DELL Technologies

INDUSTRY BRIEF

Dell Technologies Validated Designs for Computer Vision | Smart Airports

Take advantage of Dell Technologies Validated Designs to ingest your video and edge data once and apply multiple computer vision applications to develop actionable insights and maximize revenue.

ENABLING INTELLIGENT WORKFLOWS ACROSS THE AVIATION INDUSTRY

The global aviation industry is undergoing rapid transformation in just about every area of passenger travel. Customer loyalty is now earned not just by on-time departures and travel perks but also by the demand for safe, secure, and contactless travel.

Aviation organizations across the globe are turning to AI-powered computer vision capabilities to empower a safer, more engaging passenger experience. Actionable intelligence from these integrated video systems are transforming the business of travel, resulting in new value-add features for passengers, improved security, and advanced safety measures such as curb-to-gate touchless check-in and automated temperature screenings.

Data-driven insights derived from computer vision systems are also helping to drive operational efficiencies by reducing business risk and maximizing revenues. With more than two thirds of the world's population predicted to be urban by 2050[1] coupled with increasingly lower profit margins and steep competition, the need for transport efficiency will only escalate. Additionally, upwards of 30 percent of all greenhouse gas emissions come from the transportation industry.[2] Organizations are deploying computer vision systems to help lower their environmental footprint and increase sustainability by more acutely monitoring and controlling the output of harmful gases and chemicals.

COMPUTER VISION SOLUTIONS FOR THE AVIATION INDUSTRY

The Dell Technologies Validated Designs solution enables enables aviation organizations to provide a seamless passenger experience by bringing together the right combination of AI and computer vision technologies and workflows. Our full orchestration of intelligent video, edge, compute, storage, networking, analytics, and cloud technologies deliver an end-to-end workflow, enabling organizations to focus on what matters most: the passenger.

KEY BENEFITS AND VALUE

1 **Curated partner ecosystem:** Dell Technologies works with key partners to bring together otherwise fragmented components into a consolidated, streamlined workflow solution to lower investment risk.

2 **Comprehensive, lab-validation test approach:** To help deliver a solution that works for your organization from day one, Dell Technologies aligns validation standards with our partners to test hardware and software in extreme, real-world scenarios.

3 **Scalable and proven solutions:** Our approach decreases time to value by bringing together the right hardware and software from edge to core to cloud needed to precisely suit your particular use case and can scale from point solutions to enterprise environments.

4 **Dedicated global subject matter experts:** Maximize the value of your investment by relying on our global network of subject matter experts for guidance with infrastructure and data management, including video workloads, workflows, and data governance.

Figure 1: A modern computer vision environment for streamlining and enhancing the passenger experience

Dell Technologies Validated Designs for Computer Vision | Smart Airports is designed to ingest video and edge data once and apply to multiple applications to develop actionable insights and maximize revenue.

By using video analytics, the solution delivers use cases that directly reduce passenger waiting time, decrease transit time and provide our customers with access to additional passenger and staff services to enhance people experience.

Our Validated Designs solution also improves facility safety as our offer delivers a proven end-to-end solution portfolio and modern-day safety and security infrastructure that will reduce siloed infrastructures and network traffic. This is done by ingesting video and IoT sensor data to a hyperconverged infrastructure with GPUs, allowing multiple applications to work on real-time situational data in place, enabling faster, more informed decisions to be made. The offer is protected by integrated end-to end cyber security tools that secure both data and devices.

