Edge Computing: Powering Frictionless Retail

RESEARCH BY:

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Edge Computing: Powering Frictionless Retail

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Executive Summary

Edge computing will transform how retail manages the exponential explosion of structured and unstructured data from the proliferation of retail Internet of Things (IoT) and mobile device capabilities. Big data is most valuable when extracted and analyzed in a timely manner to identify the next best action to take. A majority of retail workloads and use cases depend on real-time or frequent access to data. Consider for example, personalized customer engagement, efficient omnichannel inventory and order management (pick, pack, and ship from store stock), store traffic insights and queue management, and increasingly automated processes for checkout and fraud/loss prevention.

Retailers need to use edge to improve data access speed and performance, as well as to minimize the need to transmit data that does not require external process management (like payments approval) or have external access or storage requirements (like enterprise commerce systems or transaction logs). Cloud, network, and application performance must be optimized to ensure customer satisfaction. Data security is imperative in retail. Retail organizations face steep financial penalties, remediation costs, and brand damage due to data breaches. Moving data processing to edge datacenters closer to where data is generated optimizes network data traffic, thus increasing data transmission efficiency while reducing the size of the attack surface, which improves security.

Key Findings:

- Advantages of edge computing include increased bandwidth, immediate access to data through latency improvements, reduced costs associated with transmission and storage infrastructure, and improved security.
- Cloud computing and edge computing are complementary architectures.
- Edge computing architectures are highly dependent on business objectives. Personalized customer engagement, efficient omnichannel inventory and order management (pick, pack, and ship from store stock), store traffic insight and queue management, and customer self-service are enhanced with edge computing.
What Is Edge Computing?

Edge computing is a distributed computing paradigm that includes the deployment of infrastructure and applications outside of centralized datacenters and public clouds closer to where data is acquired, analyzed, and acted on.

By 2025:
IDC Retail Insights predicts that digital shelves, real-time inventory visibility, robotic fulfillment, and automated checkout will accelerate investment in store-connected edge platforms by two years and 10 times over current forecast levels.
Edge Services: A Strategic Imperative

It’s still early days for deploying edge solutions, but edge is a strategic component of digital transformation strategies.

Underlying retail trends

- The digital transformation of the store/enterprise
- Converged safety and security
- More advanced technologies deployed at the edge
- More nuanced cloud and edge decisions for better real-time and frequent use of data
- Advanced networking
- Internet of Things
- Next-gen payments
- Leveraging the benefits of scale, scope, speed, and cost of ownership

Note: % corresponds to number of respondents; total will sum to 100%.

n = 100, Source: IDC Edge Services Thought Leadership Survey, September 2020

View edge as a strategic investment

Say edge is required by business operations

Other

47%

73%

17%

10%

of organizations plan to invest in edge solutions in less than one year.
Edge Improves Experiences and Performance

Primary motivations for deploying edge solutions

- Cost of bandwidth and centralized infrastructure can be prohibitive: 32%
- Security/data protection related to negative impact on operations/applications: 30%
- Deterministic latency and distance limitations: 17%
- Compliance with sovereign entities and industry regulations: 14%
- Continuous operation if network access is interrupted: 7%

Top benefits expected from deploying edge solutions

- Improve customer experience: 38%
- Improve application performance: 38%
- Increase productivity through automated processes: 36%
- Improve security/compliance: 33%
- Ability to support remote, connected workers: 32%

Note: % corresponds to number of respondents; total will sum to 100%

n = 100, Source: IDC Edge Services Thought Leadership Survey, September 2020
The Edge Platform for Contactless and Frictionless Retail Applications

SYSTEMS INTEGRATION

- Data management
- Edge AI
- Edge analytics
- Network connections
- Gateway devices
- Sensors or controllers

Processing
- Standard but flexible local connectivity
- Mechanisms for local data collection, aggregation, and distribution
- Centralized data control
- Frictionless infrastructure acquisition and app deployment
- Autonomous IT and standard IT governance

Sample use cases
- Computer vision and AI for fraud and loss prevention
- Enhance customer experience through 1:1 mobile and 1:many streaming content personalization
- Inventory management
- Buy online, pick up in store
- Pick, pack, and ship
- Omnichannel, intraday shelf-price changes
- Traffic insight, queue management
- Streamline, digitize, and integrate supply networks
- Risk management
Edge Can Meet Retail’s Priorities

