

MID-YEAR UPDATE

# The State of the Industrial Internet of Things: A Spotlight on Industrial Innovation



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The State of the Industrial Internet of Things is an ongoing series of market research and analysis conducted by PTC. These reports explore the robust and increasingly complex opportunities presented by the [Industrial Internet of Things \(IIoT\)](#) market. Tapping into PTC's 30 years of technology expertise, 30,000 global customers, and 1,000 technology and service partners, the State of the Industrial Internet of Things series delivers actionable trends and insights across the entire IIoT ecosystem.

### Executive Summary

Based on findings from recent quarters, there are a noteworthy number of enterprises pursuing initiatives to build and offer IoT solutions for their end customers. While a majority of these companies are also using IoT for internal benefit, this report will focus on the responses of those whose primary use is for strategic differentiation, or leveraging IoT and other advanced technologies to offer innovative, new connected products, services, and solutions.

This mid-year spotlight edition of our State of Industrial Internet of Things series examines this observation in greater detail. It focuses on development and adoption trends for innovative companies building industrial IoT experiences to serve their end customers externally by enhancing their customer-facing products, services, and solutions through the use of IIoT technology, versus for their own internal use and benefit within their internal value chain. Our key findings include:

- There is a significant market opportunity for companies looking to build IIoT capabilities into their physical products or to provide IIoT solutions to their end customers through new offerings, product interfaces, and service models.
- Larger companies are primarily focused on internal use of IIoT technology as they recognize significant opportunity for efficiency and to optimize processes across complex value chains.
- Use cases being developed to offer to end customers typically focus on service as the primary beneficiary of a company's IIoT offering.

- Cloud-hosting is the preferred method of bringing IIoT solutions for customers to market, however there is still strong market demand for on-premise options.

### Methodology

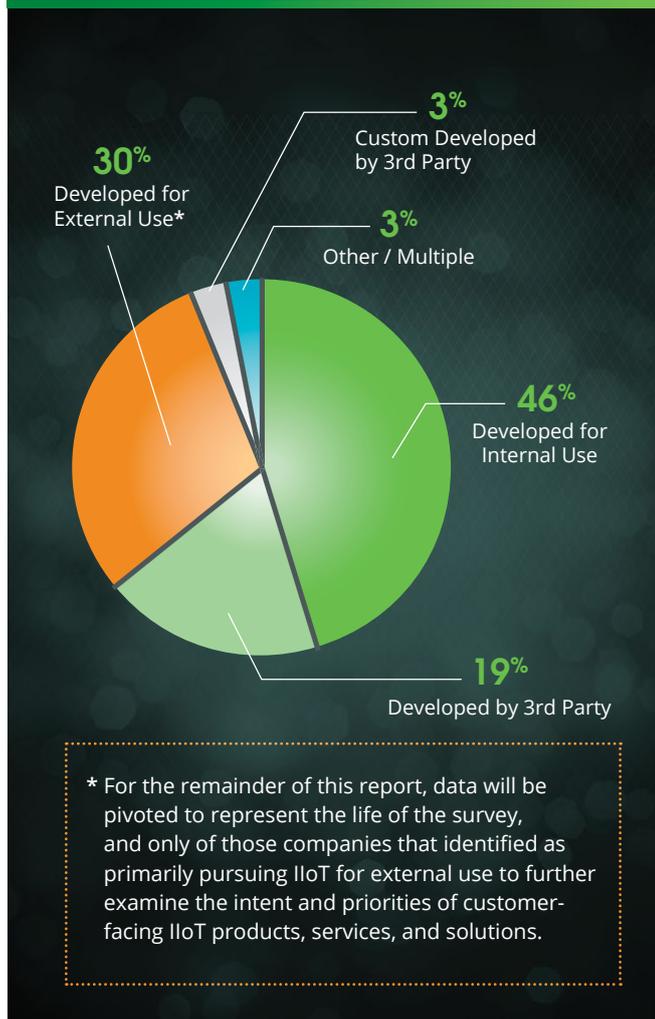
The insights contained in this iteration of the State of Industrial Internet of Things report series have been developed through primary and secondary market research conducted by PTC. The primary research includes exclusive data related to one of the largest sets of IIoT customers in the market: PTC ThingWorx customers. PTC has been engaging with its customers since 2015 to reveal their current and planned use of IIoT to drive digital transformation across their operations and products. The sample for this data set includes enterprises across multiple verticals and geographies with a focus on industrial settings. PTC supplements this proprietary data with market projections and case studies from dozens of analyst firms and consultancies in the broader market. The State of the Industrial Internet of Things distills this body of knowledge and provides a comprehensive view of the current state of the market. In this mid-year update, we offer an interesting data point from our recent research and provide a view into a particular subset of enterprises capitalizing on the opportunity presented by the IIoT.

