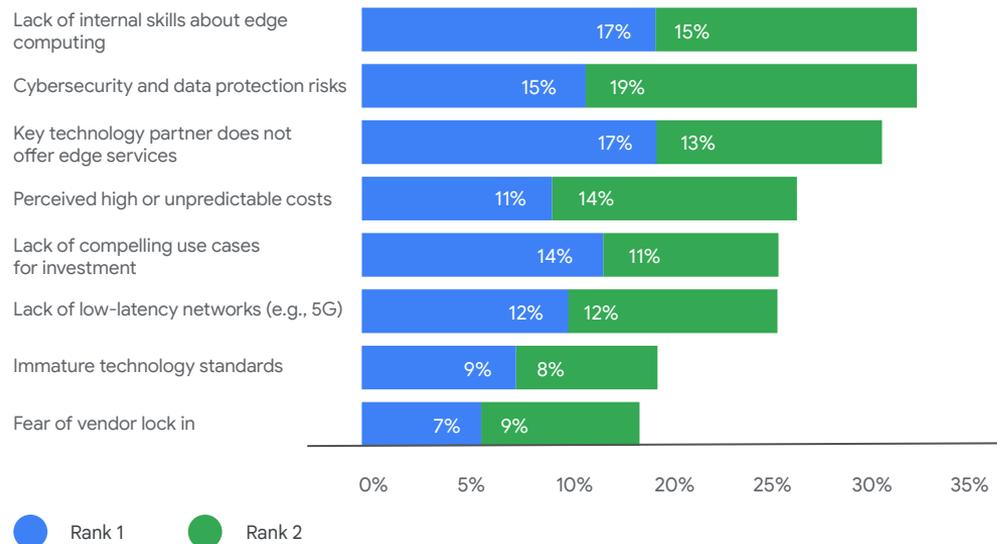
Source: Omdia Google 2021 5G Edge Survey

# Skills and security are the biggest concerns with adoption

## Vendor lock in ranks lowest, signaling broad acceptance of edge computing

- Many enterprises say they **don't have the right skills** to deploy edge
- Enterprises perceive a **gap** with respect to technology partners' edge offerings
- Technology standards are **not seen** as the top barrier to edge computing adoption

## What are the biggest barriers to the uptake of edge computing in your organization?

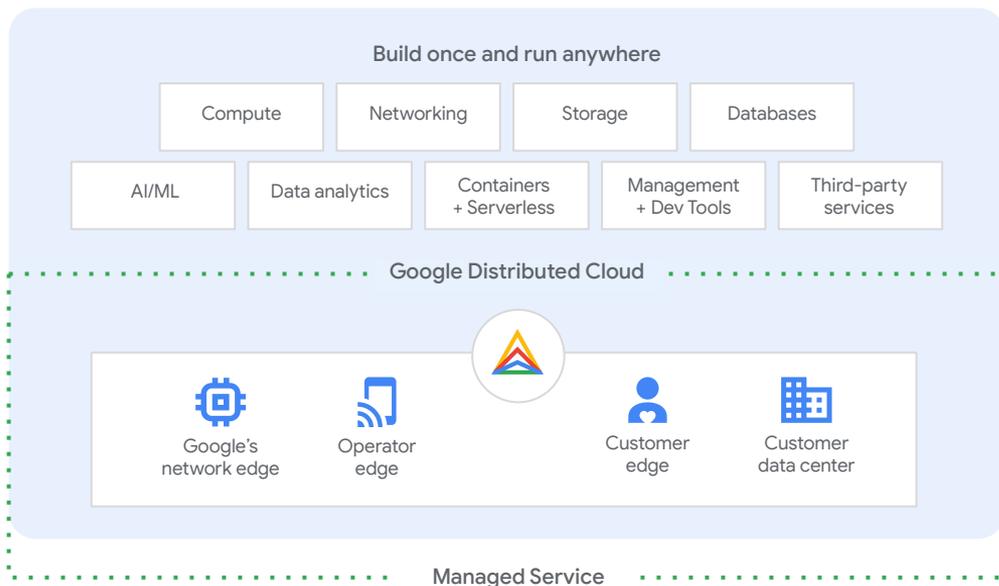


# Managed edge services is the desired consumption model

## 7 out of 10 expect to buy managed edge services

- Some enterprises have **heard** a few third-party service pitches
- Others are **seeking** them - typically from a preferred technology partner
- Consideration of hosted options is **high** for an early stage market

What type of edge computing deployment are you using/considering?