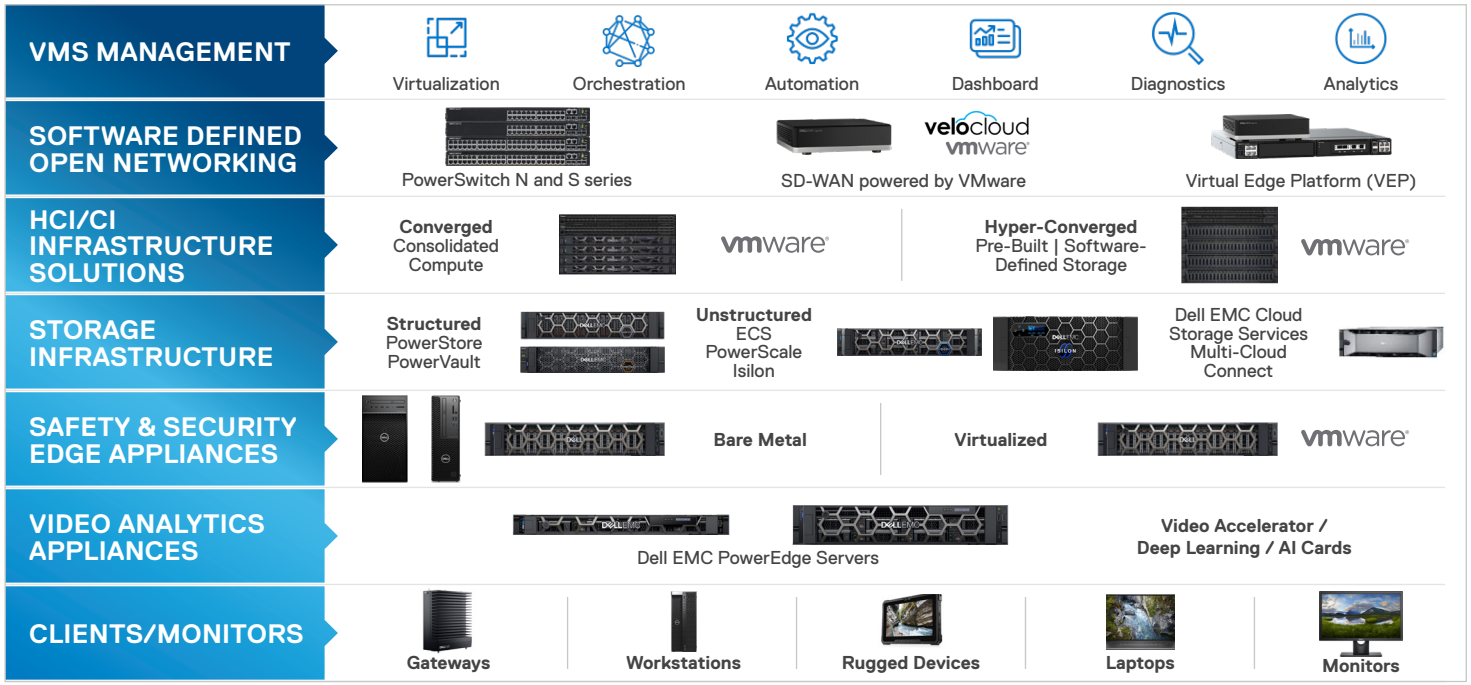
And lastly, our solution will achieve operational efficiencies and sustainability by allowing customers to access our ecosystem of validated video management and analytics software partners. By gathering inputs from multiple devices and incorporating data from edge and IoT sensors, our customers are getting better quality insights on a unified dashboard enabling them to make more informed and faster decisions.

Making the passenger journey experience smarter and safer

Aviation organizations can benefit from following AI-driven computer vision outcomes:

- **Streamlined passenger experience:** To improve customer satisfaction, the passenger experience must be as seamless as possible. Computer vision systems are empowering passengers with intelligent services and touch-free automation throughout their journeys (Figure 1). Smart parking systems, for example, allow for a less time consuming and problematic experience for passengers with features such as real-time open space guidance and "find my car" GPS navigation using license plate recognition. As passengers continue on their journeys, computer vision enables touchless interactions, providing site access, check-ins, and self-bag drop options to those with synchronized mobile applications. This mobile integration can also coordinate with digital signage to individually guide passengers to their destinations. Upon arrival, passengers can receive timely mobile updates and notifications regarding their destination including weather reports and local activities. For those needing to claim baggage, alerts can be sent when baggage is ready for pick up. As passengers exit the transportation hub, the flow of taxis and other ridesharing vehicles can be managed and optimized to ensure prompt pickups at the right locations.
- **Enhanced safety and security:** Video cameras have long been used as part of an organization's larger security workflow. Existing video data from these systems can be combined with sophisticated background processing and other structured and unstructured data using advanced analytics to generate actionable, real-time intelligence. Smart airports can leverage these insights to respond faster and with greater precision to improve safety and security for all. Features like object recognition can be used to help screen for suspicious objects. More advanced systems like thermal vision systems can also be used to improve safety measures with capabilities such as identifying temperatures over and under a defined threshold, monitoring for compliance to protective clothing regulations, and managing queues.
- **Smart airports:** Airports contain a cluster of edge devices that work in concert with internal and external cameras to provide value-add services such as real-time location tracking, capacity balancing, passenger counts, and automated ticketing. Emerging 5G wireless technology combines with rugged edge storage devices to turn aircraft into independent compute environments, delivering the desired passenger experience while making way for future innovation.
- **Operational and environmental efficiencies:** Computer vision is enabling aviation organizations to perform preemptive maintenance, equipment effectiveness, and environmental quality control and management. An aircraft equipped with external cameras, for example, can conduct real-time monitoring of track quality, spotting maintenance requirements without the need for regular separate checks and ensuring that problems are dealt with before they result in a suspension of services. Additionally, potentially

Figure 2. An integrated, validated, and secure portfolio—the foundation for a smart aviation ecosystem



harmful chemicals like those used to de-ice planes can be carefully monitored to ensure proper application as well as adherence to environmental agencies' recommendations and removal procedures.

