Enterprise Adoption of IoT Connectivity


Sandra Wendelken
Senior Research Analyst, Mobile and IoT Services
October 2022
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>3</td>
</tr>
<tr>
<td>Research Objectives</td>
<td>4</td>
</tr>
<tr>
<td>Key Analysis and Findings</td>
<td>5</td>
</tr>
<tr>
<td>• IoT Usage and Requirements</td>
<td>5</td>
</tr>
<tr>
<td>• Deployment Details</td>
<td>10</td>
</tr>
<tr>
<td>• IoT Challenges and Criteria</td>
<td>15</td>
</tr>
<tr>
<td>Related Research</td>
<td>19</td>
</tr>
<tr>
<td>Contact Information</td>
<td>20</td>
</tr>
<tr>
<td>Appendix</td>
<td>21</td>
</tr>
<tr>
<td>Methodology / Demographics</td>
<td>22</td>
</tr>
</tbody>
</table>
Executive Summary

1. Cellular connectivity is the most popular type of IoT connectivity, and 42% of respondents require more than one mobile operator to achieve their IoT coverage goals, underscoring the increasing need for global connectivity.

2. For future devices, 45% of organizations are planning to deploy integrated subscriber identity module (iSIM) technology in their devices compared with 27% that plan to deploy embedded SIM (eSIM) technology.

3. Security is top of mind, ranking first in challenges holding back IoT projects and with cybersecurity as the first evaluation criteria for a digital technology services supplier.
Research Objectives

This IDC presentation provides perspectives on enterprise attitudes, requirements, and buying behavior around IoT connectivity and services from IDC’s 2022 North American Enterprise 5G, IoT, and Private Mobile Networks survey.

IDC conducted a survey of mobility and networking decision makers in the U.S. and Canada during August 2022 to understand how enterprises are thinking about and approaching IoT adoption. Questions also targeted key areas of vendor evaluation criteria that enterprises are using to determine their IoT connectivity service providers.
Key Analysis and Findings

IoT Usage and Requirements
IT/technology teams (48%) make the most decisions around IoT, demonstrating the importance of IoT in building a digital-first organization looking to maximize the benefits of more data points. C-level executives/company directors (44%) also landed high on the decision-making list, showing IoT’s importance at top levels.

Q. Which roles in your organization make the decisions regarding IoT strategy?

**IoT Strategy Decision Makers**

- **IT/technology team**: 48%
- **C-level executives/company directors**: 44%
- **Operational technology teams**: 28%
- **Lines of business**: 26%
- **Procurement team**: 23%
- **Engineering**: 20%
- **Business operations teams**: 14%
- **Finance**: 13%
- **R&D or innovation unit**: 11%
- **Facilities team**: 8%

About 60% of organizations have deployed IoT projects in at least one department of their companies, while 40% are planning to deploy, conducting trials, or have yet to successfully deploy IoT projects. Finance, healthcare, energy, and government have the highest IoT maturity among verticals.

Q. Which of the following best describes how mature the majority of your organization’s IoT projects are today?

Q. Does your organization use or plan to use IoT (regardless of connectivity type) within its own business activities?

**IoT Project Maturity**
- Deployed/deploying companywide, 7%
- Deployed/deploying in multiple departments, 24%
- Deployed/deploying within a single business unit/department, 29%
- Proof of concept or limited trial, 16%
- Planning phase, 20%
- Yet to deploy successfully, 4%

**IoT Maturity by Vertical**

<table>
<thead>
<tr>
<th>Vertical</th>
<th>Considering/evaluating usage</th>
<th>Planning to use within the next 2 years</th>
<th>Currently using</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>19%</td>
<td>61%</td>
<td>19%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>9%</td>
<td>85%</td>
<td>6%</td>
</tr>
<tr>
<td>Government</td>
<td>11%</td>
<td>83%</td>
<td>6%</td>
</tr>
<tr>
<td>Retail/Wholesale</td>
<td>20%</td>
<td>78%</td>
<td>2%</td>
</tr>
<tr>
<td>Resource industries</td>
<td>17%</td>
<td>67%</td>
<td>17%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>14%</td>
<td>78%</td>
<td>14%</td>
</tr>
<tr>
<td>Energy</td>
<td>16%</td>
<td>84%</td>
<td>16%</td>
</tr>
<tr>
<td>Transportation/Construction</td>
<td>23%</td>
<td>71%</td>
<td>5%</td>
</tr>
<tr>
<td>Telecom/Media/Entertainment</td>
<td>17%</td>
<td>72%</td>
<td>11%</td>
</tr>
<tr>
<td>Professional Services</td>
<td>31%</td>
<td>63%</td>
<td>6%</td>
</tr>
<tr>
<td>Finance</td>
<td>11%</td>
<td>89%</td>
<td>11%</td>
</tr>
</tbody>
</table>