### Demographics

Starting out as traditionally M2M initiatives that pre-date the Industrial Internet of Things market, enterprises operating in industrial settings have long recognized the potential value of the IIoT for their internal use and benefit. As industrial IoT technology has become mainstream, it has

penetrated virtually every vertical market and given rise to new partners, service providers, and opportunities to create both internal operational efficiency and strategic differentiation in product or service offerings. Throughout the life of the survey, the data shows the majority of companies are adopting IIoT initiatives for their own internal use (54%). However, between the dates of October to December 2017, the data contains a noteworthy number of companies focused on external offerings that enhance new and existing products or service offerings. Jumping nearly 10% to 30% in this period, these companies pursuing IIoT for use by their end customers are primarily focused on strategic differentiation and generating revenue from the opportunity.

**Figure 1: Type of Use Case, Oct-Dec 2017.**



### Industry

When we look at only companies pursuing IIoT primarily for external use the heaviest concentration of companies pursuing IIoT for their end customers (external use) remains proportionate to the overall sample inclusive of those pursuing projects for internal use. However, the software industry jumps 10 percentage points to 19%, when we look at only companies pursuing IIoT primarily for external use. This suggests that software companies developing offerings for end customers are focused on partnering to develop highly visible, polished, customer-facing solutions. This is likely due to a heightened focus on user experience (UX) for these types of applications, with software service providers being more flexible in their development to enable greater customization. The fast time to market that third party development offers is also helpful for external-facing solutions, which have a more limited window to provide differentiation.

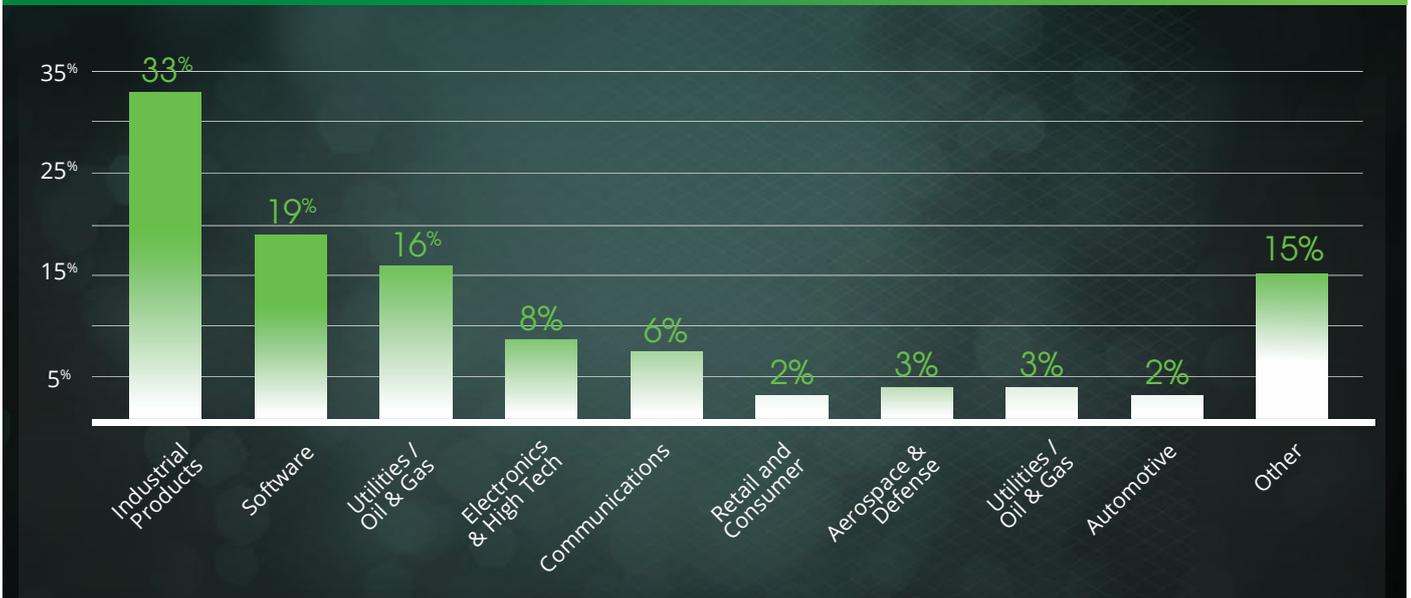
There is also a significant difference in the industrial products category when we split by internal versus external, suggesting a heightened interest in differentiating industrial product offerings with the integration of IIoT technology and solutions.

