IDC PERSPECTIVE

# Edge IT: The Engine Powering Digital Transformation

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## EXECUTIVE SNAPSHOT

## FIGURE 1

### Executive Snapshot: Preparing for IT at the Edge

This IDC Perspective provides business leaders and CIOs with a road map to develop expertise in assessing, deploying, and managing information technology (IT) at increasingly "smart" edge locations. These urban cores, hospitals, and factories are where IoT, robotics, augmented/virtual reality, 3D printing, and cognitive/AI are created and delivered. Your ability to deliver IT at the edge will be the key to boosting business velocity, enabling dynamic business scaling, and ensuring greater business operational flexibility.

#### Key Takeaways

- Edge IT is not about specific devices (sensors, vehicles, or machines) nor about a specific location (building/campus, city, or region); rather, its about delivering data and resources to people and things.
- What all edge IT efforts require is a flexible and scalable interconnect foundation that ensures secure and rapid movement of data and services between all devices and locations.
- The melding of network-resident information with cognitive/AI will require new compute/storage/network footprints at the building and metro edges, but new hardware (e.g., GPUs, FPGAs, NVMe) and software (e.g., containers and serverless) elements will dramatically alter asset management and facilities' needs.

#### Recommended Actions

- Begin to establish closer links between your IT and critical systems teams (often part of your facilities teams in factories, hospitals, and airports) who set standards for OT systems in many edge locations.
- Make the establishment of a strategy and policies for dealing with multiple providers that may want to deploy local cloud assets in your edge facilities an immediate priority.
- From an operational and technology standpoint, your priority must be to establish a corporatewide set of data controls (policies and practices) while investing in software-defined storage solutions that can help automate edge to core as well as cross cloud data placement and migration activities.

Source: IDC, 2017

June 2017, IDC #US42762517

## SITUATION OVERVIEW

### Datacenter Concentration at the Core Is Driving Current IT Visions

For CIOs and the information technology (IT) leadership teams, the development of a vision for core datacenter investments, locations, and operating models is a high priority. IT organizations are reacting to and/or exploiting fundamental IT platform changes (what IDC calls the shift to the 3rd Platform) including:

- Adoption of mobile and social-based engagement models
- Extensive use of Big Data and analytics (BDA) as well as heterogeneous computing and acceleration technologies such as GPUs and FPGAs to cognitively enable business applications
- Migration to cloud-based IT, a resource-centric approach to infrastructure, content, and application delivery

For the past five years, the primary impact of this shift in IT platforms was to drive greater datacenter concentration and the creation of a core IT portfolio. It included the consolidation of smaller corporate datacenters (often inherited during acquisitions) into larger facilities that leverage technologies such as SSD storage, converged systems, and software-defined infrastructure to boost agility and operational efficiency. It also included greater use of mega datacenters owned by major colocation, managed services, and SaaS/IaaS cloud datacenter operators to enable faster creation and scale-up of new digital services.

Contrary to perceptions, these two efforts (concentration and extensions) are more complementary than antagonistic for companies. Concentration at the core enables faster, more capable modernization of critical business systems of record needed to support and provide a layer of "trust" for new business initiatives. Extension of the core enables rapid, lower-risk access to critical compute, data, and network resources needed to develop fast-evolving and highly scalable mobile engagement and BDA services.

The major challenge within the core IT portfolio for most IT organizations, today, is to address barriers to the effective coordination of resources across both sets of facilities. These barriers include:

- Adjusting and optimizing interconnectivity between applications and resources across these different datacenters because of limitations in the tunability and flexibility of existing wide area network (WAN) product and service solutions
- Enabling control over the flow, placement, and protection of diverse and fast-growing data sets because of the proliferation of data stored in on-premise applications/storage systems and IaaS/SaaS resources as well as constantly changing data privacy/sovereignty mandates
- Ensuring optimal initial and long-term placement of workloads and data sets, as business needs and service requirements evolve due to a lack of cross datacenter/cloud visibility into service performance/costs and a lack of common data and workload migration capabilities

### Technology at the Edge Will Drive the Next Wave of Business Innovation

Digital transformation (DX) is the process of creating value, growth, and competitive advantage through new offerings, business models, and business relationships. It's about changing the way that business gets done. A key to successful transformation will be the conversion of IT from being the

back-office enabler of internal business processes to playing a prominent role as the engine powering digital business flows between people, things, and data, all of which live at the edge of the business.

Senior business leaders and CIOs must recognize that the continued concentration of IT siloed inside core enterprise datacenters or in isolated cages in large colocation/cloud datacenters is an unsustainable strategy for digital transformation.