Main use cases for retail organizations considering edge intelligent solutions

- **IoT applications**: 49%
- **Process automation**: 48%
- **Operational awareness, flow controls**: 48%
- **Predictive maintenance**: 45%
- **Video analytics**: 33%
- **Connected factory & robotics (manufacturing)**: 15%
- **Inventory management (warehouse/distribution)**: 8%

Edge solutions address four key operational improvements for retail stores:

- **Mobile productivity**: Improved availability, security, and utilization of mobile, tablet, and checkout devices
- **Omnichannel data integration and decision process automation**: Large retail app aggregation for store operations, including sales, products, orders, and inventory
- **Flexible and responsive programs**: Real-time adaptive pricing, assortment, task management, and risk and loss management
- **Rich customer experience**: Personalized engagement, rewards, and support

Note: % corresponds to number of respondents; multiple dichotomous table; total will not sum to 100%.

n = 802, Source: IDC Edge Services Thought Leadership Survey, September 2020
A Seamless Digital Experience in Stores

**CUSTOMER JOURNEYS**
- Navigation
- Employee assistance
- Contextualized promotions
- Product information and inventory availability
- Frictionless pickup and checkout
- Endless aisle

**STORE OPERATIONS**
- Navigation assistance
- Advanced loss prevention
- Fraud prevention
- Risk reduction
- Task management
- Expedited pickup and delivery
- Returns management
- Physical security
- Inventory management
- Asset management

**RETAIL INTELLIGENCE**
- Store traffic patterns
- Assortment and inventory planning
- Store layout and planogram planning
- Optimized employee scheduling
Keeping Data on the Edge Improves Business Outcomes

Most retailers (83%) expect to have access to data in real time or frequently.

The top three business transformation imperatives

- **Customer experience**
  - to drive new revenues and/or increase key performance indicator (KPI) scores
  - 66%

- **Partner network**
  - to drive new revenues
  - 56%

- **Cost structure**
  - to increase profitability
  - 52%

The top priorities that drive desired outcomes

- **Consolidating customer data and leveraging advanced analytics**
  - 52%

- **Evolving loyalty programs**
  - 26%

- **Delivering hyperpersonalized (contextual) interaction**
  - 22%

- **Leveraging data monetization**
  - 42%

- **Leveraging customer lifestyle integration across industries**
  - 36%

- **Engaging in dynamic ecosystems**
  - 22%

- **Increasing traffic and conversions**
  - 40%

- **Automating non-value-added activities**
  - 33%

- **Achieving incremental efficiency gains**
  - 27%

Note: Managed by IDC’s Quantitative Research Group. Data not weighted. Use caution when interpreting small sample sizes. % corresponds to number of respondents; multiple dichotomous table; total will not sum to 100%.

n = 100, Base: all respondents, Source: IDC Edge Services Thought Leadership Survey, September 2020

n = 602, Base: all organizations, Source: IDC Global Retail Innovation Survey, June 2020
**Tie Project Priorities to Improved Performance Metrics**

Edge computing enables retailers to engage with consumers and employees to improve outcomes, including sales and profitability.

**Q. What type of data or information does your organization plan on keeping at the edge?**

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational data (e.g., business/IT operational data)</td>
<td>72%</td>
</tr>
<tr>
<td>Customer information</td>
<td>60%</td>
</tr>
<tr>
<td>IoT collected data</td>
<td>55%</td>
</tr>
<tr>
<td>Business-critical information (e.g. pricing, inventory, etc.)</td>
<td>49%</td>
</tr>
<tr>
<td>Media such as streaming video</td>
<td>36%</td>
</tr>
</tbody>
</table>

Note: Managed by IDC’s Quantitative Research Group. Data not weighted. Use caution when interpreting small sample sizes. % corresponds to number of respondents; multiple dichotomous table; total will not sum to 100%. n = 100, Base = all respondents, Source: IDC Edge Services Thought Leadership Survey, September 2020

Retailers are focused on improving KPIs:
- Customer lifetime value
- Omnichannel customer service levels
- Return on data
- Operational efficiency and productivity
- Customer loyalty and satisfaction
- Traffic and conversion rates
Security Tops Edge Services Considerations

**Q.** What key considerations are important to your organization regarding storage (edge) services?

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>74%</td>
</tr>
<tr>
<td>Performance</td>
<td>63%</td>
</tr>
<tr>
<td>Cost</td>
<td>47%</td>
</tr>
<tr>
<td>Privacy/data sovereignty</td>
<td>44%</td>
</tr>
<tr>
<td>Latency</td>
<td>29%</td>
</tr>
<tr>
<td>Global footprint</td>
<td>22%</td>
</tr>
<tr>
<td>None of the above</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Q.** What key considerations are important to your organization regarding security (edge) services?

