

Connected OEM Ecosystems

Monetizing IoT, edge, and
data-as-a-service models

White paper



Abstract

Connected OEM ecosystems are reshaping how manufacturers create value. Instead of treating equipment as a one-time sale, original equipment manufacturers can now build recurring revenue, deepen customer relationships, and improve product performance through connected devices, edge intelligence, and data-driven services.

A connected OEM ecosystem links machines, sensors, software platforms, service teams, dealers, and customers into a continuous

digital feedback loop. That loop turns operational data into services, insights, and new business models.

This white paper explains the core features of connected OEM ecosystems, how monetization models work, and the practical solutions these ecosystems provide to OEMs, channel partners, and end customers.

01. Introduction

OEMs across industrial, automotive, medical, agriculture, energy, and commercial equipment markets are under pressure to move beyond margin compression in hardware. Customers increasingly expect outcomes, uptime, remote visibility, and flexible commercial models instead of just physical products. At the same time, IoT connectivity, edge computing, cloud platforms, and AI analytics have matured enough to support scalable service delivery.

This creates a strategic opportunity: OEMs can evolve from product manufacturers into ecosystem orchestrators. In that role, they do not simply sell machines. They provide digitally enabled performance, compliance, optimization, and life cycle support.

The scale of this shift isn't hypothetical anymore. Caterpillar's Helios platform now connects more than 1.5 million machines and engines worldwide, including non-Caterpillar brands, and processes over 50 billion data points a month to flag equipment at risk of failure before it happens. Caterpillar reports that customers using its combined digital tools spend up to 33% more on aftermarket services - which is the clearest evidence yet that this model isn't just a nice-to-have add-on, it's a significant driver of the company's public target of \$28 billion in services revenue by late 2026.

Business shift: The most valuable OEMs increasingly monetize what the asset does, what the asset knows, and how the asset improves over time.

02. What Is a Connected OEM Ecosystem?

A connected OEM ecosystem is an operating model in which physical products, embedded software, connectivity, edge processing, enterprise systems, service workflows, and external partners are integrated into one value chain. Data moves from asset to insight to action.

2.1 Key features of a connected OEM ecosystem

- **Connected assets:** Equipment includes sensors, telematics, controllers, and software that continuously report operating conditions, usage, and performance.
- **Edge intelligence:** Processing happens on or near the device to enable fast response, local automation, filtering, and resilience when connectivity is limited.
- **Cloud integration:** Central platforms aggregate fleet data, manage devices, run analytics, and expose services to users and partners.
- **Digital service layer:** Applications support monitoring, diagnostics, predictive maintenance, alerts, configuration management, and remote support.
- **Data governance:** Security, access control, consent, ownership rules, and compliance frameworks determine how data is collected and used.
- **Partner participation:** Dealers, service providers, software vendors, insurers, financiers, and customers interact through shared data and workflows.
- **Feedback-driven product improvement:** Field data informs engineering, quality, warranty management, and next-generation product design.

Connected ecosystems create a closed loop between design, operation, service, and commercial value. That loop is the foundation of monetization.

03. The Technology Foundation: IoT, Edge, and Data-as-a-Service

3.1 IoT as the sensing and connectivity layer

IoT provides the raw telemetry that makes ecosystem intelligence possible. Sensors and embedded devices capture temperature, vibration, pressure, location, runtime, utilization, energy consumption, software status, and fault codes. Connectivity methods may include cellular, Wi-Fi, LPWAN, Ethernet, satellite, or hybrid networks depending on the asset environment.

For OEMs, IoT is valuable not just because it connects products. Its real value is that it creates persistent visibility across the installed base. That visibility makes service delivery measurable, automatable, and scalable.

3.2 Edge computing as the operational control layer

Edge computing processes data at or near the machine instead of sending every event to the cloud. This is essential when decisions must happen in milliseconds, bandwidth is expensive, sites are remote, or regulations limit data movement.

Edge capabilities often include local analytics, rule execution, anomaly detection, software updates, buffering, protocol conversion, and secure device management. In industrial settings, edge also bridges operational technology and enterprise systems.

Why edge matters commercially: Edge reduces latency, lowers cloud costs, improves reliability, and enables premium service offerings such as autonomous optimization, local safety controls, and remote

3.3 Data-as-a-service as the monetization layer

Data-as-a-Service, or DaaS, turns asset and operational data into consumable products. Instead of using data only internally, an OEM packages data, benchmarks, alerts, forecasts, APIs, reports, or decision support tools for customers and partners.