Success in digital transformation requires new thinking about the consumption of IT resources in increasingly "smart" edge locations. These are the urban cores, hospitals, factories, transportation hubs, and a wide range of spaces where connected people or "smart" things are concentrated. Such edge environments are the foundation for innovation in augmented/virtual reality, IoT, robotics, 3D printing, and cognitive/AI. Preparing for delivery of IT at the edge will be the key to boosting business velocity, enabling dynamic business scaling, and ensuring greater business operational flexibility.

## *Enterprise Focus on Edge Is Increasing*

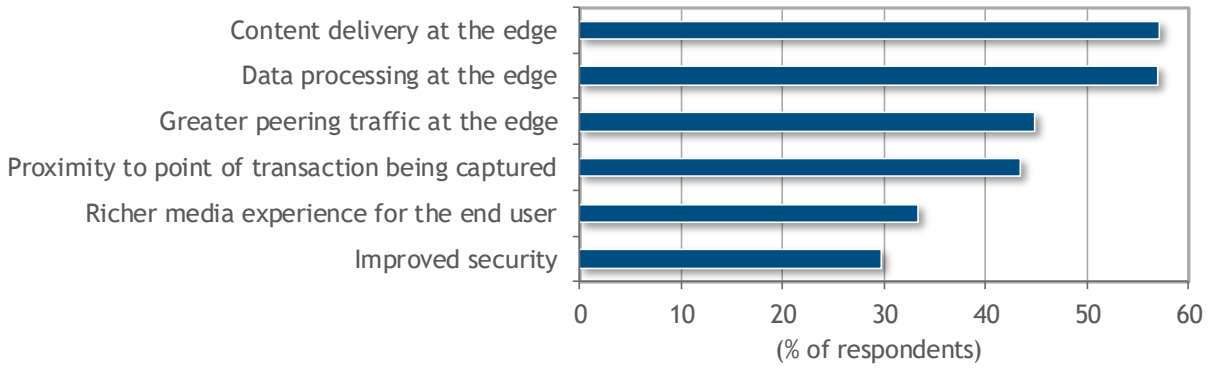
At the end of 2016, enterprises around the world owned and operated just over 40,000 datacenters of more than 2,000 sq ft usable space. After eliminating the millions of server closets and rooms as well as smaller datacenters under 2,000 sq ft that are owned/operated by small, independent businesses, a typical enterprise owns and operates over 97 edge IT facilities, with some owning and managing hundreds or thousands of such facilities. In February 2017, IDC surveyed 500 IT executives in the United States on current datacenter expansion and management requirements. We also asked them to discuss their current thinking related to edge IT.

IDC asked respondents to identify key factors shaping their current thinking on edge computing and edge IT investments (see Figure 2). The top ways that IT teams think about edge today were to improve content delivery (enhanced engagement) and improve the responsiveness of and availability for systems of record.

## FIGURE 2

### Use Cases Driving Edge IT Deployment

*Q. Which of the following features of edge computing are driving your edge strategy?*




n = 500

Source: IDC's *Enterprise Datacenter Survey,* 2017

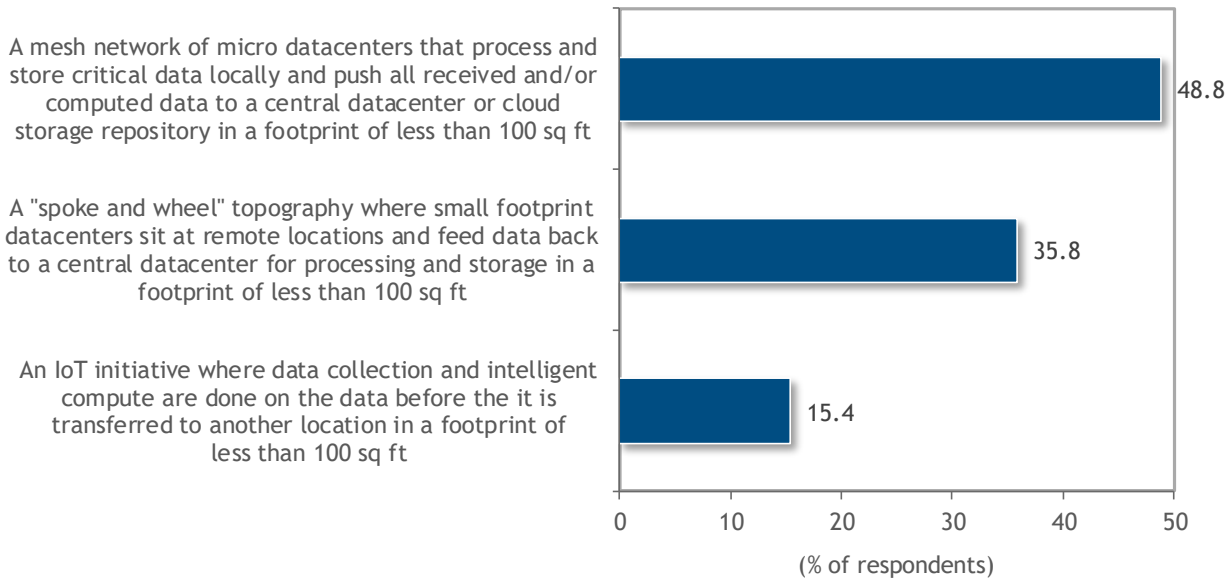
IDC then asked respondents to define their current architectural thinking when it comes to edge IT (see Figure 3). For these respondents, edge focused on the IT assets deployed in edge locations, not on the sensors or devices in those locations. Just over a third of respondents defined edge in a way (hub and spoke) that matches with the classic view of remote office/branch office IT (an approach that has been a management challenge for IT organizations at least since the advent of PCs and LANs).