- **Smart hubs:** Transporation hubs such as airports behave much like smart cities to provide more seamless passenger experiences, improve revenues, and maximize efficiencies. Retail spaces in airports require safety and security provisions for their "residents," and benefit from analytics to optimize operations. With computer vision, businesses can use real-time edge analytics to enhance their retail and hospitality provisions, while centrally aggregating this data allows them to discover usage insights and improve overall strategies for greater profitability. Energy usage can be controlled through the optimization of smart spaces, fleets and equipment can be tracked and monitored, and threats can be identified in real time. Waste from trash bins, for example, can be collected and disposed of in a timely fashion. Passenger flow can also be monitored, controlled, and optimized.
- **Automated tracking:** Just like passengers, baggage handling systems can benefit from computer vision technology to provide a friction-free and safer journey. AI-based optical baggage identification can result in a significantly faster on-boarding for passengers and simultaneously reduce transfer mishandling, baggage tampering, ticketing errors, and failures during loading. Machine learning techniques are also being introduced to automatically detect and identify dangerous or restricted items during the baggage screening process.

A consolidated safety and security platform for smart airports

Computer vision systems combine real-time video data coupled with other edge sensor data (audio, biometric, etc.), historical data, artificial intelligence (AI), and high-performance edge computing. The complexity of the resulting IT ecosystem presents some unique challenges for aviation organizations looking to implement a computer vision solution. Not only does it require orchestration of large quantities and types of sensors with powerful edge compute, low-latency networking, and multi-cloud ecosystems, but it also requires the right analytics engines, automation capabilities, security standards, and data management workflows needed to generate insights from unstructured data.

Organizations can inadvertently create isolated silos of data by purchasing point solutions for specific use cases. Bringing together the right combination of technologies and workflows that are specific to the aviation industry requires a tailored, enterprise-integrated approach.

The Dell Technologies Validated Designs solution for Computer Vision | Smart Airports can help simplify, consolidate, and streamline your organizational deployment process by combining validated workloads for video analytics, converged and hyperconverged infrastructure (CI/HCI), and industry-specific software in a scalable architecture (Figure 2).

Our expansive range of essential IT offerings includes client devices and peripherals, servers, storage, software-defined open networking, and industry tools for video management, virtualization, and analytics.

Figure 3. Aviation use case for computer vision—generating insights across air travel

AN EXTENSIVE PARTNER PROGRAM

Our extensive ecosystem of technology and industry partners helps deliver the tailored approach needed to realize your desired business outcomes from simple workflows to advanced organization-wide automation—turning passive video into scalable, intelligent video analytics systems to enhance the passenger experience, drive operational efficiencies, and lower your environmental footprint.

MODERN, SCALABLE IT ECOSYSTEM FOR THE AVIATION INDUSTRY

The Validated Designs solution provides a custom-designed solution based on hyperconverged and storage platforms, purpose-built for aviation use cases (Figure 3) with access to the required system building blocks from distributed locations to a centralized location (on-premises and cloud). Combined with our ecosystem of systems integrator partners and solution providers, we help you design, deploy, manage, and scale your solution as you grow—all without needing additional IT expertise.

Our solutions bring together:

- **Real-time edge compute and analytics:** Data at the edge is growing at a staggering rate. A single twin-engine Boeing 737 aircraft generates 333 GB of data per minute per engine.[3] With all that data comes a need for compute systems at the edge that can quickly translate data into insights rather than having to send it to the cloud or data center. Processing and storing data at the edge eliminates latency and connectivity challenges while improving security. With Dell Technologies Validated Designs for Computer Vision for Smart Airports solution, your organization can respond rapidly to data growth and operate within isolated aircrafts by ingesting video streams at the edge and preprocessing these streams before moving the pertinent video data to an on- or off-premises central archive. Our Dell Technologies family of compute platforms including ruggedized edge gateways and embedded PCs, edge networking, storage appliances, and high-performing, scalable edge servers helps capture, analyze, and gain insights from cameras and other sensing devices for real-time data analytics and machine learning at the edge. Solutions are purpose-built and designed with the distributed, virtualized framework needed to easily extend to the data center or cloud, leveraging solutions like VMware ESXi and vSphere.
- **The software-defined data center:** Our next-generation software-defined solutions enable you to manage both current data and future workloads with efficiency, security, and scalability. As the need for capacity grows exponentially, our all-flash data storage appliances eliminate traditional tradeoffs in performance, scalability, and storage efficiency, with a data-centric, intelligent, and adaptable infrastructure that transforms and mobilizes both traditional and modern workloads. For a true turnkey experience, Dell VxRail HCI combines servers, storage, networking, and virtualization into one cloud-ready solution to achieve ultimate application deployment flexibility.
- **Data integration across a multi-cloud environment:** As you expand your computer vision capabilities using multiple cloud-native workloads, Dell Technologies cloud solutions combine VxRail, VMware Cloud Foundation (VCF), and Pivotal into one pre-engineered ready-to-run platform to eliminate silos of operation with service management, governance, security, automation, and orchestration tools. For cloud-based storage, we take a multi-cloud approach via Dell Technologies cloud service providers that leverage VCF and Dell Technologies APEX as-a-Service. This capability enables customers to easily extend their storage from edge to core to cloud. Leverage a data integration tool, such as Boomi, to add additional functionality, governance, and data access across disparate sources. Accelerate cloud-based Kubernetes application development with VMware's Pivotal platform running VMware Tanzu.
- **Secure, resilient IT:** The Dell Technologies Validated Designs solution helps our customers mitigate cybersecurity risks through our open network community. Our industry-leading hardware and partner offerings help address network complexities in an end-to-end safety and security deployment. VMware Carbon Black delivers next-generation secure cloud technology to the transportation industry while software-defined open networking solutions such as Dell PowerSwitch and SD-WAN powered by VMware help optimize your computer vision solution based on an open architecture with fast and secure access to the needed computer vision applications across the safety and security ecosystem.
- **A comprehensive, lab-validation test approach:** To help deliver to your organization a computer vision solution that works from day one, Dell Technologies aligns validation standards with our partners to test hardware and software in extreme, real-world scenarios in order to reduce deployment risk. Our global labs enable our customers to have confidence in our solutions and gain access to the latest capabilities on the market while ensuring optimization of customer-specific applications through access to developer support resources.

ACHIEVE THE NEXT LEVEL OF SMART AIRPORTS WITH DELL TECHNOLOGIES VALIDATED DESIGNS FOR COMPUTER VISION

The digital future of travel has arrived. To be a digital organization powered by data running in a multi-cloud world, transportation organizations must lead with a data-centric approach that extends from edge to core to cloud. Doing so will allow for the adoption of autonomous passenger services, smart facilities and vehicles, intelligent energy usage, and automated safety and security systems.

At Dell Technologies, we understand that you require a fully-integrated edge solution designed to help turn your data into information-driven decisions to drive transportation efficiencies from hub to destination, while improving the passenger experience every step of the way.

Whether starting off small or looking to solve complex problems, the Dell Technologies Validated Designs solution for Computer Vision | Smart Airports offers the scalability, efficiency, simplicity, and agility to help you along your digital transformation journey and realize your future as a digital organization.

Our comprehensive solutions portfolio and computer vision expertise help reduce the risk, cost, and complexity of implementation by leveraging the right mix of technologies to fit your specific use case requirements. In addition, our advisory, design, build, integration, and lab validation services help deliver an edge-to-core-to-cloud computer vision system, helping to streamline deployment with orchestration and automation.

As the aviation landscape continues to evolve in response to industry drivers such as enhanced people experiences, improved passenger safety, and new environmental measures, Dell Technologies is committed to continued innovation with significant investments allocated towards computer vision in R&D. This commitment extends to providing you with an open and scalable infrastructure designed to deliver results from day one and as your business needs change—helping you to transform your organization with data-driven insights that empower and protect your passengers and property, maximize revenues, and drive operational efficiencies, all while moving us closer to a greener, healthier planet.

Learn more
about our computer vision solutions

Contact
one of our computer vision experts.

Connect
with us.

1. https://ourworldindata.org/urbanization
2. https://transportgeography.org/contents/chapter4/transportation-and-environment/
3. https://bit.ly/3gmfoWg

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