

# The edge of remarkable opportunity

How the retail sector offers exciting new 5G revenue potential for communication service providers.

Intel Innovation Built-in intel

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Ready to profit from retail’s customer experience revolution?

## For shoppers, good is no longer good enough

From fast moving consumer goods to financial services, the online revolution has transformed retail. Customers love its slick, convenient data-driven time and money saving experiences, and want more.

Now, retailers are competing to bring the same customer experience into physical stores. This requires the ability to understand customer behavior, predict demand and deliver better outcomes with real-time data analytics.

Incremental innovation cannot achieve this. Today’s retail disruptors are transforming core operations, infrastructure, and data management to enable profitable, seamless customer journeys across every touch point.

This represents a moment of remarkable opportunity for communication service providers. High capacity, ultra-low latency connectivity is essential to deliver retail’s next generation customer experiences, and 5G has a critical role to play in this transformation.

What’s more, retail brands will likely be among the very first to invest in a new generation of experiences delivered by 5G apps. These will help drive mass consumer adoption of 5G, building the market and demonstrating the technology’s potential to other sectors.

Dell Technologies has made a major commitment to building the open telecom ecosystem of the future. Together with Intel®, we are also leading the way in providing the edge computing capabilities retailers need to deliver data-driven real time customer experiences.

Discover how we can help you unlock major new opportunities in one of the global economy’s most important sectors.





Fast Moving Goods



Specialty stores



Restaurants and hospitality

Over  
**\$25 trillion**  
Global Retail Sales<sup>1</sup>



Financial and utility services



Automotive services



Infrastructure retail



INTEGRATED OMNICHANNEL EXPERIENCES

The new retail frontier

The balance of power has shifted from retailers to customers. Today's shoppers take quality and value for granted: what matters is the consistency and ease of experience retailers offer across all their channels.

Delivering this seamlessly across physical and digital stores requires the ability to make intelligent decisions on the entire value chain in real-time, based on real world data.

TODAY'S CUSTOMER EXPECTATIONS OUTWEIGH MOST RETAILERS' ABILITY TO DELIVER

Customers expect a great experience

80%

say they would stop doing business with a vendor due to poor customer experience.<sup>2</sup>

70%

say a poor digital experience would make them somewhat or very likely to switch to a different brand.<sup>3</sup>

Not all retailers can deliver

88%

say their customer experience decisions are not yet driven by data.<sup>2</sup>

6%

have consistent customer experience processes across departments and channels.<sup>3</sup>

CUSTOMERS EXPECT



Mobile shopping app

72%



Contactless payments

75%



Delivery services

70%



Mobile order ahead

70%



Online grocery delivery

74%



Buy directly from manUFACTURER

70%



Curbside pickup

66%<sup>3</sup>



## A view of the future

Customer experience innovation is focused on building profitability by enhancing shopper engagement, removing barriers to purchase, and increasing basket size. Retailers are also keenly aware that they need to make supply chain and operational advances to drive down costs and maximize stock availability.

From new levels of supply chain transparency to delivering personalized customer messages at the point of purchase, all these capabilities depend on the ubiquitous real time data communications offered by 5G networks. This gives Communication Service Providers (CSPs) a remarkable opportunity to deliver both connectivity and added value at the retail edge.



### WHAT THE EXPERIENTIAL, FRICTIONLESS AND PERSONALIZED RETAIL FUTURE WILL MEAN TO CUSTOMERS

#### Experiential

I enjoy a fun, exciting experience when I visit the store.

- Product information makes purchase decisions easier
- RFID smart fitting rooms, plus immersive AR and VR experiences encourage try on
- Smart shelves and interactive signage highlight offers
- Endless aisles enable customers to see and order out of stock items

#### Frictionless

Transactions are fast and easy – I do not have to wait to get what I want.

- Self-checkout options and ‘grab and go’ make shopping quicker and simpler
- Buy online, pickup and or return in-store, plus curbside pickup and touchless options maximize convenience
- Effective, unobtrusive health and safety monitoring reassures shoppers
- AI-powered loss prevention is invisible to customers

#### Personalized

I can move seamlessly between digital and physical stores.

- Shoppers pick up in one channel where they left off in another
- User experiences in physical store are informed by customer history and preferences
- Every step in the purchase journey is personalized
- Retailers gain new opportunities to understand and interact with customers

## Connecting digital and physical worlds

Customers want experiences to flow seamlessly from websites and social media on their devices to the interaction and options they are offered in physical stores. To deliver this, today's retail disruptors are making a fundamental shift in their technological capabilities.