n = 415
Employee-centric and industrial-centric use cases topped the list for current IoT deployments, followed by security-centric use cases. Industrial use cases rely heavily on the benefits of 5G technology, such as low latency, high transmission speeds, massive IoT, and enhanced positioning.

Q. Which use case has your organization already deployed (respondents currently using IoT)?

Most Deployed IoT Use Cases

- Employee-centric (connected workforce, employee safety) 69%
- Industrial asset-centric (industrial automation, asset/quality management) 69%
- Security-centric (alarm systems, physical access, remote monitoring) 66%
- Utilities-centric (smart energy, smart machines, water meters) 53%
- Environment-centric (climate monitoring, temperature control) 50%
- Market-centric (supply chain, warehouse/inventory management) 50%
- Video-centric (surveillance, crowd monitoring) 50%
- Building-centric (smart lighting, elevators, building management) 47%
- Consumer-centric (wearables, smart appliances) 45%
- Health-centric (patient monitoring and healthcare) 41%
- Worker augmentation (drones, robotics, bots) 38%
- Extended reality (virtual or augmented reality) 30%
- Mobile asset-centric (asset tracking, connected car, fleet/vehicle management) 26%

The requirement for licensed spectrum goes hand in hand with the mission-critical use cases cited by respondents with IoT deployments. A fast cellular connection was also a top requirement, along with global coverage, which is becoming more important to many IoT deployments.

**Q. Which of the following requirements does your organization have to connect the people/assets for the use cases you have selected?**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Currently using IoT</th>
<th>Planning to use IoT within 2 years</th>
<th>Considering/evaluating IoT</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology uses licensed spectrum</td>
<td>58%</td>
<td>46%</td>
<td>50%</td>
</tr>
<tr>
<td>The fastest mobile cellular connection possible</td>
<td>50%</td>
<td>42%</td>
<td>50%</td>
</tr>
<tr>
<td>Fixed network/broadband connection</td>
<td>47%</td>
<td>46%</td>
<td>42%</td>
</tr>
<tr>
<td>Coverage is available globally</td>
<td>42%</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>The mobile connection with the highest uptime as possible</td>
<td>42%</td>
<td>40%</td>
<td>42%</td>
</tr>
<tr>
<td>The mobile connection with the longest range</td>
<td>42%</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>The mobile connection with the lowest network delay</td>
<td>39%</td>
<td>31%</td>
<td>38%</td>
</tr>
<tr>
<td>The mobile connection that optimizes the device’s battery life the most</td>
<td>29%</td>
<td>21%</td>
<td>25%</td>
</tr>
<tr>
<td>The technology uses unlicensed spectrum</td>
<td>18%</td>
<td>15%</td>
<td>23%</td>
</tr>
</tbody>
</table>

**Source:** North American Enterprise 5G, IoT and Private Mobile Networks Survey, IDC, August 2022
Key Analysis and Findings

Deployment Details
Of the respondents with IoT projects, most use or plan to use cellular connectivity for those deployments. Licensed LPWAN technologies such as LTE-M and NB-IoT are already deployed by 60% of respondents with IoT projects, which coincides with the proliferation of North American LPWAN networks.

Q. Which connectivity technologies does your organization use (respondents currently using IoT)?

- **Already deployed**
  - 83% with 3G, 4G or 5G cellular connectivity
  - 60% with NB-IoT/LTE-M
  - 43% with another connectivity method (LoRa, ethernet, satellite, SigFox, etc.)

- **Plan to deploy within 2 years**
  - 40% with another connectivity method (LoRa, ethernet, satellite, SigFox, etc.)