DaaS can be delivered as dashboards, subscriptions, benchmark reports, machine health scores, compliance records, production optimization recommendations, or API feeds into customer systems. The offering may be standalone or embedded inside a broader service contract.

04. Monetization Models for Connected OEM Ecosystems

Connected OEM ecosystems support multiple revenue streams. The strongest strategies typically combine recurring digital services with higher-margin aftermarket and outcome-based offerings.

Model	How it works	Value to customer	Value to OEM
Subscription monitoring	Customer pays monthly or annually for fleet visibility, alerts, dashboards, and device management.	Improved transparency, faster issue detection, simpler oversight.	Predictable recurring revenue and stronger account retention.
Predictive maintenance services	Analytics detect likely failures and trigger proactive service recommendations or dispatch.	Reduced downtime, lower maintenance cost, better uptime planning.	Service revenue growth, reduced warranty leakage, improved parts demand forecasting.
Usage-based or pay-per-use	Pricing is tied to hours, cycles, throughput, output, or utilization.	Lower upfront investment and alignment between cost and value received.	Expanded market access and better monetization of high-performing assets.
Outcome-based contracts	OEM commits to uptime, efficiency, yield, or service-level performance.	Commercial model tied to business results rather than equipment ownership.	Premium pricing and differentiation based on operational excellence.
Data-as-a-service	OEM packages insights, APIs, benchmarks, or compliance data as a paid offering.	Actionable intelligence without building internal analytics capability.	New software-like margin streams from installed base data.
Remote software and feature enablement	Capabilities can be activated, updated, or upgraded over the air.	Faster access to features and lower service disruption.	Post-sale upsell and longer life cycle monetization.

4.1 Common pricing approaches

- **Tiered subscriptions:** Basic monitoring, advanced diagnostics, premium optimization.
- **Asset-based pricing:** Fee per machine, gateway, site, or fleet.
- **Consumption-based pricing:** Fee per data volume, API call, processing event, or machine-hour.
- **Shared savings:** OEM shares in cost reduction or productivity improvement achieved.
- **Bundled contracts:** Hardware, connectivity, support, and analytics combined into one commercial package.

05. Solutions Connected OEM Ecosystems Provide

The value of a connected OEM ecosystem is not abstract. It solves operational and commercial problems across the asset life cycle.

5.1 Predictive and prescriptive maintenance

Traditional maintenance depends on fixed schedules or reactive repairs. Connected ecosystems improve this by continuously monitoring machine health and identifying patterns that precede failure. More advanced systems move from prediction to prescription, recommending the best action, parts, timing, and technician response.

Solution: Less unplanned downtime and more efficient field service, since technicians arrive knowing what's wrong and what to bring rather than diagnosing on-site.

Business impact: Better customer uptime, lower warranty cost, and higher aftermarket revenue, because a scheduled fix is almost always cheaper than an emergency one.

5.2 Remote diagnostics and support

Connected OEMs can diagnose many issues without sending a technician on-site. Device logs, fault codes, configuration data, and live telemetry allow service teams to isolate root causes faster. In some cases, problems can be solved remotely through software resets, parameter adjustments, or over-the-air updates.

Solution: Faster problem resolution and reduced truck rolls, since a significant share of issues do not require a physical visit.

Business impact: Lower service delivery cost and improved customer satisfaction, which compounds over the life of the contract as customers come to expect a faster response than the one the old model offered.

5.3 Fleet optimization and benchmarking

When many connected assets report standardized data, OEMs can compare performance across fleets, geographies, duty cycles, and operators. This helps customers understand underutilization, inefficient operating behavior, energy waste, and maintenance hotspots.

Solution: Operational benchmarking and continuous improvement insights that a single customer could never generate from their own fleet alone.

Business impact: Stronger customer value realization and differentiated advisory services, turning what used to be a one-time-sale relationship into an ongoing consulting one.

5.4 New aftermarket and digital revenue streams

Connected ecosystems make aftermarket more intelligent. OEMs can predict parts demand, recommend consumables, trigger service campaigns, and dynamically offer upgrades based on actual machine behavior. Digital entitlements also allow features to be sold after the initial purchase.

Solution: Better timing for parts, service, and upgrade offers, so the offer arrives when the customer actually needs it instead of on a generic sales cadence.

Business impact: Increased customer lifetime value and improved channel coordination between the OEM and its dealer network.