A critical requirement for this shift is the ability to connect digital and physical operations in real time. This has never been practicable before, but in 5G, communication service providers offer a critical enabling technology.



#### From retailer-centric, supply-led

##### RETROSPECTIVE DECISIONS ARE:

- Made remotely, in the cloud or data center
- Use descriptive analytics practices
- Based on historical mass customer data
- Delivering familiar customer experiences

#### To customer-centric, demand-led

##### REAL-TIME DECISIONS ARE:

- Made locally, at point of interaction
- Use predictive analytics enabled by 5G and edge computing
- Based on real-time data on customer behavior in individual buying journeys
- Delivering rich media personalized customer experiences



From supply chain and logistics to flexible collection and delivery options, every aspect of retail operations has to align around seamless, profitable customer interactions.

The biggest step to achieving this is enabling physical stores to:



Gather real-time information on an individual shopper's behavior



Connect that behavior to data about the customer's past behavior and preferences



Turn that data into insights



Use these insights to deliver personalized information and incentives through staff interaction, signage and shoppers' digital devices

Video capture and computer vision have a central role to play in translating what happens on the shop floor into actionable data. Two technologies make this possible: edge computing and 5G.

## Two retail transformation accelerators

### EDGE COMPUTE

Say a retailer has 50 stores. To gain customer behavior insights and deliver personalized retail experiences, they install 50 4k video cameras in each.

In a day, they'll generate 1.8PB of data. That's costly to backhaul and, as only a fraction contains useful insight, it's expensive to analyze. What's more, each millisecond of latency reduces the value of the data insights. Edge computing solves the problem by enabling retailers to run computer vision analytics where the data is generated: their stores.

### 5G NETWORKS

The other consideration for retailers is how to transmit real-time streaming data securely from hundreds of locations and often difficult environments. WiFi is prone to dead spots and security vulnerabilities. Hardwiring can be inflexible, expensive, and is often not practical in retail locations. And 4G cellular lacks the speed and capacity needed.

5G, however, is the ideal connectivity solution for the new era of retail, offering ultra-low latency and huge bandwidth needed for applications like real-time video analytics. Network slicing helps address security concerns and ensure endpoint security on public networks.

What's more, increasing consumer demand for exciting new experiences will help ensure that 5G networks will soon be ubiquitous. This will make it ideal to enable the broader retail ecosystem – from gathering logistical information from products in transit on road and rail networks to delivering personalized rich media content to thousands of customers in hundreds of locations.

However, the opportunity extends beyond connectivity. Communication service providers that shift to modern, disaggregated Open RAN infrastructure will be ideally placed to generate new revenue streams from the retail sector by offering edge based managed services and added value products.



### ACCELERATING RETAIL TRANSFORMATION

#### Edge compute

Enables real-time decision making powered by artificial intelligence and streaming data analytics at the point of interaction.

77%

of retailers plan to increase edge deployments in the next two years<sup>2</sup>.

#### 5G connectivity

Enables real-time data gathering and rich media customer experiences like augmented and virtual reality.

63%

of enterprises expect to use 5G as their primary means of IoT connectivity within two years<sup>2</sup>.



# Three pillars of 5G-enabled retail opportunity

5G networks offer solutions to some of the biggest challenges retailers face in their drive to offer remarkable customer experiences. Let’s look at three key areas of opportunity for communication service providers.

## INTELLIGENT STORE TRANSFORMATION

What does a retailer learn when an online customer walks into their analog store? In most retail enterprises, security cameras may capture the customer’s face and journey around the store, but beyond that they are entirely anonymous.

The combination of 5G connectivity and video analytics at the edge offers the ability to recognize that customer, connect their instore and online behaviors, and deliver personalized experiences to them in real time. In a retail environment that is increasingly focusing on customer experience as a key differentiator, this offers major competitive advantage.

5G’s ability to deliver large volumes of data to hundreds of locations with ultra-low latency makes it a key enabling technology for retail transformation. But more than this, CSPs have mutually rewarding partnerships with retailers.

One example would be locating Open RAN base stations at major retail enterprises’ sites. As well as providing the stores with dedicated network sliced capacity on the public network, CSPs would be ideally positioned to offer value-added edge compute services such as video analytics on their virtualized Open RAN infrastructure.

This opens up the potential for ambitious CSPs to shift from being utility providers to the retail sector to key strategic partners in the process of intelligent store transformation.