### Company Size

There is a significant shift in adopters when we split by revenue. Companies pursuing IIoT primarily for external use tend to be much smaller in size, with the concentration of companies in the \$5 billion or greater category dropping from 29% to only 13%. This trend highlights the adoption of IIoT for internal use by large companies, rather than an acute focus on connecting products and services for the end customer by smaller companies.

IIoT initiatives thrive where there are high concentrations of high-value assets and greater levels of automation. Large enterprises typically have large service networks and are keen to leverage IIoT technology for gains in efficiency and productivity. For larger, more complex industrial environments with global operations and wider service networks, maturity tends to be higher for industrial IIoT and automation initiatives internally;

Figure 2: Industry Vertical, External Use Only.



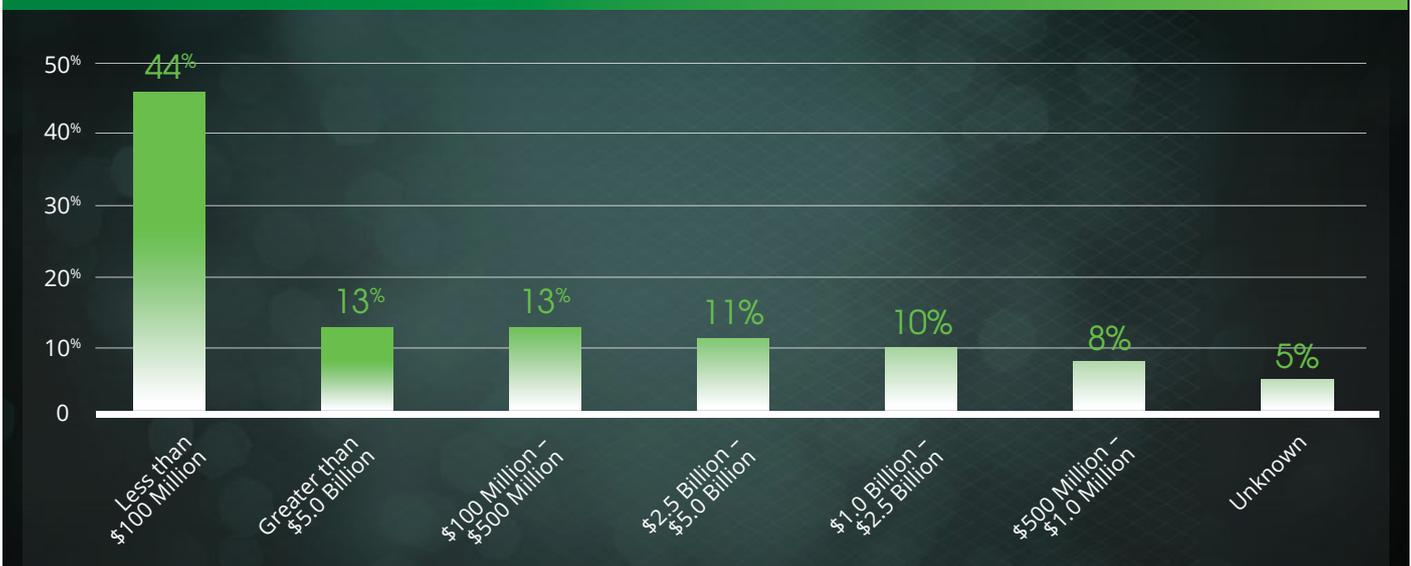
larger companies are hyper-focused on reaping the operational benefits of using IIoT to generate actionable, data-driven insights and visibility.

