



Beyond the platform

How Dell Technologies is leading the industry with an outcomes-based process for computer vision

Organizations from every industry are in a digital race to turn data into business outcomes, faster. Computer vision is playing a more central role in that effort by accelerating time to value with its ability to connect video and other data at the edge with broader centralized networks.

From situational awareness to tracking customer flow in retail to optimizing supply chains, the opportunities to improve outcomes using computer vision are immeasurable. Progress, however, is often impeded by operational and design complexities. How does an organization match the right systems to the right workflows, and subsequently those workflows to achieve the desired outcomes? That's where Dell Technologies comes into play.

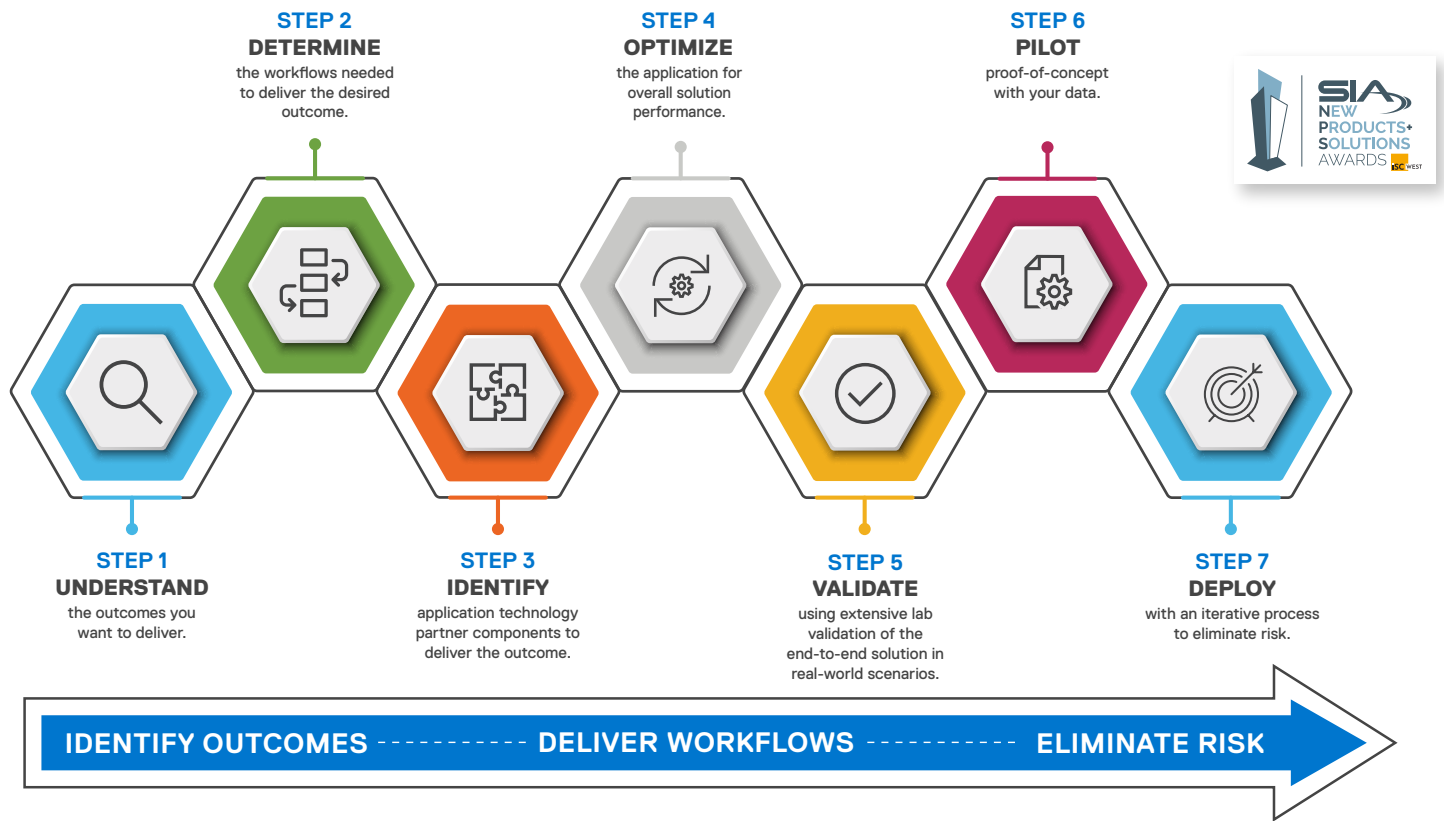
At the forefront of the enabling technology of computer vision, Dell Technologies has combined with key industry stakeholders and an extensive partner network to develop and refine an award-winning process that takes customers from ideation to full-scale implementation, faster and with less risk. This process for computer vision delivers optimized business outcomes for customers.

