SOLUTION BRIEF

Enterprise
Edge Services

# AI Software Operations at the Edge with Pivot Technology Services

**Operations at the edge can be very complex, expensive, inconsistent and labor intensive. Pivot Technology Services solves this through SaaS-like software deployments with security features that enable impactful AI experiences with Intel® edge technology.**

## Overview

The upsurge in software applications powered by deep learning AI methods is continuing at a rapid pace across industry boundaries. Effective solutions are being deployed to facilitate competitive advantages for enterprises through previously unachievable consumer experiences and increased process efficiencies, among many other use-case categories. One in five organizations are implementing AI across their entire enterprises, not just in small pockets.[1]

Advances in edge computing, where intensive AI processing can be transferred from cloud or data center deployments to a decentralized model, allow those software applications to deliver the best possible performance to enterprises. The Pivot Intelligent Edge, powered by Intel and serviced by Pivot Technology Services, positions latency-sensitive AI business applications at the enterprise edge to optimize their effectiveness.

The Intel® Smart Edge platform facilitates advanced workloads with enhanced security features: 2nd generation Intel® Xeon® processors run at the edge with Intel® QuickAssist Technology (Intel® QAT) to accelerate the performance and efficiency of compute-intensive operations necessary in edge deployments.

Pivot Technology Services is working to create compelling AI solutions on Intel® edge infrastructure, employing the Intel® Distribution of OpenVINO™ toolkit to power deep learning applications based on computer vision. The cross-industry possibilities for the Intel Distribution of OpenVINO toolkit, coupled with the Pivot Intelligent Edge, offer up capabilities for true innovation and value creation within a business such as enhanced consumer engagement analytics, intelligent workforce monitoring and automated exception detection.

As the benefits of AI implementations are realized within an organization, it will discover a demand to operationally deploy solutions on edge infrastructure in a multitude of locations.

## The Challenge

Enterprises are being transformed by decentralized edge technologies that facilitate opportunities to deliver previously unachievable performance in latency-sensitive business applications. Pivot Technology Services utilizes Intel Smart Edge software to deliver intelligent edge business solutions for customers who are seeking to innovate in their industry, creating sustainable competitive advantages through boundary-pushing technology.

AI capabilities, such as those provided by the Intel Distribution of OpenVINO toolkit, are the perfect example of software that thrives at the enterprise edge. The Intel Distribution of OpenVINO toolkit deployed on 2nd generation Intel Xeon processors creates the conditions for industry thought leaders to envision

compelling AI applications based on the ability to emulate human vision that have the potential to differentiate their businesses in the marketplace. Pivot Technology Services partners with Intel to make those business visions become a reality, delivering edge-native enterprise software for the Pivot Intelligent Edge, pre-packaged with the Intel Distribution of OpenVINO toolkit's deep learning inference engine.

Developing an enterprise software application presents plenty of challenges for professional software engineers. How will the application scale? How will the application perform? What software patterns should be used for maximum agility? How can the delivery team be agile for the business?

The answers to those questions present themselves in a variety of ways throughout the software development process. An application's solution architecture may contain microservices, containers and APIs to facilitate frequent changes, portability and scaling out of targeted areas of application functionality. Pivot Technology Services advocates strongly for a product management approach to software delivery that is supported by agile methodologies, resulting in small packets of value being delivered regularly to the business according to their feedback and priorities. Finally, the much-increased frequency of software deliveries and the smaller change footprints that agile deliveries create necessitate automation of the software release processes through DevOps pipelines that ensure consistent and low-risk deployments.

The modern management of software delivery means that applications change over time, often quite regularly, according to a managed product roadmap. The installation of software is not a one-off event. Software applications evolve over time due to businesses engaging thoughtfully with an application's features, making enhancement requests and strategically guiding its development. In edge scenarios, the changing software must be deployed not into a central cloud location, but to potentially many physical, decentralized edge nodes.

The very nature of edge infrastructure decentralizes the deployment of the software applications running on it. The physical deployments of both edge infrastructure and the business software that is hosted on edge nodes increase throughout the enterprise as their value is recognized and further rolled-out. In a retail scenario, for example, edge deployments could span multiple store locations across geographies to provide customers with a consistent, if localized, experience. Each site may have its own nuanced differences in culture and environment. Perhaps the business engages in A-B testing, where the effectiveness of a new release of software is compared with an older one before widespread roll-out.

The impact of having to manage software applications deployed on a multitude of edge nodes could be substantial. Engineers would be required to physically touch each installation, introducing an upgrading overhead and technical inconsistency with respect to software versioning across the enterprise. This scenario is not just time-consuming; the business is forced to wait for its plans to be enacted through the slow roll-out of new features and issue resolutions in its application. An organization's need for business agility can be hamstrung by overlooking day-to-day operations of managing software at the enterprise edge.