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>67%</td>
</tr>
<tr>
<td>Privacy</td>
<td>54%</td>
</tr>
<tr>
<td>Performance</td>
<td>51%</td>
</tr>
<tr>
<td>Cost</td>
<td>51%</td>
</tr>
<tr>
<td>Latency</td>
<td>28%</td>
</tr>
<tr>
<td>Global footprint</td>
<td>25%</td>
</tr>
<tr>
<td>None of the above</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Q.** What key considerations are important to your organization regarding app delivery (edge) services?

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>65%</td>
</tr>
<tr>
<td>Performance</td>
<td>54%</td>
</tr>
<tr>
<td>Privacy</td>
<td>49%</td>
</tr>
<tr>
<td>Cost</td>
<td>44%</td>
</tr>
<tr>
<td>Global footprint</td>
<td>26%</td>
</tr>
<tr>
<td>Latency</td>
<td>25%</td>
</tr>
<tr>
<td>None of the above</td>
<td>3%</td>
</tr>
</tbody>
</table>

Note: Managed by IDC’s Quantitative Research Group. Data not weighted. Use caution when interpreting small sample sizes. % corresponds to number of respondents; multiple dichotomous table; total will not sum to 100%.

n = 100, Base = all respondents, Source: IDC Edge Services Thought Leadership Survey, September 2020.
Technology Providers Are Key to Edge’s Success

IDC predicts that by 2024, more than 75% of infrastructure in edge locations will be consumed or operated in a service model, as will more than half of datacenter infrastructure.

Q. Who manages your organization’s edge solutions?

- Fully managed: 42%
- Comanaged: 34%
- Self-managed: 24%

54% of organizations look to technology service providers as the primary source of edge solutions.

44% prefer a managed service based on usage or a subscription when considering new edge solutions.

Note: % corresponds to number of respondents; total will sum to 100%.

n = 100, Base = all respondents, Source: IDC Edge Services Thought Leadership Survey, September 2020
Edge Adoption Levels Are Increasing

As data requirements increase and cloud solutions come into play, edge solutions will become an increasingly important component capable of balancing responsiveness (latency), reducing costs, and driving personalized engagement in real time.

Q. Which of the following best represents your organization’s adoption of edge solutions?

- 43% In production in multiple locations
- 34% Currently pilot/proof of concept
- 23% In production in a single location

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54% of organizations treat edge solutions as capital expenditures. They own and operate the solution.

46% of organizations treat edge solutions as operating expenses. They pay for service based on usage or subscriptions.
Essential Guidance

Articulate a vision for using edge computing and identify appropriate use cases to prioritize investments.

Embrace data governance, establish data definitions, and determine how data from edge devices flows across the enterprise.

Define key performance metrics for use cases to prioritize investments in edge computing and measure success.

Take a holistic approach to security; edge locations have less physical security than traditional datacenters.

Include stakeholders and domain experts to define requirements.

Seek a strategic relationship with your edge computing technology and services supplier.

Take inventory of devices already connected to the network.
About the Analyst

Leslie Hand
Vice President, IDC Retail Insights

As Vice President for IDC Retail Insights, Leslie Hand is responsible for the research direction for IDC Retail Insights, and leads research related to the digital transformation of retail omnichannel operations. Hand works with retailers and technology providers on developing best practices and strategies, aligned with where they are, and where they want to go, leveraging IDC quantitative and qualitative data sets.

Ms. Hand’s specific research includes a particular emphasis on mobile, IoT and augmented / virtual reality technologies and the threats and opportunities now facing the entire retail ecosystem from evolving consumer behaviors. Leslie likes to say that she will always be a retailer through and through, but in her current role she now has the opportunity to work for many top retailers and the technology providers that serve them.

More about Leslie Hand
Message from the Sponsor

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