The global industries team from Dell Technologies includes computer vision subject matter experts in just about every major industry. This team works with customers and partners throughout the process to provide end users with a Validated Design Solution that they can use to deliver real-time business insights.

An outcomes-based process for computer vision delivers better quality insights faster:

- **Increased operational efficiencies:** Leverage all the data you're capturing to deliver high-quality services and improve resource allocation.
- **Optimized safety and security:** Provide a safer, more real-time aware environment
- **Enhanced experience:** Provide a more positive, personalized and engaging experience for both customers and employees.
- **Improved sustainability:** Measure and lower your environmental impact.
- **New revenue opportunities:** Unlock more monetization opportunities from your data with more actionable insights.

Figure 1. An award-winning Validated Design Solution from the world's leading infrastructure provider for Safety and Security.¹



Prioritizing outcomes over platform

Dell Technologies is moving away from the platform discussion. Our focus is on outcomes and bringing in the voice of the customer. We follow a unique validated design solution process (Figure 1) and then take that back out to the customer. Through this process we reduce the risk. We speed up the implementation process and deliver the workflows that the customer needs.

Although our discussions start with understanding the customer's current physical security infrastructure, it evolves into defining their desired outcome(s). After conducting thousands of conversations, our global industries team discovered a universal theme. Regardless of industry, every customer was interested in delivering one (or more) of the following outcomes. These are:

- Increasing operational efficiencies
- Strengthening safety and security
- Enhancing the people experience
- Improving sustainability
- Generating new revenue opportunities.

Each of the five outcome categories entail different workflows depending on the specific industry. The customer may be looking to improve the passenger experience or retail customer experience or fan experience, and they can see how that is impacted. If you work for the airline industry, maybe you were forced to lay off many of your staff during the pandemic, but now travel is returning to pre-pandemic levels. How do you create operational efficiency? There is pressure on every industry to reduce its carbon footprint. As a result, companies are looking at sustainability, not only for internal operations, but also for how they can improve their impact on the environment in dealing with vendors and outside entities. Still further, from a revenue enhancement perspective, this technology can be used to deliver new services or create new opportunities to generate more business.






Operational efficiency is paramount as today's workforce is shrinking, not growing. This process from Dell Technologies enables companies to do more with fewer people while ultimately helping organizations enhance their bottom line.



Better quality insights faster

From a technology standpoint, Dell Technologies delivers the ability to ingest visual data once, and then provide multiple insights for any one of the five outcomes. It's the ingest point for visual data. Ingest once and use that data in as many ways as possible to deliver the desired output faster.

Figure 2. Computer vision example workflows: Delivering greater business value by focusing on the right outcomes.

	 People & Facility Safety	 People Experience	 Operational Efficiencies	 Sustainability	 Enhanced Revenue Streams
Transportation	Abandoned object	Queue monitoring	Fuel optimization	De-icing management	Retail wayfinding
Smart Cities	Intersection safety	Taxi flow management	Traffic pattern analysis	Water management	Parking revenue
Critical Infrastructure	Substation security	Smart metering	Smart grid	Vegetation control	Dynamic pricing
Retail	Loss prevention	Customer 360°	Dynamic inventory	Cold chain management	Shelf location analysis
Healthcare	Access control	Extended patient care	Virtual nursing	Medical waste	Increased procedures
Manufacturing	Worker safety	Connected worker	Predictive maintenance	Energy optimization	Production quality
Sports & Entertainment	Entrance monitoring	Wayfinding	Dynamic staffing	Waste management	Targeted digital signage

Building computer vision workflows

Once the desired outcome(s) are identified, the Dell Technologies Global Industries team works with key customer stakeholders to define the specific workflows that will achieve those outcomes (Figure 2).