In contrast, smaller companies are driven primarily by the need to increase market share, and are therefore hyper-focused on product and service differentiation required to convert and retain new customers. It is important to large organizations to predict the disruption brought on by new innovators and startups entering their markets, and they should not neglect their product and service offerings as part of their broader IIoT strategies.

### Top Use Cases and Examples of IIoT for End Customers

Industrial enterprises focused on harnessing IIoT capabilities are deploying this technology across their value chains. While the data suggests internal use in manufacturing operations, taking a step back to look at those developing for end-customer use shows a focus on service as the key functional beneficiary.

Figure 3: Industrial IoT Adoption by Company Size , External Use Only.



As industries shift toward service-oriented business models, industrial enterprises are eager to leverage the same capabilities to monitor and optimize connected devices with their customers the same way they do internally. Companies recognize that reducing downtime (via predictive maintenance, remote service, etc.) continues to be a top priority for their customers. As a result, they are capitalizing on the opportunity to extend their footprint within the customer’s operations and monetize this highly strategic outcome.

To better serve end users, extend their product and service footprint, and develop more strategic partnerships with customers, industrial enterprises are working to enable a series of use cases across their customers’ environments.

This distribution of use cases is consistent with that of companies pursuing IIoT for internal use. The path to value for new IIoT innovation typically begins with the monitoring capability of connected devices. Looking for early value, enterprises pursue remote monitoring while innovating in parallel, utilizing this

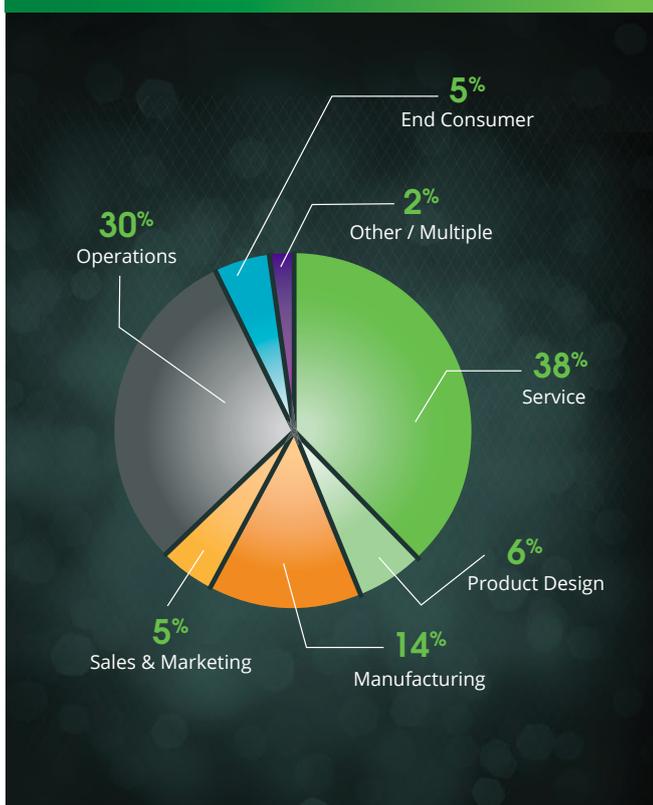
new capability as the foundation upon which to develop or identify new and unique use cases.

The heaviest concentration of solutions developed for end customers focuses on providing transparency into machine performance through remote monitoring. This core capability enabled by IIoT technology is unlocking new business models and revenue opportunities such as automatic consumable replenishment or product-as-a-service models.

Burdened by less bureaucracy, startups and new entrants are increasingly choosing this type of business model. Large enterprises would be well served to start their business model transformation today—preempting the agility and speed with which start-ups may be able to disrupt their market.