## COST REALIGNMENT

5G and edge computing can help retailers boost sales and basket size by transforming customer experience. However, they can also be powerful tools to improve the bottom line through cost realignment.

Inventory checks are one example of how 5G-enabled technologies can deliver major efficiencies. Manual stocktaking is a notoriously time-consuming and error prone necessity of retail operations. Furthermore, the larger the inventory a retailer holds, the less often they can check it, and the greater the likelihood of inaccuracies.

Computer vision scanning by drone or robot offers the ability to check inventory levels with a far greater accuracy and frequency than ever before. 5G is the ideal connectivity solution for the resulting video feeds, with potential to offer lucrative analytics services at the virtualized network edge.

For retailers, being able to reduce stock checking costs and release staff to carry out more valuable customer-facing roles are major benefits. Even more significantly, there are huge cost and efficiency gains to be made by optimizing total stock holdings with real time data from every warehouse and distribution center.

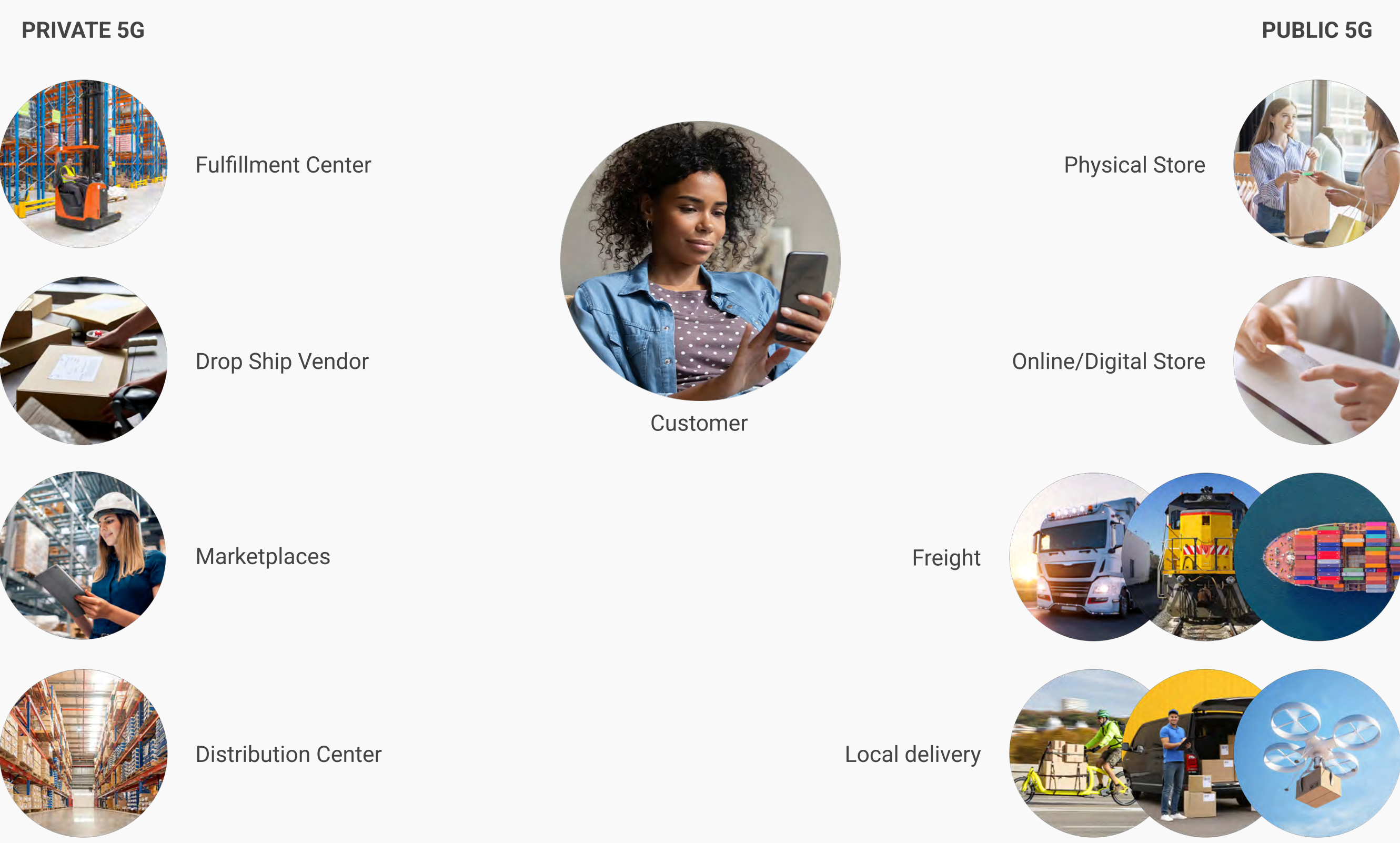
## SUPPLY CHAIN

In just a few years, we’ve seen the rise of multibillion-dollar ultrafast grocery and take-out delivery businesses in major urban centers. Ten-minute services like these may be outliers, but they show how speed to customer is now a major source of competitive advantage.