Interestingly, the other two-thirds are already thinking about edge IT in an age of digital transformation. Just under half see edge IT as a mesh network of micro datacenters that process and store critical data locally as well as orchestrating the pushing of received and/or computed data to central datacenters or cloud storage repositories. Another 15% specifically linked edge IT to an IoT initiative "where data collection and intelligent compute are being done on the data before the data is transferred to another location."

## FIGURE 3

### Customer Definitions of Edge IT

*Q. Please select which of the following definitions most closely match your definition of edge computing. Edge computing is ...*



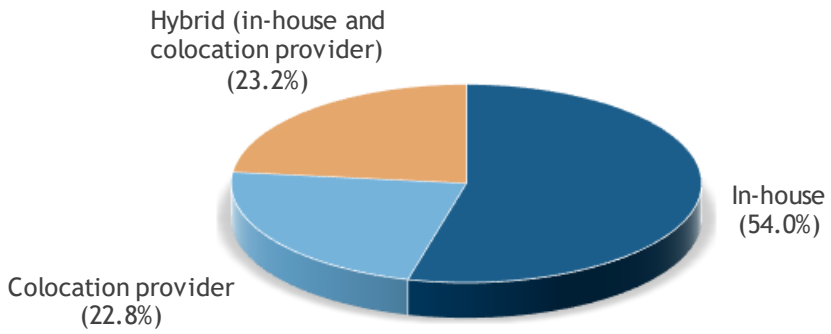

Source: IDC's *Enterprise Datacenter Survey,* 2017

Finally, IDC asked respondents whether they have a specific edge IT strategy in place to ensure the effective rollout and management of these key IT assets. Just under 60% of respondents reported that they currently have a strategy in development, with the clear majority of those already beginning to deploy assets in the field. Interestingly, however, just over half of the organizations with an edge IT strategy indicated that those assets exclusively reside within in-house locations (see Figure 4). Just under a quarter indicated that edge assets would reside exclusively in colocation facilities. The rest plan to place assets in a mix of on-premise and off-premise locations.

## FIGURE 4

### Preferred Location of Edge IT Assets

*Q. Will your edge deployments be done in-house or through a colocation provider?*




**n = 500**

Source: IDC's *Enterprise Datacenter Survey,* 2017

## ADVICE FOR THE TECHNOLOGY BUYER

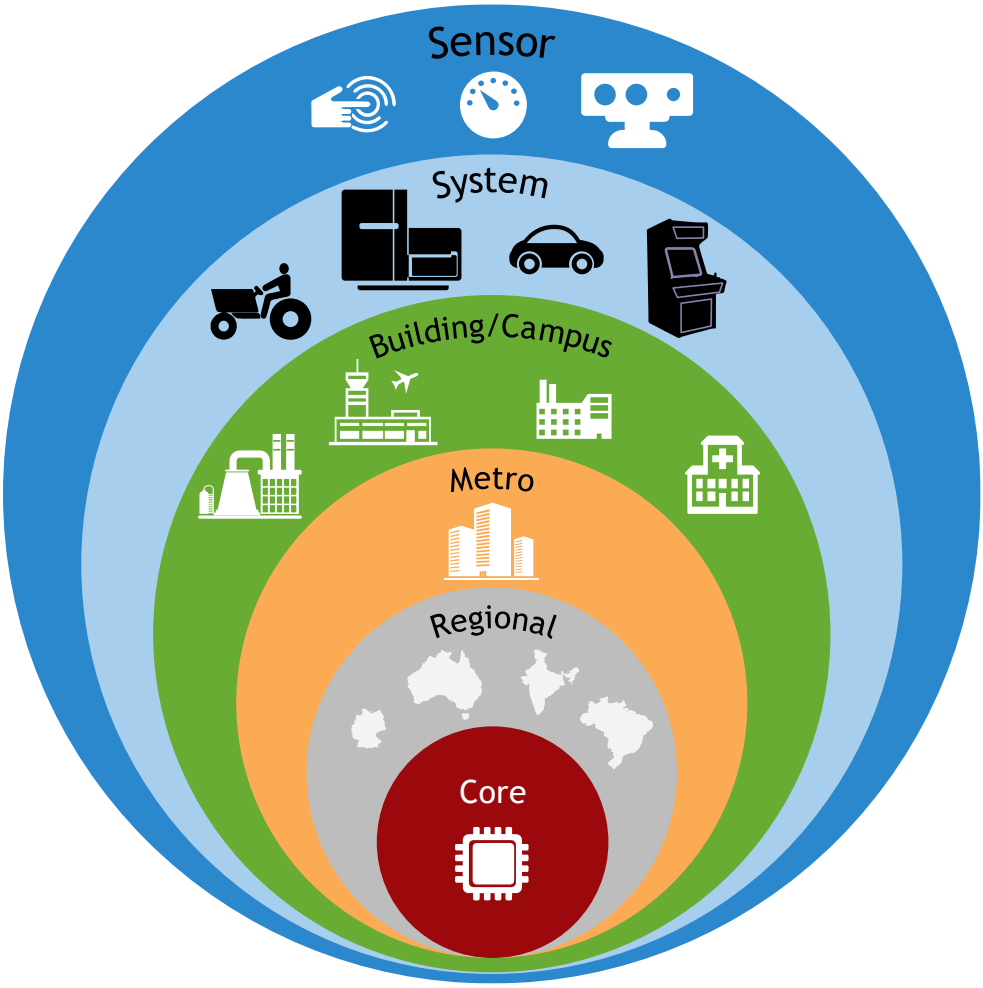
As your organization extends its digital transformation efforts and undertakes IT modernization based on cloud-based IT, the development of an edge IT strategy along with a robust interconnect framework will be critical, but it will pose more complex architectural, placement, operational, and management challenges than ever before.