Source: Omdia Google 2021 5G Edge Survey

# Industry Snapshots





# Industry snapshot: Healthcare

## Summary

Status	Transformations	Investments	Infrastructure	Suppliers
<ul style="list-style-type: none"> <li>46% use a form of edge</li> <li>A further fifth plan to invest within a year</li> <li>Over a third are using or planning a locally-hosted edge solution</li> </ul>	<ul style="list-style-type: none"> <li>Most wanted transformations are putting customers in control, seamless entry to venues, and pickup of medicines / data</li> <li>Challenges are improving logistics and driving innovation</li> </ul>	<ul style="list-style-type: none"> <li>Edge is most likely under the network budget; a third say it's part of digital transformation; less than a fifth say it's under a cloud budget</li> <li>6 out 10 expect to spend over \$100k on edge; a quarter over a \$1m per year</li> </ul>	<ul style="list-style-type: none"> <li>44% have just 1 edge enabled site, but 44% expect to have 2-4 in 12 months</li> <li>44% say 5G is critical to edge success; 81% say a campus network upgrade is essential</li> <li>A third are looking at a private network</li> </ul>	<ul style="list-style-type: none"> <li>Existing SI partners are preferred for edge but many aren't stepping up yet; data center / hosting provider also rated</li> <li>Only 8% cite a telco as a primary edge partner</li> <li>Cybersecurity, app development and integration skills are top ranked for edge partners</li> </ul>

Source: Omdia Google 2021 5G Edge Survey

## CSP Implications

**1** Healthcare is savvy to the transformational benefits of near zero-latency environments – both in hospitals and communities.

**2** Edge is part of wider digital renewal that depends on robust connectivity – on campus and across the wide area.

**3** Healthcare sets a high bar for partners, requiring top-notch security, cloud, app dev, and networking skills.



# Industry snapshot: Energy and utilities

## Summary

Status	Transformations	Investments	Infrastructure	Suppliers
<ul style="list-style-type: none"> <li>47% use a form of edge</li> <li>A further 1 in 5 plan to invest within a year</li> <li>More than half are using or considering a hosted edge solution</li> </ul>	<ul style="list-style-type: none"> <li>Most wanted transformations are customers designing and controlling services; also end to end live supply chain visibility</li> <li>Challenges are empowering remote workers and leveraging data insights better</li> </ul>	<ul style="list-style-type: none"> <li>A third put edge in the network budget; a fifth under cloud</li> <li>58% expect to spend over \$100k on edge; a fifth over a \$1m per year</li> </ul>	<ul style="list-style-type: none"> <li>A third have just 1 edge enabled site, but 45% expect to enable 2 to 4 sites with edge within 12 months</li> <li>8 out of 10 say a campus network upgrade is essential to use edge</li> <li>6 out of 10 are looking at a private network</li> </ul>	<ul style="list-style-type: none"> <li>Existing major SI / IT SP or data center providers are preferred edge partners</li> <li>Only 7% cite a telco</li> <li>Legacy integration and app development are top ranked skills to advance edge adoption</li> </ul>

Source: Omdia Google 2021 5G Edge Survey

## CSP Implications

**1** Energy and utilities are key edge targets due to their real time performance and data insight needs.

**2** Safety and security concerns make these firms cautious – but more about partners than edge since it can improve insight.

**3** Existing partners are sluggish in offering edge; those that offer integration, security and app packages will win.



# Industry snapshot: Manufacturing

## Summary

Status	Transformations	Investments	Infrastructure	Suppliers
<ul style="list-style-type: none"> <li>46% already use a form of edge</li> <li>A further 25% plan to invest within a year</li> <li>While many flavors are used or considered, 42% are looking at locally-hosted edge services</li> </ul>	<ul style="list-style-type: none"> <li>Most wanted transformations are customers designing their own products and experiences</li> <li>Top challenges are operational efficiency, employee productivity, safety, and skills</li> </ul>	<ul style="list-style-type: none"> <li>Edge budget ownership varies: some put edge in the network budget, others within a wider digital transformation budget; a fifth put it under cloud</li> <li>A third expect to spend over \$1M on edge per year; 8 out of 10 expect spend to exceed \$100k annually</li> </ul>	<ul style="list-style-type: none"> <li>40% have just 1 edge enabled site, but 61% will expand, most likely to 5 sites or less</li> <li>Almost 40% believe a private 5G network is essential to use edge</li> <li>A campus network upgrade is in high need</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturers prefer to work with their existing trusted partners, most likely an SI, for edge</li> <li>15% cite a telco; this is higher than peers in other industries</li> <li>Integration and app development are top-ranked skills for preferred edge partners</li> </ul>

Source: Omdia Google 2021 5G Edge Survey

## CSP Implications

- 1 Manufacturing is sold on edge concepts, but real benefits can only come with a major overhaul of legacy systems.
- 2 Need for tight control and deeper operational insights means edge is often aligned to a private network proposition.
- 3 Any partner must have a solid migration plan and ability to manage legacy systems out in order to introduce edge.