5.5 Outcome-based service delivery

Because connected products generate continuous evidence of use and performance, OEMs can support contracts tied to uptime, throughput, energy efficiency, or yield. This shifts the conversation from equipment ownership to measurable business results.

Solution: Performance-backed services aligned with customer goals, where the contract terms are things the customer actually cares about, not just hardware specs.

Business impact: Higher-value contracts and stronger strategic positioning, since a performance guarantee is much harder for a competitor to underbid than a straightforward equipment price.

5.6 Faster product innovation and quality improvement

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5.7 Compliance, traceability, and reporting

In regulated industries, customers need accurate records for inspections, environmental reporting, safety audits, and service documentation. Connected ecosystems can automate evidence capture and reporting workflows.

Solution: Digital audit trails and automated compliance reporting that don't depend on someone remembering to fill out a paper log.

Business impact: Reduced administrative burden and stronger trust in OEM services, particularly valuable in industries where an audit failure carries real regulatory consequences.

06. Highlights of the Connected OEM Model

- **Continuous connectivity:** Assets remain visible throughout their life cycle, not just at installation or failure.
- **Real-time intelligence:** Streaming data enables faster decisions for operators, service teams, and automated systems.
- **Life cycle monetization:** Revenue continues after the initial sale through software, service, and data products.
- **Ecosystem collaboration:** Dealers, customers, and partners share insight through connected workflows.
- **Edge-enabled resilience:** Local processing supports low-latency control and operation in bandwidth-constrained environments.
- **Remote serviceability:** Support, updates, diagnostics, and configuration can be delivered without physical access.
- **Scalable insight products:** Data can be packaged into reports, APIs, scores, and subscriptions for different user groups.
- **Closed-loop improvement:** Operating data continuously informs service strategy and product design.

07. Business Benefits for Key Stakeholders

Model	Primary benefits	Typical examples
OEM	Recurring revenue, better margins, stronger differentiation, better product feedback, lower warranty exposure.	Remote service subscriptions, analytics upsell, usage-based contracts, connected warranty programs.
Customer or operator	Higher uptime, lower operating cost, better visibility, predictable service outcomes, reduced risk.	Predictive maintenance dashboards, benchmark reports, uptime guarantees, remote troubleshooting.
Dealer or service partner	Smarter dispatching, improved parts planning, stronger service conversion, more customer touchpoints.	Alert-driven service workflows, remote triage, prioritized field interventions.
Enterprise partner	Better integration with financing, insurance, energy, or compliance services.	Usage verification, asset performance data feeds, audit-ready reporting.

08. Operating Model Requirements for Success

Technology alone does not create monetization. OEMs need commercial, operational, and governance changes to make connected ecosystems work at scale. These include:

1. **Product strategy alignment:** Connectivity and serviceability must be designed into the product, not added as an afterthought.
2. **Clear data ownership and rights:** Contracts must define who can access which data, for what purpose, and under what terms.
3. **Cybersecurity by design:** Device identity, encryption, secure updates, access control, and vulnerability response are essential.
4. **Service transformation:** Field service, support, and dealer operations must use digital workflows and remote-first methods.
5. **Scalable platform architecture:** OEMs need interoperable systems for device management, analytics, applications, and partner integration.
6. **Commercial packaging:** Offerings must be easy to understand, price, sell, renew, and support.
7. **Change management:** Sales teams, service teams, dealers, and customers need education on the new value model.

Common mistake: Many OEMs invest in connectivity but stop at internal dashboards. Monetization requires packaging insights into customer-facing offerings with clear economic value.

09. Challenges and How Leading OEMs Address Them

- **Fragmented installed base:** Older equipment often lacks native connectivity. Leading OEMs use retrofit kits, gateways, and phased modernization.
- **Data overload:** Not all telemetry is useful. Edge filtering and use-case-led data models help focus on value.
- **Customer trust concerns:** Customers may worry about surveillance or data misuse. Transparent policies and demonstrable benefits are critical.
- **Channel conflict:** Dealers may see digital services as competitive. Successful OEMs include partners in service workflows and revenue models.
- **Integration complexity:** Enterprise systems, operational technology, and customer environments rarely align cleanly. Open APIs and modular architecture reduce friction.
- **Unclear ROI:** Monetization works best when tied to specific use cases such as downtime reduction, energy savings, or improved asset utilization.