### Define Your Edges

Edge IT is not a single type of device nor a single kind of location. Some CIOs, CTOs, and enterprise architects choose to compare the edge IT ecosystem with an inverted multilayer wedding cake ranging from millions/billions of sensors to a central core residing in a few enterprises or cloud datacenters. A more useful metaphor is the set of rings. Each ring varies in depth and density (see Figure 5).

## FIGURE 5

**Framing the Edge IT Landscape**

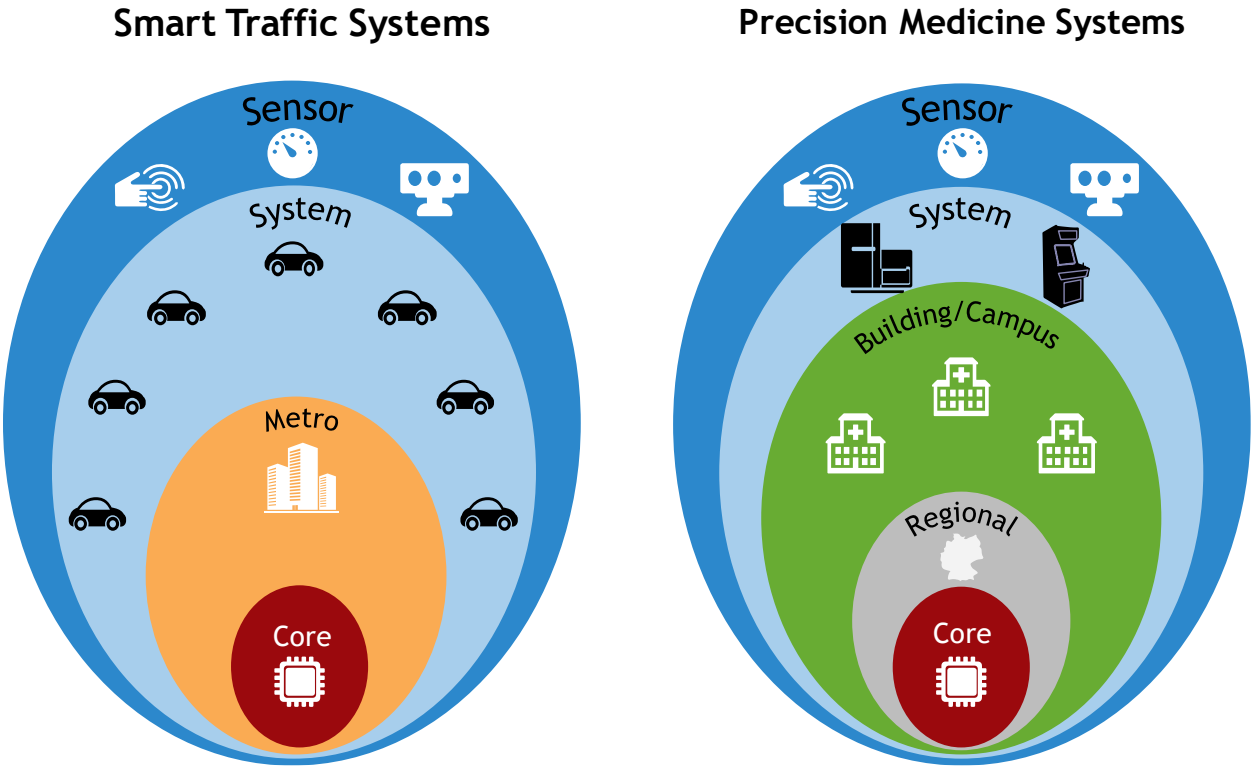



Source: IDC, 2017

It is important to recognize that individual digital services will not require the use of all the rings. Tractor trailers (systems and sensors) share location and telemetry data systems directly with core cloud resources. Smart home meters (sensors) report to metro-level hubs that provide smart power management before passing log data onto the core for longitudinal analysis. Figure 6 provides other examples. What all these use cases require is a flexible and scalable interconnect foundation that ensures secure and rapid movement of data and services between all the rings.

## FIGURE 6

**Variation of Edge IT by Use Case**




Source: IDC, 2017

**Executive guidance:** While any given digital service may not call for extensive investments within every ring, you need to understand the role that each ring potentially plays across a broad range of services and assess how that will shape edge IT and interconnect requirements.

An important distinction to consider when thinking about the rings is whether the technology assets are deployed more as operational technology (OT) or IT. While both OT and IT solutions are increasingly built using the same compute, storage, and network building blocks, OT solutions are much more likely to be designed, built, and managed like embedded systems (e.g., kiosks, clinical systems, and manufacturing robots). They have a physical design, but they are also addressing a business design/objective. They have long product life cycles and project-based consumption patterns dominated by the system/device/thing manufacturer, integrator, or provider. IT solutions are more likely to be sold (rented) to the ultimate end customer, and have shorter life cycles, but are increasingly being consumed in pay-as-you-go/pay-as-you-use and cloudlike models regardless of location.

**Executive guidance:** Your IT team must begin to establish closer links with critical systems teams (often part of the broader facilities teams in factories, hospitals, and airports) who often own and manage existing OT systems in many edge locations. Pre-establishing common standards for power requirements, physical access, and ongoing monitoring of sites with a mix of IT and OT deployments is critical.

## *Sensor Edge: The Sensory Web*

The sensor edge is the ultimate edge of all digital services. It consists of all the sensors (standalone and embedded) within larger systems that your organization owns or accesses. In most cases, the sensor ring is used for passive data collection, although the ability to communicate with the sensor to update firmware or authenticate the sensors is increasingly important. It falls exclusively within the domain of OT.