The question in the new world of edge computing becomes, how do you efficiently, consistently and more securely ensure that the business software deployed on edge infrastructure is configured, managed and governed? In the age of XaaS, where maintenance concerns are increasingly outsourced to centralized specialists, decentralization of software deployments suddenly poses a significant operational challenge.

## The Solution

In the rush to innovate it may be tempting to stand up edge infrastructure with individually deployed business applications, often pre-installed on arrival at an enterprise location. The approach may be appropriate for time-limited proof-of-concept initiatives, but technology leaders with an eye on the medium-to-long term should be wary of short-term solutions that will lack scalability and agility in full production scenarios. Pivot Technology Services solves the challenge of efficiently managing software deployments across an organization's edge estate elegantly, through an SaaS-like software deployment experience with built-in security.

In Pivot's approach, the effort to deploy a physical edge node is standardized and pointedly decoupled from the strategic business objectives that are addressed by the software application. Edge nodes deployed into an enterprise by Pivot utilize a lightweight deployment agent that on start-up registers with Pivot's cloud-hosted edge release management platform. From that point it becomes possible to leverage Pivot's edge release management platform to manage software deployments centrally for the registered edge node, using whatever segmented approach to release management the business requires.

While the deployment of the physical hardware becomes a repeatable, reliably implemented task, the creation of an innovative, business-driven software application can continue as a strategic priority. Pivot's application services team's product-centric style of managing software applications means industry-standard software development methods are strictly adhered to. These include managing an agile roadmap to support business priorities, employing distributed version-control, building multi-target deployment pipelines for production and pre-production environments, fully automating the testing of application components and verification of configurations prior to releasing, and ultimately delivering frequent, prioritized application enhancements to business stakeholders.

When those software releases become available on Pivot's edge release management platform, a business can tactically decide how to make the application available to its edge environment by selectively choosing which edge nodes can avail of the new version. The edge node's lightweight deployment agent will periodically poll the platform, asking for any new updates. As they become available for the specific edge node, the agent will download the update and switch to running the latest version. While an upgrade can be made generally available if desired, a target release facilitates everything from A-B testing to localization.

Pivot's ability to create deep learning-based software applications that utilize the Intel Distribution of OpenVINO toolkit, means the Intel Distribution of OpenVINO toolkit