Workflows require certain algorithms and functionality. They can be used for simple object detection, such as identifying abandoned objects in an airport terminal, debris on the runway, or link a particular item or bag to a specific person. Or, they can be more complex such as monitoring ramp operations, ensuring the right personnel and equipment is in place to minimize aircraft turnaround time. For retail, the workflow can leverage analytics that show which items customers examine, how much time they spend at the display, if they ultimately purchase the product. More advanced algorithms can be used to plot the most common paths through the store so the highest-margin goods are placed in high-traffic locations, thus maximizing per customer revenue.

After defining the workflows, computer vision experts from Dell Technologies look for best-of-breed software partners that have the capabilities to support these workflows. They are assessed from both a technical and business perspective. Once the right partners are identified, the lab validation process starts.

The importance of lab validation

The validation process from Dell Technologies is one of the most comprehensive in the industry. We start by leveraging our partnerships with technology partners like Intel® and NVIDIA. We maintain mutual labs where these applications are brought in and tested on the various Dell platforms. Not only are the applications tested for basic functionality, but an extensive ecosystem of partners provide developer support to help optimize their code on a Dell

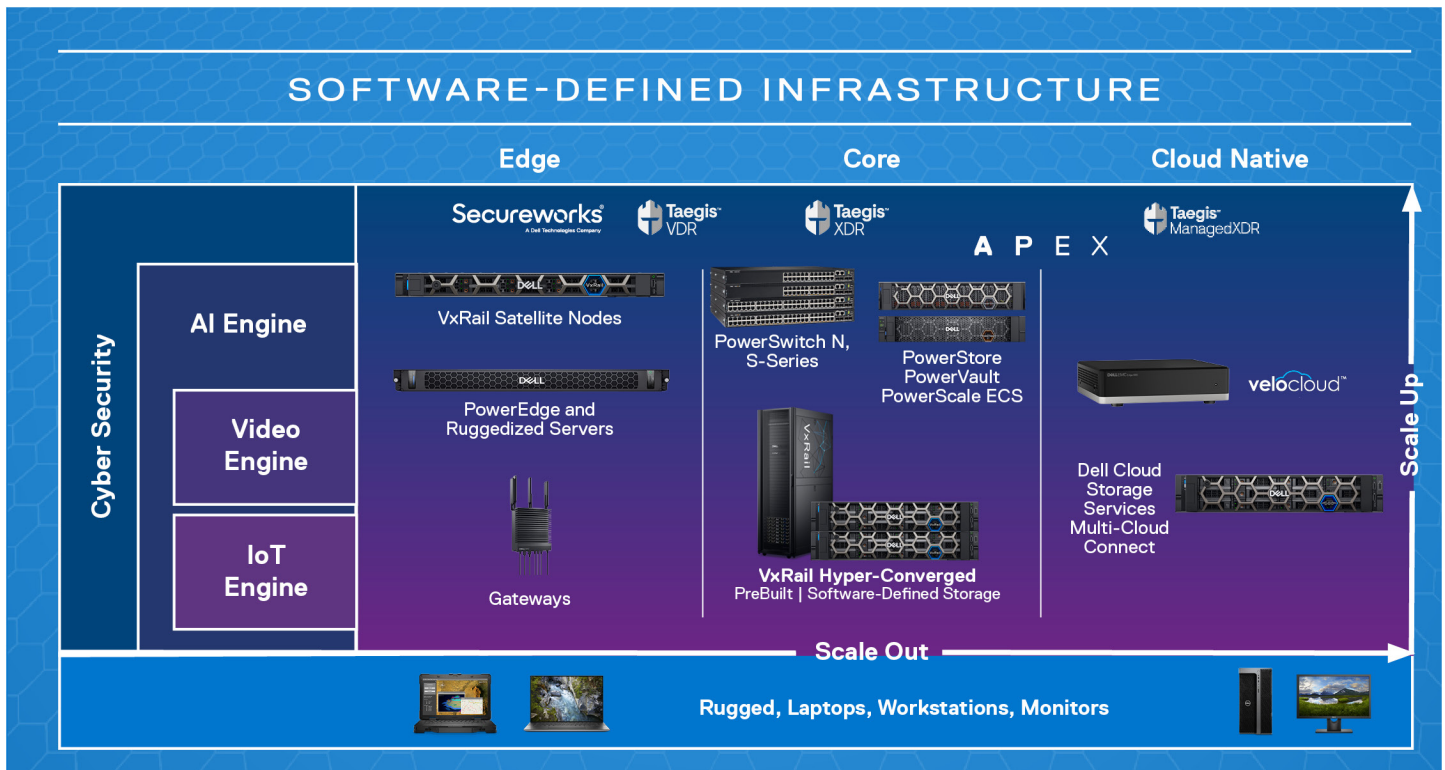
platform—a critically important aspect that helps deliver benefits to our end users and partners. In fact, one Dell analytics partner was recently able to increase their support per GPU per server by ten-fold after completing the lab validation process. As a result, it opened up new market opportunities for the partner while dramatically reducing the cost per channel for their users.