10. Sector-Wise Use Cases

- **Industrial equipment:** Manufacturers of compressors, pumps, CNC machines, and production systems use connected ecosystems to monitor health, predict failures, and sell uptime-based service agreements.
- **Agriculture and heavy equipment:** OEMs connect tractors, harvesters, and construction fleets to provide location intelligence, fuel monitoring, operator behavior analytics, and seasonal maintenance planning.
- **Medical devices:** Connected imaging systems, diagnostics platforms, and hospital equipment support remote monitoring, software compliance, uptime assurance, and consumables optimization.
- **Energy and infrastructure:** Turbines, storage systems, charging infrastructure, and distributed assets benefit from edge control, remote diagnostics, and performance optimization across dispersed networks.

11. Strategic Recommendations

- **Start with high-value use cases:** Focus first on downtime reduction, service efficiency, or premium digital add-ons with measurable ROI.
- **Design offerings, not just platforms:** Customers buy outcomes, visibility, and reduced risk, not raw telemetry.
- **Use edge and cloud together:** Place latency-sensitive or bandwidth-intensive functions at the edge while using cloud for fleet-wide analytics and orchestration.
- **Build a data product mindset:** Treat data outputs as commercial products with target users, pricing, service levels, and roadmaps.
- **Align ecosystem incentives:** Ensure dealers, service partners, and internal teams benefit from connected service adoption.

Best-practice pattern: The strongest connected OEM strategies combine embedded connectivity, remote service workflows, analytics-led maintenance, and a commercial model built on recurring value

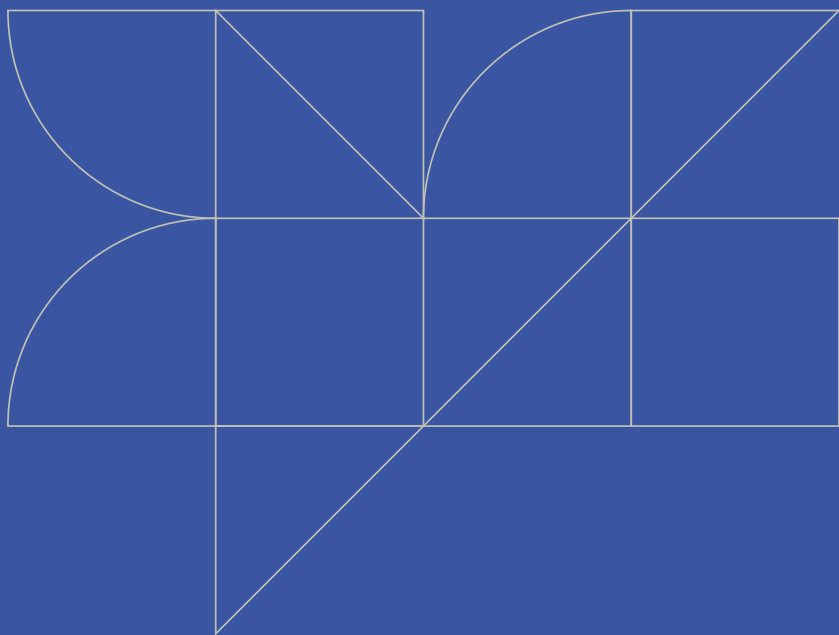
12. Conclusion

Connected OEM ecosystems represent a major shift in industrial and equipment-based business models. By linking IoT-enabled assets, edge intelligence, cloud analytics, and data-as-a-service offerings, OEMs can move from transactional product sales to recurring, insight-driven relationships. The features that define this model - continuous connectivity, remote serviceability, edge processing, ecosystem integration, and data monetization - create practical solutions for uptime, efficiency, compliance, innovation, and life cycle profitability.

For OEMs, the opportunity is not simply to digitize products. It is to reframe the product as a platform for services, intelligence, and outcomes. Caterpillar's Helios numbers make the case better than any framework could: connectivity and predictive analytics aren't a differentiator anymore so much as table stakes, and the OEMs still treating them as an add-on are the ones most exposed as the model matures. Those that execute well can create durable competitive advantage, expand revenue beyond the initial sale, and deliver measurable value across the full life cycle of connected assets.

14. References

1. McKinsey & Company - IoT value set to accelerate through 2030: Where and how to capture it
2. McKinsey & Company - New demand, new markets: What edge computing means for hardware companies
3. Harvard Business Review - How Smart, Connected Products Are Transforming Companies
4. International Energy Agency - Digitalisation and Energy
5. Digital Commerce 360 - Caterpillar aims for \$28 billion in services revenue by using digital technologies



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