Even today’s highly optimized fulfilment operations find this acceleration challenging. Positioning inventory correctly across distribution centers, fulfilment centers, and stores can greatly improve speed to customer. However, forecasting customer demand and deploying stock appropriately is notoriously difficult, particularly for retailers with hundreds of stock items in motion at any one time.

CSPs can play a central role in helping retailers improve their performance in this area. The combination of private 5G networks at distribution centers with network sliced public networks covering highways and other transportation routes enables retailers to track products more accurately than ever before.

There is a close synergy here with the central role CSPs will play in widespread autonomous vehicle deployment. Imagine, for example, if the 5G network guiding the truck could also be alerting the distribution center and enabling it to update online and in store stock levels in real time.



**The combination of public and private 5G networks enables retailers to deliver better customer experience based on real-time data from across the value chain**



# Key retail transformation applications

## Intelligent in-store transformation

- Immersive experiences through virtual, augmented and mixed reality
- Personalized, interactive and instructive displays
- Customer behavior analytics, such as dwell time and product placement optimization
- Personalized marketing, promotion and customer assistance
- Frictionless, cashier-less and autonomous checkout
- Navigation assistance
- Conversational robot assistance

## Cost Optimization in Stores and Distribution Centers

- Out-of-stock and overstock mitigation
- Pick, pack and ship automation
- Automated sorting and palletizing
- Loss prevention
- Employee-to-customer interaction optimization
- Conversational AI-based customer service
- Drone-assisted inventory counts

## Health, Safety and Compliance

- Workplace and shop floor temperature monitoring
- Temperature, humidity and freshness compliance
- Carbon emissions management
- Air quality tracking
- Spill detection
- Planogram compliance
- Crowd control
- Check-out lane traffic management

## Supply Chain Excellence

- End-to-end demand forecasting
- Real-time inventory visibility across the value chain
- Automated fulfillment and logistics
- Warehouse capacity planning
- Fulfillment systems optimization
- Micro-fulfilment centers and dark stores for fast and efficient order fulfillment



# Drive new retail revenues with a partner you can rely on

Dell Technologies and Intel® have a deep, longstanding connection with retail enterprises. Today:

65%  
of US retailers depend on  
Dell desktops and laptops<sup>4</sup>

78%  
of US retailers use  
Dell servers<sup>4</sup>

80%  
trust Dell storage  
infrastructure<sup>4</sup>

Now, as retailers look to the edge to achieve new customer experience capabilities, our leadership in edge computing make us a natural partner for the next phase in their evolution.

However, we know that 5G also has a critical role to play in the future of retailing – and as well as many other major business sectors. This is why we have made a major commitment to accelerating the practical applications of Open RAN technologies through our Open Telecom Ecosystem Laboratory (OTEL).

OTEL brings together CSPs with our engineers and specialist partners in a unique collaborative environment focused on solving engineering challenges, product innovation and creating validated, ready-to-deploy solutions.

This is the ideal environment in which to shape a 5G and edge-driven retail future which will bring major new opportunities to communication service providers. If you would like to learn more, talk to an expert today.

Learn more at [Dell.com/Telecom](https://Dell.com/Telecom) or contact [OTEL@dell.com](mailto:OTEL@dell.com)

<sup>1</sup> Statista, Retail market worldwide - Statistics & Facts

<sup>2</sup> 451 Research, part of S&P Global Market Intelligence. Voice of the Enterprise: Customer Experience and Commerce, Organizational Dynamics, 2021.

<sup>3</sup> 451 Research, part of S&P Global Market Intelligence. Voice of the Connected User Landscape, Disruptive Technologies Survey, 2021.

<sup>4</sup> All statistics use the retailer list from National Retailer Federation, Top 40 Retailers with US Home location cited at <https://www.dell.com/en-us/dt/industry/retail-1/index.htm>.