Following application optimization, the video management and analytics applications are tested together, in real-world scenarios that range from tens to thousands of cameras. This is where we look at performance metrics that are critical to the development of its sizing tools, ensuring that when a design is deployed, it works from day one and beyond, and that it can be properly scaled. A ‘test to fail’ approach also ensures that the system has the bandwidth required no matter what the situation. This sequence of testing then drives an implementation guide so that when Dell or one of its OEM or systems integration partners stands the system up, the customer gets the same results obtained in the lab. Ultimately, the customer receives what is needed most—a working infrastructure delivering real-time insights at scale.

From that point, demonstrations are conducted at a Dell Customer Solution Center to provide support for proof-of-concept designs, either virtually or onsite. This allows a company to bring its data into a secure environment and get some time with the various applications, seeing how they’ll behave in their environment, on a variety of Dell hardware. All of this is backed by a team of industry experts who can provide insights about specific use cases that have been implemented across the globe, at facilities large and small.

The output is a Dell Validated Design Solution—a platform including multiple applications that have been tested together. As part of the process, Dell produces a design guide with sizing and configuration information to help the customer, integrator and OEM replicate exactly what was done in the lab. This process is all about eliminating risk inherent with delivering a complex deployment.

Figure 3. A universal platform to deliver business outcomes.



Advantages of a universal platform

Dell Technologies is not just providing an application. Rather, through a universal platform (Figure 3), customers can have diverse applications running simultaneously to achieve multiple, specific, and desired outcomes. Conversely, what typically happens in the industry is fragmented. Vendors often just test an individual application from a single partner leading to what has been referred to as ‘data sheet validation’ (i.e. the process of testing applications individually and making the assumption that they should work together). In the real world, systems don’t behave in this way. By testing things together, Dell ISV partners uncover issues in their application or their coding which in turn helps interoperability.

In the end, what customers are buying is a workflow, not an application. That workflow may be delivered through multiple application partners because some are good at one algorithm, and some are better at another. Some are better at real time, and some are better at a more retrospective type of analysis. Regardless, the computer vision solution must be equipped to deliver a workflow so Dell is testing all the applications that deliver that workflow together to understand how they interact and how they need to be sized and configured to deliver the outcome that the customer can use.

Dell’s process and the resulting workflow help drive down costs. Because customers have tested the solution with their own data, they know it works. The validation process ensures optimal speed with less compute, and the removal of uncertainty of a failed implementation. This eliminates the risk to the customer, ISV, and integration partner, while expediting deployment because everything is pre-validated.

Getting started with Dell Technologies

When it comes to innovation, people often find themselves paralyzed by the ‘art of the possible’. They don’t know where to start because they may be looking at individual use cases. They find themselves asking how it applies to them. At Dell Technologies, we can help address these unknowns. With our outcomes-based process, we can help define the workflows that map to the desired outcomes, test the solution at scale, test it to fail, and build it from an ecosystem of industry-leading partners. Through validation, best practices plus sizing, we can help you accelerate the adoption of innovation.

Learn more

Discover Dell Technologies workload solutions: infohub.delltechnologies.com/t/workload-solutions/

Discover Dell Technologies solutions for computer vision workloads: infohub.delltechnologies.com/t/computer-vision/

Learn More about our solutions for computer vision.

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1. Omdia: “Enterprise & IP Storage Used for Video Surveillance – 2022 Analysis.”