Private 5G Networks: Defying Expectations

A Survey Report

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Purpose and Methodology

Determine real-world usage of and interest in private 5G cellular networks and issues affecting deployment

What applications?
What devices?
What spectrum?
Which partners?
Goals and challenges?

Telephone-based survey of 400 US-based organizations using or interested in private networks

Medium and Large Businesses
With and without private cellular networks
Survey fielded March/April 2022
A private cellular network (PCN) is a local area network (LAN) that uses the same LTE or 5G technology as the public mobile operators but scaled down to provide a wireless network within the premises of the enterprise. It is not the use of enterprise devices on major public telco networks (e.g., AT&T, T-Mobile, Verizon etc.)
The Private 5G Opportunity is Real, But….

• …Real-world usage and expectations from those planning to deploy the technology doesn’t always match the industry hype

“Defining the benefits and expectation would not be easy at this time, for example it is not yet clear in which applications we would be using private 5G networks, but certainly it will reduce our reliance on wireless service providers.”—Survey Respondent

“It will be a challenge for us as a team to successfully deploy a Private 5G network. It will require a highly skilled multi-vendor team to overcome the technical complexity challenges and also to integrate our legacy systems with 5G.”—Survey Respondent
Private 5G Seen Taking Two Key Paths

<table>
<thead>
<tr>
<th>Advanced General-Purpose Network</th>
<th>Technology Enabler for IoT and Other Advanced Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Business entities can accelerate their digital transformation by implementing 5G private networks to provide secure connectivity, while simultaneously managing massive amounts of business-critical data.” — Survey Respondent</td>
<td></td>
</tr>
<tr>
<td>“The private 5G networks will be simple to scale and will manage large numbers of IoT-connected sensors and devices.” — Survey Respondent</td>
<td></td>
</tr>
<tr>
<td>“We expect Private 5G to overcome the constraints of existing LTE, Wi-Fi and ethernet technologies by allowing better mobility, higher bandwidth, more reliability and easy maintenance.” — Survey Respondent</td>
<td></td>
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<tr>
<td>“It will enhance and improve the use cases for emerging technologies like AI, AR/VR.” — Survey Respondent</td>
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</tbody>
</table>

“Private 5G networks give companies total control over data, security, and networks. The networks also offer ultra-reliable, low-latency use cases such as industrial IoT and robotics.” — Survey Respondent
Private Cellular Primarily for Early Adopters
Existing Private Networks

Top Industries

- Technology: 22%
- Wholesale/Retail: 15%
- Entertainment: 11%
- Manufacturing: 7%
- Health Care and Social Assistance: 13%

100% Use 4G LTE

Top Applications

- Campus-Wide Network: 93%
- IoT Sensor Data: 80%
- Remote Asset Control: 76%
- Port/Ship: 33%
- Education/Training: 26%
- Edge Computing: 26%
- Transportation: 17%
- Manufacturing: 15%
- Private/Public Combo: 4%

4.2
Overall Satisfaction (5 Scale)
Spectrum Realities

Spectrum Expected to be Used for Private 5G Network

- **Sub-6**: 81%
- **mmWave**: 17%
- **CBRS**: 2%

51% Expect to acquire spectrum from telcos

Millimeter wave may get more discussion and CBRS is a much cheaper option, but the majority are planning to use licensed sub-6 spectrum.
**Private Network Coverage Expected to Start Small, But Grow**

<table>
<thead>
<tr>
<th>Network Locations</th>
<th>Initial Indoor</th>
<th>Initial Outdoor</th>
<th>Future Indoor</th>
<th>Future Outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>84%</td>
<td>16%</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Medium Business</td>
<td>16%</td>
<td>19%</td>
<td>51%</td>
<td>54%</td>
</tr>
<tr>
<td>Large Enterprise</td>
<td>81%</td>
<td>48%</td>
<td>48%</td>
<td>32%</td>
</tr>
</tbody>
</table>

**66%**
Expect to deploy in multiple buildings 18 months after launch.

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*Image: Technalysis Research*
Industry Opportunities

- Tech-focused companies see 5G as a future-looking technology
- Manufacturing, retail and health care looking at it to solve practical problems
Top Partner Choice is Not Telcos

Preferred Partner for Upcoming 5G Network

<table>
<thead>
<tr>
<th>Preferred Partner</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Provider</td>
<td>81%</td>
</tr>
<tr>
<td>Telco</td>
<td>78%</td>
</tr>
<tr>
<td>Telco SI</td>
<td>64%</td>
</tr>
<tr>
<td>MSP</td>
<td>57%</td>
</tr>
<tr>
<td>Networking Equipment</td>
<td>53%</td>
</tr>
<tr>
<td>O-RAN/V-RAN Vendor</td>
<td>43%</td>
</tr>
<tr>
<td>Telco Equipment</td>
<td>34%</td>
</tr>
<tr>
<td>Cable Operator</td>
<td>10%</td>
</tr>
</tbody>
</table>

Average Number of Partners Expected: 3.9
Top Connected Device is Not Smartphones

Top Devices Expected on Private 5G

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Medium Business</th>
<th>Large Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected Device Numbers</td>
<td>1,337</td>
<td>4,423</td>
</tr>
<tr>
<td>Connected Devices in 18 Months</td>
<td>6,114</td>
<td>10,060</td>
</tr>
</tbody>
</table>

- **Laptop PCs**: 90% (Medium), 95% (Large)
- **Smartphones**: 91% (Medium), 87% (Large)
- **Other Specialized Devices**: 58% (Medium), 39% (Large)
- **IoT Sensors**: 25% (Medium), 15% (Large)
- **Tablets**: 0% (Medium), 0% (Large)
- **Robots (e.g., AGVs)**: 0% (Medium), 0% (Large)
- **AR/VR Headsets**: 0% (Medium), 0% (Large)
- **Specialized Manufacturing Devices**: 0% (Medium), 0% (Large)
Key Applications

Top Applications Expected for Private 5G

Most common expected use is for a general-purpose network, while IoT, device management and edge computing are also planned by most respondents.
Types of Solutions

- Multi-Vendor Solution Built by SI: 42%
- Multi-Vendor Solution Built by Tech Vendor: 26%
- Multi-Vendor Solution Built Themselves: 20%
- Single Vendor Solution: 6%
- O-RAN Solution from Multiple Vendors: 6%

94% Expect to use multiple vendors to create their private 5G network
Benefits vs. Challenges of Private 5G

**Top Expectations**
- Improved security: 75%
- Faster speeds: 74%
- Increased efficiency: 69%
- Increased flexibility: 68%
- Increased quality: 63%
- Improved reliability: 58%

**Top Concerns**
- Limited internal skill sets: 78%
- Technology complexities: 77%
- Cost overruns: 65%
- Acquiring spectrum: 56%
- Integration with existing networks: 49%
- Less-than-expected performance: 36%
Wireless Battle?

Will Private 5G Complement or Replace WiFi?

Top reasons for replacement
- Speed
- Security
- Latency
Big Expectations for the Edge

IoT-focused edge applications dominate, highlighting the perceived link between private 5G and OT applications.
Conclusions

• Private 5G is primarily seen as an additional means of connection and as a means to a practical end
  • Integration with existing networks a big concern
• Technological and educational challenges remain a major concern
  • Excitement for the potential speed and security benefits, however, is palpable
• Industry expectations on technologies, timelines, partners and more don’t match real-world expectations
  • Indoor networks based on sub-6 spectrum in partnership with cloud providers a top choice
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The complete 96-slide version of this study is available separately for purchase. Please contact me directly if you are interested.