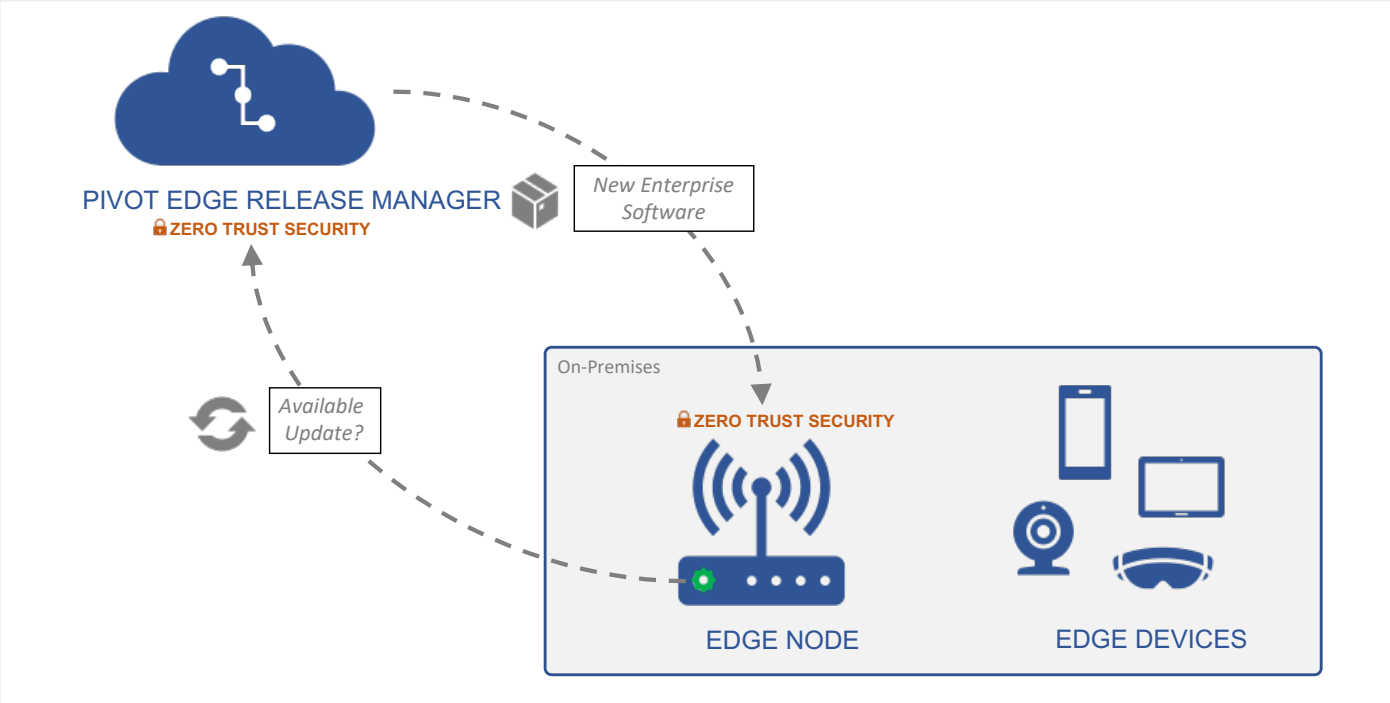


**Figure 1.** Pivot Edge Release Management approach

should ideally be incorporated into the same centralized deployment platform. Otherwise organizations will find themselves in unwanted deployment situations where the Intel Distribution of OpenVINO toolkit must be directly installed on small compute devices and physically attached to edge devices such as IP cameras, for example. This generates unwanted operational responsibilities and increases cost due to additional hardware.

Pivot has optimized its platform with industry-standard containerization technology to make the Intel Distribution of OpenVINO toolkit portable, allowing the Intel Distribution of OpenVINO toolkit to be deployed directly with the Pivot Intelligent Edge using the same standardized release management approach as is used for the core business application.

Pivot's edge release management capability allows enterprises to avail of the latest Intel Distribution of OpenVINO toolkit capabilities using the same standardized deployment practices as are used by the core business application. If there is a new release of Intel Distribution of OpenVINO toolkit, then the task of making it available within a widely-deployed estate of edge infrastructure becomes a centralized governance task and not a lengthy operational project.

## Conclusion

Innovating with AI-based software at the edge is an opportunity for organizations to generate real differentiation, whether that is delivering fresh customer experiences or redefining internal business processes. Pivot Technology Services can deliver edge-native business applications, utilizing the Intel Distribution of OpenVINO toolkit for deep learning use cases and taking advantage of Intel Smart Edge software on 2nd generation Intel Xeon processors.

### Pivot Edge Release Management Features and Highlights

- Enterprise software designed, built and maintained by Pivot Technology Services for edge use cases, utilizing Intel Smart Edge software
- Intel Distribution of OpenVINO toolkit for deep learning inference packaged with the Pivot Intelligent Edge for next-gen differentiation
- 2nd generation Intel Xeon Scalable processor, powering business innovation
- Scalable operations for edge with centralized, SaaS-like software delivery
- Lightweight deployment agent at the edge polling for centrally managed updates
- Centralized application governance in the cloud, including the Intel Distribution of OpenVINO toolkit
- Containerization supports multiple deployment targets for the business application and the Intel Distribution of OpenVINO toolkit
- More secure communications from edge infrastructure to cloud
- Managed release capabilities for complex roll-out strategies

The challenge to operationalize the management of business applications at the edge emerges with deployments of multiple edge nodes throughout an organization. Manual maintenance is not scalable, and a strategy for consistent, centralized management of business software becomes a necessity.

Pivot's edge release management platform facilitates a more secure, SaaS-like software release capability, where operations at the edge become standardized and scalable. Pivot's edge development capabilities, coupled with the Intel Distribution of OpenVINO toolkit, Intel Smart Edge software and 2nd generation Intel Xeon processors, can help realize your visions for innovation at the edge.

## About Pivot Technology Services

Pivot is an industry-leading information technology services and solutions provider to many of the world's most successful companies, including members of the Fortune 1000, as well as governments and educational institutions. By leveraging its extensive OEM partnerships and its own fulfillment, professional, deployment, workforce and managed services, Pivot supports the IT infrastructure needs of its clients. For more information, visit www.pivotts.com.

## About Intel® Network Builders

Intel® Network Builders is an ecosystem of infrastructure, software, and technology vendors coming together with communications service providers and end users to accelerate the adoption of solutions based on network functions virtualization (NFV) and software defined networking (SDN) in telecommunications and data center networks. The program offers technical support, matchmaking, and co-marketing opportunities to help facilitate joint collaboration through to the trial and deployment of NFV and SDN solutions. Learn more at http://networkbuilders.intel.com.

[1] https://www.pwc.com/us/en/services/consulting/library/artificial-intelligence-predictions-2019.html