# Industry snapshot: Sports and entertainment

## Summary

Status	Transformations	Investments	Infrastructure	Suppliers
<ul style="list-style-type: none"> <li>37% use a form of edge</li> <li>More than a third plan to invest within a year</li> <li>42% are using or planning a locally-hosted edge solution</li> </ul>	<ul style="list-style-type: none"> <li>Most wanted transformations are seamless entry to venues and live end-to-end visibility of activities</li> <li>Challenges are improving logistics and operational efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Edge is most likely part of the digital transformation budget</li> <li>7 out of 10 expect to spend over \$100k on edge; almost a fifth over a \$1m per year</li> </ul>	<ul style="list-style-type: none"> <li>40% have just 1 edge enabled site, but 80% expect to expand to multiple sites</li> <li>60% say a campus network upgrade is essential to use edge</li> <li>40% say 5G is critical for edge success</li> </ul>	<ul style="list-style-type: none"> <li>40% think their existing major SI / IT SP is a key edge partner, but many expect to seek new partners for edge</li> <li>Only 10% cite a telco</li> <li>Integration and implementation are top ranked skills to advance edge adoption</li> </ul>

Source: Omdia Google 2021 5G Edge Survey

## CSP Implications

**1** Potentially big winners in creating new experiences with edge, the immediate desire is more efficiency and safety.

**2** Pitching richer, real-time analytic is a foot in the door to these accounts for both internal use and to enrich the client experience.

**3** Digital transformation is the wider context supporting edge, favoring integrators to deliver on business objectives.



# Industry snapshot: Retail

## Summary

Status	Transformations	Investments	Infrastructure	Suppliers
<ul style="list-style-type: none"> <li>50% use a form of edge</li> <li>Close to a third plan to invest within a year</li> <li>50% are using or planning a locally-hosted edge solution</li> </ul>	<ul style="list-style-type: none"> <li>Most wanted transformations are customers creating their own products and services, and seamless entry to locations</li> <li>Top challenges are operational efficiency, employee productivity, skills, and safety</li> </ul>	<ul style="list-style-type: none"> <li>Edge is most likely under the network budget; a third say it's part of digital transformation; less than a fifth say it's under a cloud budget</li> <li>6 out 10 expect to spend over \$100k on edge; a quarter over a \$1m per year</li> </ul>	<ul style="list-style-type: none"> <li>48% have 2-4 edge enabled sites now, but 25% expect to expand to 10 or more</li> <li>70% say a campus network upgrade is essential to use edge</li> <li>40% say 5G is critical for edge success</li> </ul>	<ul style="list-style-type: none"> <li>Cloud or hosting service providers are most cited preferred edge partners</li> <li>Only 11% cite a telco as a primary edge partner</li> <li>Integration and implementation skills are highly requested for edge partners</li> </ul>

Source: Omdia Google 2021 5G Edge Survey

## CSP Implications

- Insight on internal operations is a bigger driver for edge than creating new customer engagement in the short term.
- Edge must deliver on efficiency benefits first to justify investment, notably around supply chain performance.
- Many existing partners don't offer edge – an opportunity to transform an industry in transition post COVID.

# What does this mean for CSPs



# The recipe for 5G edge success

 Proposition	 Targeting	 Technology	 Partnership	 Experience
<p>Satisfy immediate, pragmatic needs (eg., safety and efficiency), but prepare to satisfy experiential aspirations (eg., enabling new customer experiences).</p> <p>Expect to make edge part of a portfolio sale – it is not a standalone proposition.</p> <p>A successful portfolio should blend edge apps, compute, and network. Expect to offer cognitive analytics, IoT, and private network options in the wrap.</p>	<p>One size does not fit all - understand investment triggers for enterprise stakeholders.</p> <p>Develop nuanced propositions for different industries.</p> <p>Don't ignore the midmarket enterprise need for edge services, it's not just a large enterprise opportunity.</p>	<p>Be prepared to support all flavors of edge - just as enterprises demand.</p> <p>Don't fixate on 5G. Public and private cellular are superior for many deployments, but edge can also thrive with other choices, such as fiber.</p>	<p>Build an innovation ecosystem that can help you adapt and play different roles as needed.</p> <p>Don't ignore the importance of professional services expertise (eg., integration, migration, and design skills) in the early stages - they can help you secure recurring revenue for edge services.</p>	<p>Be sure to provide an elegant, unified platform to manage enterprises' hybrid edge deployments.</p> <p>Demonstrate scalability, flexibility, and pervasive security across environments.</p> <p>Offer open APIs and analytic support tools that integrate with enterprises' own systems.</p>

# How Google Cloud can help

## Partnering with CSPs to rapidly enable a global 5G edge presence

Google Distributed Cloud Edge brings Google Cloud's infrastructure and services closer to your enterprise customers, empowering CSPs to deliver new experiences with 5G and edge and powering network transformation.

[Learn more](#)[Speak to a Google Cloud expert today](#)

### Scale and Presence

Google's Global Edge Network

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### Time to Market

Agility in Deployment

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### Ecosystem

Google 1P and ISVs

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### Operations

Increased Efficiencies

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