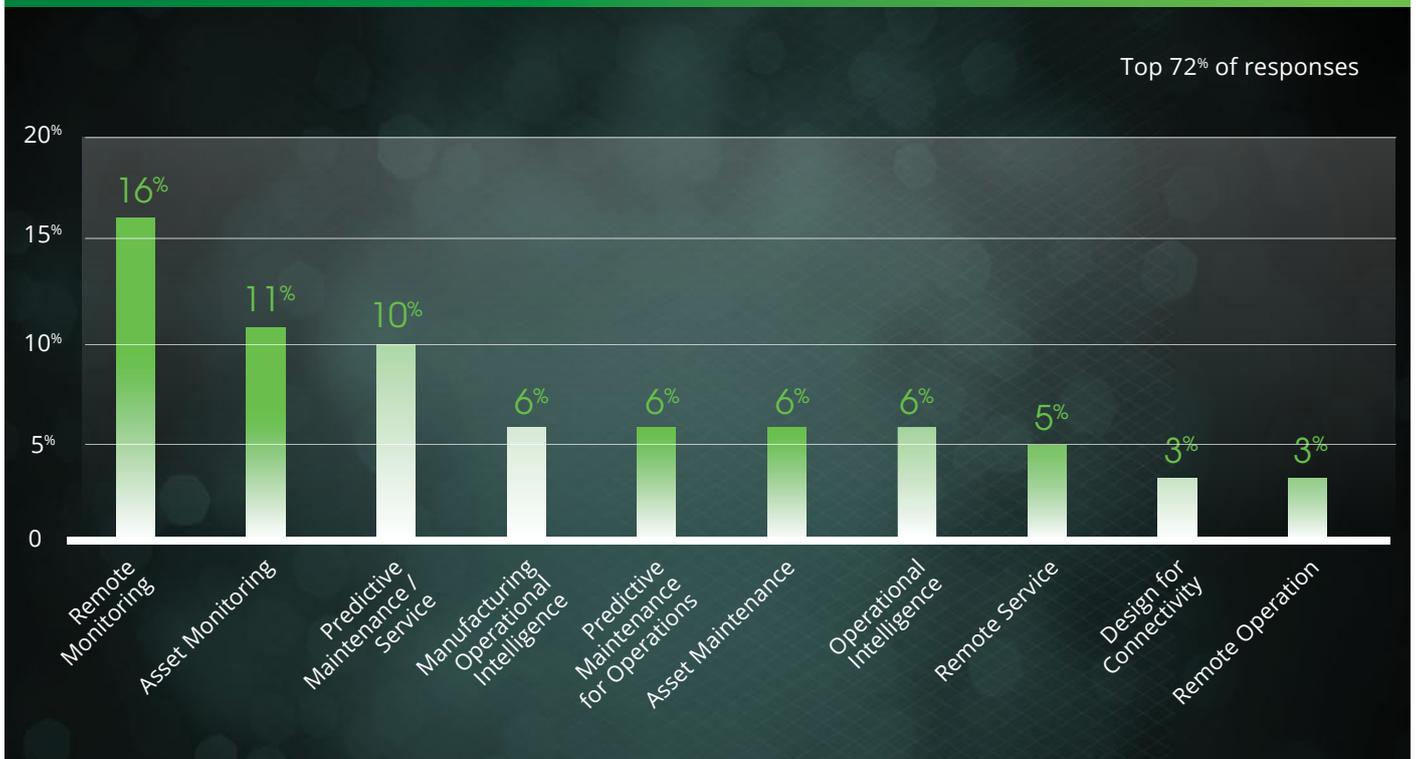
By providing a window into throughput and asset utilization with data streams and dashboards related to asset performance, companies selling IIoT capabilities to customers improve the strategic value of their relationship by more closely tying the customers’ success to the individual equipment

**Figure 4: Use Case Key Functional Beneficiary, External Use Only**



For example, [Instron](#), a leading manufacturer of structural testing machines, is testing a variety of materials for a range of applications and leveraging IIoT technologies to remotely assess the health of their equipment. By deploying remote monitoring, Instron tapped into the valuable data streaming from their field equipment and gained a real-time view into the health of their equipment in the field. This real-time visibility allowed Instron to improve the management and uptime of their machines for their customers while also opening the door for new revenue streams from premium service plans. In addition, this massive data set about product performance and usage enabled Instron to be more attuned to customer needs. This data could be incorporated into a [digital twin](#) model, for example, enabling Instron’s design and engineering teams to capitalize on this unique new source of insight.

Figure 5: Top 10 Use Cases, External Use Only.



and solutions they provide—a key attribute of why product-as-a-service models are sought after by many customers. These stronger relationships, in turn, can insulate customer relationships from competition.