**Executive guidance:** Connectivity is one of the key challenges that your IT team must address at the sensor edge. Clearly, sensors embedded in a system (e.g., a car) can leverage an embedded network; however, many sensors are added onto existing systems/buildings (e.g., warehouses, factories, and datacenters themselves). In these cases, wireless connectivity (e.g., WiFi and 2G/3G/4G/5G) and new WAN technologies (such as WWAN and SD-WAN) will play a critical role. Buildouts (or upgrades) to existing wireless and WAN networks should dominate sensor edge investments for IT organizations. The focus should not just be on connectivity speed; however, you must also employ solutions that strengthen yet simplify network security and authentication capabilities. Addressing these will require more agile network services partners as well.

### Sometimes You'll Need a Bigger Sensor

One extreme exception to the typically limited scale and complexity of the sensor edge shows that the lines between the rings can blur. A leading U.S. rail carrier is piloting a machine vision system that consists of an array of high-speed digital cameras that scan rail cars as they pass through the array at full speed. The system then generates the equivalent of a functional MRI for the locomotive and all the cars, which is used to diagnose wheel, axle, and brake wear.

At one level, it's a highly refined sensor that will be deployed in tens or hundreds of locations. At another level, it is a very large, complex system that leverages many digital cameras and a large module (micro datacenter) of "converged" compute and storage to generate the equivalent of a "digital twin" for passing trains. In this case, there is as much IT as OT in the sensor/system/building design.

**Executive guidance:** While this kind of extreme sensor edge is limited to specific industries, there are many cases where the designers of the digital service will blur distinctions between sensors and systems. As an IT leader, you need to initiate close contacts with any business leaders contemplating development of such systems and start planning for the interconnectivity, data control, and asset management challenges that these types of complex sensor systems will create.

## *System Edge: The Thing That Matters*

The system edge includes all the systems (e.g., smartphones, kiosks, vehicles, robots, 3D printers, bridges, and digital signs) that are at the core of the digital service. They are the "things" that you want to manage more effectively. While aggregation of the plethora of sensor data generated within the system is an important job to be done, the goal is to make these systems more intelligent. The system edge is where the cognitive layer can be inserted, specifically to perform training and inferencing functions (e.g., self-diagnosing/learning or autonomous operations). These additions will require growing pools of in-system compute and memory (e.g., NVMe) resources along with software that is easy to create, update, and secure.