- **Not deploying and not planning to deploy**
  - 7% with 3G, 4G or 5G cellular connectivity
  - 8% with NB-IoT/LTE-M
  - 10% with another connectivity method (LoRa, ethernet, satellite, SigFox, etc.)

While it seems somewhat counter-intuitive for cellular-connected IoT deployments, most IoT assets are located on-premise, and most respondents have stationary assets rather than mobile assets, located either on- or off-premise.

Q. In what types of locations are the IoT assets that your organization manages?

![Locations of IoT Assets](chart)

- On-premise and stationary (e.g., connected machinery, IP CCTV): 47%
- On-premise and mobile (e.g., automated guided vehicles): 40%
- Off-premise and stationary (third-party location): 26%
- Off-premise and mobile (e.g., vehicles or trackers): 17%
- Don't know: 4%

About 42% of respondents have global IoT deployments, with cellular IoT connections in more than one country. Nearly 30% of companies rely on IoT MVNOs for their worldwide connectivity needs, with most using more than one type of connectivity provider to meet their IoT deployment needs.

Q. In how many countries does your organization have cellular IoT connections?
Q. How do you currently obtain, or plan to obtain, international cellular connectivity for IoT devices?

iSIM could be moving toward a break-out moment, with the technology preferred by 45% of respondents. About 27% of organizations are planning to use eSIM for new device deployments.

Q. For any new devices that your organization plans to deploy on cellular networks in the future, what kind of SIM would you prefer to use?

Types of SIMs Planned for New Devices

- Integrated SIM (iSIM or iUICC), in which the secure element is integrated into the chipset: 45%
- Embedded SIM (eSIM or eUICC) installed during manufacturing: 27%
- Multi-IMSI (several operator profiles on one SIM): 16%
- Traditional SIM that can be manually exchanged: 11%
- Don’t know: 2%

n = 415
Key Analysis and Findings

IoT Challenges and Criteria
Network latency, cost, and managing global IoT deployments are the top cellular IoT connectivity challenges that organizations will face in their projects. Surprisingly, with supply chain problems still making headlines, only 18% of respondents cited difficulty in ordering SIM cards.

Q. What are or do you anticipate will be the key challenges your organization has faced with IoT cellular network connectivity?

Cellular IoT Connectivity Challenges

- Unacceptable network latency levels: 40%
- Cost of connectivity prohibits scaling: 38%
- Manage multiple operators to get desired geographic coverage: 35%
- Difficulty in automating the operations of the device fleet: 25%
- Difficulty in ordering SIM cards: 18%
- Lack of visibility to third-party network rollout plans: 15%

Across all North American respondents, security was the biggest challenge for respondents, which tracks to the high percentage planning to use iSIM technology. Cost was second followed by deployment complexity, highlighting the need for a connectivity partner to address the pain points.

Q. What are the top challenges holding back or slowing progress on IoT project(s) within your organization?

Challenges Holding Back IoT Projects

- Security concerns: 40%
- Overall cost of deployment: 35%
- Deployment complexity: 29%
- Limitations of existing infrastructure: 27%
- Lack of all hardware, software, and services needed: 24%
- Concern about technology stability/capabilities: 21%
- Insufficient interoperability/lack of industry standards: 19%
- Lack the skills internally: 15%
- Management buy-in of the overall project value: 14%
- Complexity of business process change: 13%
- Unclear or unproven ROI: 12%

n = 415
Security (58%) and solution scalability (53%) are leading factors for enterprises in choosing an IoT or 5G vendor, but don’t discount external branding (49%), thought leadership (40%) and analyst engagement (30%) as tools for influencing buyer decision-making.

Q. Which of the following criteria are important for your organization when selecting a supplier for digital technology services like private mobile networks, 5G, and IoT?