Just behind these monitoring-related use cases are IIoT solutions for maintenance and service. These solutions layer machine learning and predictive analytics on top of this monitoring stream to predict failures before they happen and help customers optimize their use of a product. These service-oriented applications also enable discrete manufacturers to identify service opportunities and proactively pursue customers either directly or via their service network. In this way, they are capturing new service revenue that may have otherwise been directed to a third party, conducted in-house by the customer, or resulted in emergency customer calls and escalations. All of these provide a suboptimal experience for the customer and can damage relationships over time.

Industrial enterprises and solution providers developing applications to enhance their product

or service offerings today tend to favor public-cloud hosted (including PTC-hosted) applications at nearly a 2:1 ratio compared to on-premise installations, such as their corporate-owned servers. These companies

[Varian](#), a global manufacturer of radiation oncology equipment, has leveraged IIoT technology for predictive maintenance, ensuring the uptime of their machines in the field, while greatly reducing the cost associated with service. By deploying predictive maintenance, Varian has reduced the number of service visits per machine by 42%. The reduction in unnecessary service visits has allowed Varian to greatly increase their service margins while guaranteeing greater up-time and higher quality experiences for their customers.

prefer cloud-hosted applications, which simplify integration with customer and third-party systems and enable maximum scalability and stability. These benefits are helpful for certain products or offerings, particularly in the consumer space.

However, as industrial customers run more of the IIoT technology stack (such as analytics at the edge or within the factory walls), PTC predicts that the customer demand for on-premise offerings in industrial verticals will hold steady or increase. This is also driven by the need for extremely low latency and high control over application security for these mission-critical applications. Companies offering

IIoT-enabled products and solutions will need to ensure their offering is available for on-premise installation to fit the needs of this particular customer base. This increased need for on-premise deployment options is counter to the trend in adjacent technology markets, which sees a more linear path to hosting all software in the cloud.

### The Bigger Picture

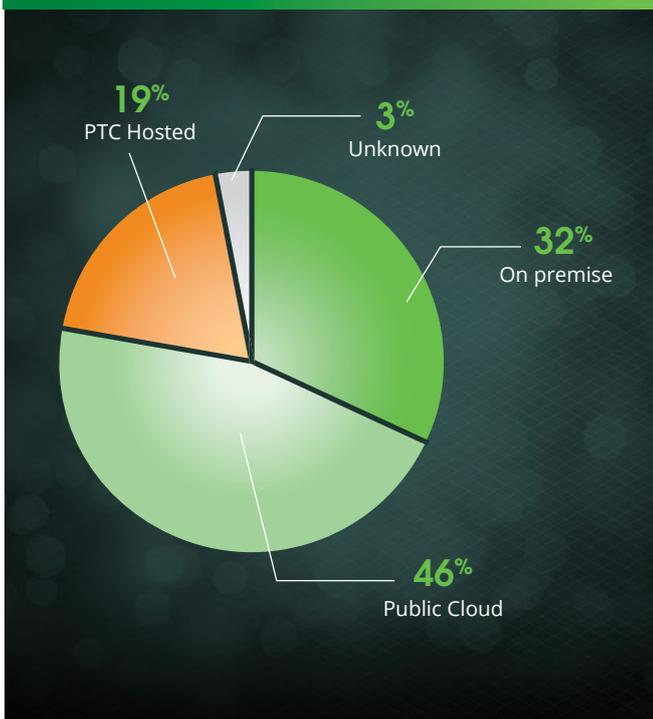
There is no longer doubt: The Industrial Internet of Things is here to stay—and IIoT technologies can mean the difference between success and failure for industrial enterprises. Taking the breadth of IIoT impact holistically, technology market analysts’ and PTC’s forecasts predict that the IIoT has the potential to create significant economic disruption and impact.

Global consultancy McKinsey predicts the impact of “linking the physical and digital worlds,” stating that “... by 2025 IoT will have a potential total economic impact of as much as \$11.1 trillion per year. In fact, IoT will be the biggest source of value of all disruptive technologies, ahead of mobile Internet, knowledge-work automation, cloud computing, and advanced robotics.”

While the majority of this economic impact will come from companies developing and deploying IIoT technologies for their internal use, this simply is not possible without vendors and partners who offer industrial IoT-ready connected devices and solutions.

For more information, [contact an expert](#) to learn about the ThingWorx Industrial Innovation Platform.

**Figure 6: Desired Deployment Strategy, External Use Only**



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