Except for very large/complex systems (e.g., commercial aircraft, aircraft carriers, or oil exploration rigs) that are more like a building or campus (see the The Building/Campus Edge: Thinking Local section), these are also almost exclusively OT.

**Executive guidance:** Ultimately, the designers/builders of these systems decide which sensors and systems-level technologies and functions reside within the system. They also have a great deal of influence over connectivity options:

- If your company is in the business of building autonomous vehicles, precision medicine systems, or any new, edge-enabled digital service, this is the product development/engineering team's responsibility, and you need to understand what they are planning.
- If you are acquiring or "renting" these systems, your IT team's responsibility involves managing connectivity (bandwidth and security), defining policies for access to physical assets, and setting standards/controls for data access, ownership, and use.

## *The Building/Campus Edge: Thinking Local*

The building/campus edge is the critical, and not often well-defined, transition point between OT and IT for most companies. The building/campus edge includes the pre-bundled IT systems (compute, memory, storage, and network) that provide services for multiple people and things within a building or campus. In the past, these services were things like basic file/print services or local inventory systems. In a world of digital transformation, these services are at the core of new business initiatives.

At a basic level, this new building edge includes the array of predefined IoT gateway systems used to consolidate data from older manufacturing devices while adding basic levels of automated operations for manufacturing lines or distribution warehouses.

A growing number of IT systems at the building/campus edge are supporting increasingly sophisticated digital services that are at the core of digital transformation efforts in many industries Examples of such targeted IT systems include:

- Collection, processing, onsite viewing of electronic medical images/records in hospitals or HD video streams used for airport security, in-store customer tracking, or factory process monitoring
- Management and coordination of activities for the fleets of autonomous cranes/vehicles/robots/drones in a container port, warehouse, or mine
- Short turnaround download and analysis of aircraft/jet engine data during unloading/loading of commercial aircraft
- Deployment of an augmented reality platform at major construction sites to enable a faster and more reliable review/alignment of structural, electrical, HVAC, and plumbing design elements

These services have provisioning, resiliency, scalability, and development characteristics that increasingly look like and behave like cloud services.

**Executive guidance:** Contrary to what some people may claim, edge and cloud are not mutually exclusive from this point on. Although its sometimes rebranded as "fog computing," the building/campus edge is emerging as one of the key drivers of a new IT solution category, local cloud, that your IT organization must start to evaluate and deploy.

### What Is Local Cloud, and Why Should You Care?

Local cloud is the opposite of most enterprise private clouds. It isn't a general-purpose cloud infrastructure environment in an existing corporate datacenter. Rather, it's a highly standardized hardware, infrastructure software, and applications software bundle that is deployed in a specific

location to deliver a specific set of cloud-native, SaaS-like services with low latency, high availability, and local data governance requirements.

These local cloud solutions go beyond a simple IoT gateway, although they may take advantage of an IoT gateway hardware platform. They employ a stable software-defined infrastructure and cloud orchestration framework that is linked to well-known core cloud service portfolios (e.g., Microsoft Azure Stack, VMware Cloud Foundation, Oracle Cloud Machine, Amazon Greengrass, and an array of OpenStack bundles). They are also built on a hyperconverged hardware design (and will often include GPU processing elements) that can range in scale from less than 4U to a self-contained micro datacenter with many racks of IT hardware.

Focusing on the IT hardware/software bundle alone is misguided; however, as many of these solutions will be deployed in non-datacenter locations. These solutions must accommodate a "bring your own facilities" approach that links IT and facilities to speed time to deployment while boosting resiliency and physical/digital asset security.

Most important, local cloud solutions will increasingly be delivered via a pay-as-you-go/pay-as-you-use model. The digital service provider (your business unit or your service provider) may retain ownership and management responsibility for the entire stack, including facilities components such as power management, cooling, and physical containment. Such local clouds don't operate in isolation, however. They must interconnect to metro, regional, or core resources for application upgrades, backup, and data aggregation, which will strain existing interconnect systems and services.

**Executive guidance:** The design, deployment, and/or control of local cloud systems/services will be one of the most critical jobs for your IT organization in the coming years:

- If your organization is creating a new digital service, you will need to be involved in the specification, design, and "fleet management" of local cloud assets deployed in your customer's locations (e.g., hospitals, mines, transportation hubs, and factories).
- If your organization is consuming such digital services, your IT organization must play a leading role in defining interconnectivity, critical facilities standards, and data controls policies for any physical or logical third-party owned/controlled assets placed in your locations.

## Preparing for an Overabundance of Clouds

A major concern that will arise soon is a proliferation of separate local cloud platforms in a single building/campus edge location, raising major security, facilities, and asset management challenges. The establishment of a strategy and policies for dealing with multiple providers that want to deploy local cloud assets in your facilities should be an immediate priority for you and your critical facilities colleagues.