Key Evaluation Criteria for Digital Technology Suppliers

- Cybersecurity capabilities: 58%
- Ability to scale: 49%
- Strong telecom brand: 40%
- Quality of thought leadership: 38%
- Cloud, edge or MEC capabilities: 35%
- ROI metrics or relevant KPIs: 30%
- Industry analysts’ opinion: 29%
- Vendor agnostic: 27%
- Existing relationships: 25%
- Sustainability credentials: 24%
- Compelling case studies: 22%
- Owns its own mobile network: 21%
- Digital service provider reputation: 18%
- Consulting services capabilities: 17%
- Sustainability credentials: 16%
- Positive media coverage: 15%
- Fixed connectivity capability (e.g., SD-WAN): 0%

n = 415
Related Research

- **US47942022**
  U.S. 5G Connections Forecast, 2022-2026
  - Sept. 2022

- **US47948122**
  Worldwide and U.S. IoT Cellular Connections Forecast, 2022–2026
  - July 2022

- **US47949622**
  U.S. Mobile Consumer and Business Services Forecast, 2022–2026
  - May 2022

- **US48360821**
  IoT Connectivity: Demand-Side Perspectives
  - Nov. 2021

- **US48445322**
  Connectivity Challenges in Agriculture
  - March 2022

- **US49455122**
  Private 4G/5G Network 1H22 Contracts Offer Glimpse into Overall Worldwide Market
  - Aug. 2022

- **US48061522**
  IDC MarketScape: Worldwide Managed IoT Connectivity Services 2022 Vendor Assessment
  - Feb. 2022
Sandra Wendelken
Senior Research Analyst, Mobile and IoT Services
Worldwide Telecom & Mobility
swendelken@idc.com
1.303.513.1905
@SJWendelken
Appendix
Methodology

• Survey Sample

<table>
<thead>
<tr>
<th>Total</th>
<th>United States</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 415</td>
<td>N = 310</td>
<td>N = 105</td>
</tr>
</tbody>
</table>

• Field Time: July – August 2022

• Method: Web response survey

• Screener Requirements
  • Respondent’s organization for which they have decision-making responsibilities must be located in the U.S. or Canada
  • Organizations with greater than 100 employees
  • Respondent is an IT decision maker involved in digital transformation and related technologies, including 5G
  • Organization must currently be using, planning to use in the next 2 years or considering/evaluating usage of IoT and 5G technologies

• Data Specifications
  • All numbers may not be exact due to rounding; caution should be used when interpreting results from small sample sizes.
Demographics

Country

United States
Canada

Company Size, by employee range

- 10,000+ 9.2%
- 5,000 - 9,999 14.2%
- 2,500 - 4,999 12.8%
- 1,000 - 2,499 14.9%
- 500 - 999 24.8%
- 250 - 499 17.3%
- 100 - 249 6.7%

Demographics

By Industry

- Manufacturing: 8.9%
- Education: 8.7%
- Government: 8.7%
- Professional services: 8.4%
- Healthcare facilities and services: 7.5%
- Retail trade: 6.5%
- Freight transport/Logistics: 5.8%
- Media, broadcasting & publishing: 5.3%
- Banking and credit institutions: 4.8%
- Utilities: 4.3%
- Oil & gas: 3.9%
- Construction: 3.9%
- Insurance: 3.6%
- Wholesale trade: 3.1%
- Passenger transport: 3.1%
- Telecommunications: 2.4%
- Arts & Entertainment: 2.4%
- Resource industries: 1.4%
- Other financial services: 1.4%

n = 415
Demographics

By Role

- IT director or manager: 24.3%
- CIO/CTO / VP / Head of IT: 12.0%
- Manager or director for operational technology: 10.4%
- Network manager: 10.1%
- Network engineer / architect: 6.5%
- Digital transformation manager or digital director: 6.3%
- Telecom director or manager: 4.1%
- CFO, Finance Director / head of IT sourcing or IT procurement: 3.9%
- IT engineering manager or director: 3.6%
- IoT specialist: 3.6%
- Enterprise / IT architect: 3.4%
- COO/business operations director: 2.9%
- IoT architect / engineer: 2.9%
- Research and development (R&D) director or manager: 2.9%
- Chief digital officer (CDO) / VP / Head of digital: 2.2%
- Telecom engineering specialist: 1.0%

n = 415
Demographics

Plans to Use 5G Technology?
(either for IoT or non-IoT uses)

- Currently using: 55%
- Planning to use within the next 2 years: 32%
- Considering/evaluating usage: 13%

Plans to Use the Internet of Things (IoT)?

- Currently using: 76%
- Planning to use within the next 2 years: 17%
- Considering/evaluating usage: 6%

n = 415