**Executive guidance:** You have two options for dealing with cloud proliferation at the building/campus edge. The first is to establish (potentially with other companies in your same industry) a set of physical and network access controls (NAC) as well as power/cooling standards for any local cloud hardware/software bundles landing in your building. Today's approach to NAC (and NAC-like offerings) are neither sufficiently agile nor operationally scalable enough to enable such "cloud safe rooms." They will require adoption of identity-based software-defined networking that provides policy-based, microsegmented overlays.

The second option is to demand your providers to deliver a VM or container version of their service that can run on one of the "shared" local cloud (or fog computing) platforms, as previously mentioned, which you select and manage.

## *The Metro Edge: From Content to Context*

The metro edge is another critical transition point as it involves a major shift in datacenter investment and ownership practices. In some cases, the metro edge is for consolidated management of systems typically dispersed across a city, not a campus. These include solutions supporting Smart City initiatives for roads, public safety, or public health. In other cases, the metro edge provides an added layer of resiliency for fleets of IoT gateways or local clouds deployed in a metropolitan area. One example is a coordinated system for patient tracking and sharing of test data across a network of regional hospitals and outpatient clinics to improve care management.

**Executive guidance:** At the metro edge, IT, rather than OT, begins to dominate technology packaging and operating requirements. It's where local cloud deployments reach new levels of scale and complexity. Colocation, hosting, and communications service providers that play an important role in building and delivering the facilities and critical interconnect services required to ensure acceptable performance and security often refer to this metropolitan edge as the digital edge. Finding the right interconnect partner that can support the buildout of this digital edge must be a high priority as your metro edge expands.

### Context and Cognition Happen Here

Today, the metro edge is mostly about content. It's where the caching of locally collected data for later transfer to the core and/or local delivery of centrally generated content to the system edge happens. The metro edge is where virtually all content delivery service providers deploy their systems. The most important new element that you must consider at the metro edge is the growing importance of context (especially location) as part of the digital services being delivered.

The ability to quickly access location information and apply that contextual information to enhance customer experience (e.g., traffic rerouting) or business outcomes (e.g., weather damage avoidance) only scales when delivered across a broad swath of metro areas. Companies developing autonomous vehicle solutions will need to make major investments at the metro edge.

The melding of network-resident information with cognitive/AI and machine learning systems will define the optimal compute/storage/network footprint at the metro edge, but important hardware (e.g., GPUs, FPGAs, and NVMe) and software (e.g., containers and serverless) elements promise to evolve rapidly over the next five years. Flexibility in capacity management and system design will be critical. It will also spur the need for self-operating networks (SD-WAN type solutions) that inform themselves through machine learning. The goal of these networks is to provide proactive traffic steering and security enforcement (remediation) based on intent (policy).

**Executive guidance:** Unless your company is a communications service provider or utility that already owns and operates a pool of reliable, network-connected facilities in many different metropolitan areas, a large portion of your metro edges are most likely to be placed in colocation or hosting facilities. Partner selection for these critical facilities must become a priority. These partners must take responsibility for facilities resiliency as well as agile interconnect services. They must also provide a portfolio of "white glove" asset installation, asset management, and service assurance capabilities that make it easier for you to quickly expand your footprint into new metro areas.

Ultimately, some of these partners will emerge as important providers of dedicated and shared local cloud solutions. Picking a partner that can address connectivity, data control, and rapid service delivery requirements is critical.

### *The Regional Edge: The Edge That Data Sovereignty Built*

The regional edge is the last, and somewhat controversial, ring. Many would argue that it's the start of the core (internal datacenters, hosted private clouds, and/or public clouds) datacenter. The primary drivers of these types of regional investments are resiliency (e.g., reducing exposure to major cloud datacenter/regional outages) and overcoming long-haul network latency (e.g., providing acceptable cloud-based services to end users in Australia).

The primary focus has been delivery of content for systems of engagement, although this is expanding to include application delivery infrastructure that provides acceleration, optimization, load balancing/ADC, and security services for SaaS and other cloud-based applications.

As digital transformation and context play a bigger role in new service creation, data sovereignty will start to dominate the regional edge conversation. Rapidly evolving regulations (e.g., the General Data Protection Regulation [GDPR] enacted by the European Union) and expectations about the use and placement of sensitive data is already driving changes in major cloud service providers' datacenter design and construction plans. Over the next few years, you can expect an increase in smaller cloud datacenters in many countries that would never have the volume of traffic needed to justify the construction of current hyperscale datacenters. They will still be part of the core cloud portfolio but will offer more functionality when it comes to defining and automating data sovereignty–centric data controls.

**Executive guidance:** The regional edge will be a more critical, and volatile, issue in some regions (e.g., Western Europe and Latin America) and not as important in others (e.g., the United States and China), so your IT team needs to stay focused on regulatory changes in those regions if you do business or plan to expand into those regions. From an operational standpoint and a technology standpoint, your priority must be to establish a corporatewide set of data controls policies and invest in software-defined storage solutions that can help automate cross cloud and datacenter data placement and migration activities.

## Meld Your Core with the Edges

To succeed in digital transformation, your IT organization must develop expertise in assessing, deploying, and managing IT at the edge. Table 1 provides a summary of what you as a CIO or an IT leader need to do now and over the next two years to capitalize on this shift.

As noted in Table 1, the major barriers your company faces in the core include:

- Optimizing interconnectivity between applications and resources in different datacenters
- Controlling the flow, placement, and protection of diverse and fast-growing data sets
- Ensuring optimal placement of workloads and data sets as business needs and service requirements evolve

The addition of IT at the edge, or more accurately multiple edges, increases the complexity and urgency of overcoming these barriers by an order of magnitude. Your IT organization must develop competencies in three specific areas:

- Take advantage of software-defined networking and SD-WAN products as well as virtual network functions from communications service providers and leading colocation datacenter operators to enable dynamic and secure inter-datacenter and edge to datacenter connectivity.
- Exploit software-defined storage solutions that provide a set of data movement, placement, protection, and classification that work across multiple clouds (private and public, IaaS and SaaS, and core and local) as well as existing noncloud systems to the implementation of universal data controls.
- Adopt cross-cloud and multicloud resource management solutions that automate service creation/provisioning of resources as well as automate service assurance to monitor performance and costs across all assets.

The key is developing the competencies, not just investing in technologies. Creating the right skill sets in your IT organization through retraining and new hiring is the most critical element in using edge IT to drive digital transformation.

## TABLE 1

### Edge IT for DX

| Roles | Timing | Actions | Outcomes |
|---|---|---|---|
| CIO and CTO | Now | Assess the wireless and WAN capacity and security status of edge buildings/campus. | Network capacity and deployment readiness |
| | | Build an edge planning coalition with new business developers, critical facilities, and WAN interconnect teams. | Establish standards, policies, and practices for edge IT adoption |
| | | Champion the creation of a scalable edge IT vision and strategy for the company. | Road map for digital service adoption and/or creation |
| CIO | 6–12 months | Implement a portfolio approach to edge IT initiatives focused on data controls and interconnect standards. | Strategic approach to launch/adopt edge IT initiatives while maintaining strong security/governance practices |
| | | Set guidelines for adoption of local cloud bundles and managed services in building edge and metro edge locations. | Ensure flexibility in the deliver/adoption of digital services |
| CIO | 12 months and over | Rationalize current core and edge environments and rebuild from ground up the most business-critical edge locations. | Provide a flexible, scalable, and secured digital transformation environment |
| | | Create or help create edge IT solutions for deployment in customers' locations. | Boost revenue through enhancement of products with digital capabilities |
| | | Leverage data and analytics to drive a 360 view of edge while optimizing cost to serve. | Ensure service assurance across all locations while boosting bottom-line gains |

Source: IDC, 2017

*Note: All numbers in this document may not be exact due to rounding.*

## LEARN MORE

### Related Research

- *How to Build Smarter Datacenters to Support Digital Transformation* (IDC #US42555817, May 2017)
- *Edge Computing: Findings from IDC's U.S. Enterprise Datacenter Survey* (IDC #US42556817, May 2017)
- *Key Factors for Datacenter Placement* (IDC #US42415817, April 2017)
- *IDC Innovators: Smarter Datacenter Infrastructure to Support Dynamic and Agile IT, 2016* (IDC #US42059116, January 2017)
- *On-Premise As-a-Service Assets – Are We There Yet?* (IDC #US42096416, December 2016)
- *The IoT Cloud: Infrastructure Options for Accelerating the Shift to Digital Business Services* (IDC #US41952016, December 2016)
- *IDC FutureScape: Worldwide Datacenter 2017 Predictions* (IDC #US41870916, November 2016)
- *Developing a Cloud Strategy for Digital Transformation: Solve the Three Clouds Problem* (IDC #US41519516, June 2016)

### Synopsis

This IDC Perspective provides business leaders and CIOs with a road map to develop expertise in assessing, deploying, and managing IT at increasingly "smart" edge locations. These urban cores, hospitals, and factories are where IoT, robotics, augmented/virtual reality, 3D printing, and cognitive/AI are created and delivered. Your ability to deliver IT at the edge will be the key to boosting business velocity, enabling dynamic business scaling, and ensuring greater business operational flexibility.

"To succeed in digital transformation, your IT organization must develop expertise in assessing, deploying, and managing IT at the edge," said Richard Villars, vice president, Datacenter and Cloud.

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