MODERN
MATERIALS HANDLING®

MAKING THE CASE FOR
CLOUD ROBOTICS

THE HALLMARKS OF CLOUD ROBOTICS:
Why They Fit the Times

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F rom manufacturing to distribution, the entire supply chain is looking for answers to mounting pressure, especially given labor shortages, tighter cycle times across channels, and the need to stay competitive on cost. These pressures are causing companies with fulfillment and production operations to look at automating their material handling.

As a result, growth for automation solutions is on the rise, from the more traditional "fixed" automation like conveyors, to newer types of automation including autonomous mobile robots (AMRs). MHI's 2019 Annual Industry Report's survey found that 14% of supply chain participants surveyed are using autonomous vehicles and drones in their operation today, but this is expected to reach 30% within two years.

Such growth projections reflect the industry need for efficient operations in this era of serious labor shortages. As MHI's Industry Report states, automation is being adopted "with a goal of streamlining operations and making them safer, quicker, and more reliable."

There are significant differences among AMR solutions, however many are strictly focused on order picking work, especially for e-commerce fulfillment warehouses. However, some AMRs can easily adapt to support a wide variety of processes, such as long-range materials transfer in warehouses or factories, or replenishing goods held in automated storage systems. But perhaps the biggest difference maker with AMRs is that some solutions run on a Cloud-based platform instead of using on-premises infrastructure, making them quick to rollout and reconfigure.

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Cloud robotics can also be seen as an enabler of flexible automation that is quick to deploy and change, without the need to install a database or server at the user site, and certainly without the need for special guidance infrastructure for robots. In effect, there is no extra information technology (IT) expense, other than adequate WIFI.

Using Cloud-based software, managers or engineers at user sites can create or adjust robotic workflows as execution needs evolve. With the need to automate to address serious labor shortages and unrelenting fulfillment pressures, the Cloud robotics approach fits with the times.

Speed of deployment for mobile robotics, a wide range of workflows that can be created, and an easy ability to change up how robots are used, are all key capabilities Cloud robotics, which Wise sees as enabling on-demand automation.

"On-demand automation is really about providing the ability and flexibility to deploy automation and change automation whenever you want," Wise says. "With traditional automation, it might do one thing effectively, but it's always going to stick to doing that one thing. With on-demand automation and Cloud robotics, you can change solutions easily."

To support a wide variety of workflows and match the range of goods that may need to be moved, AMR vendors should be able to offer a range of robots capable of moving different sized payloads, as well as innovative attachments for the bots. Some vendors, for example, offer robots that can handle pallet sized loads or attachments such as roller tops for interfacing with and inducting goods onto conveyors.

Some mobile robot providers have also come up with robots with integrated radio frequency identification (RFID) sensors on top, allowing the robots to move about a facility to automatically perform functions like cycle counts.

As a note of caution, when considering vendors that have specialized attachments or accessories that mount to a robot, make sure the combination of robot plus attachment/accessory has gone through any required certification for your country or industry (for example, CE and/or FCC certification). Certification of the robot without the accessory does not fulfill certification requirements, especially for robots that are operating in close proximity to workers.

A key benefit with robotic workflows is they allow precious human resources to be devoted to higher value-added work, while having the robots to do tasks like longer range materials transport. With a flexible Cloud robotics solution and innovative robotic options and attachments, user organizations can rapidly configure and adjust many types of workflows that involve materials handling and transport. In short, don't think of AMRs as limited solutions for ecommerce order picking--they can support most any material transport task in an industrial facility.

WHAT IS CLOUD ROBOTICS?
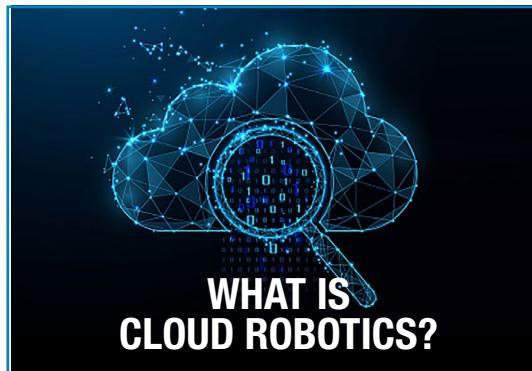
A robot is a physical asset, right, so what exactly is cloud robotics? According to analyst firm IDC, a cloud robotics solution is one in which autonomous mobile robots (AMRs), and indeed the entire solution is managed 100% via cloud technology. As IDC puts it: "cloud robotics utilizes cloud innovation across all elements of an [AMR] deployment, including simulation, design, robot management, workflow creation and operation, integration, analytics, and optimization." A key benefit of the cloud approach, IDC concludes, is the ability to accelerate the time to value for AMR deployments.

AMRs can be deployed very quickly under a standalone deployment model in which the robots are prompted to bring a load of goods from Point A to Point B, using a command on a robot's touchscreen, or via a barcode scan. The robotic workflows can also integrate and coordinate with warehouse management system (WMS) or warehouse control system (WCS) solutions, as well as manufacturing execution systems (MESs).

Cloud software typically has application programming interfaces (APIs) so it can integrate tightly with a WMS, for instance, to support picking or materials transfer tasks, or with a WCS to coordinate materials replenishment with an automated storage and retrieval system (ASRS).

Simple communication hardware modules offered by some Cloud robotics vendors also make it possible to sync the movement of mobile robots with equipment like conveyors and elevators. Through such integration mechanisms, a mobile robot can reliably and autonomously do things like transport goods up an elevator to a mezzanine area, or to arrive at a motorized conveyor and autonomously unload a bin onto the conveyor for further transport.

Robots essentially fulfill tasks, but something needs to tell them what to do and when to do it. It can be a very simple human prompt or trigger like a barcode scan or, with some workflows, integration to a WMS or WCS is recommended. A good Cloud robotics platform is able to handle both scenarios—a simpler stand-alone solution or integrated with other systems.

Configuring and adjusting workflows with Cloud robotics can be done using simple, drag and drop type tools, rather than special programing. Providing a robot has the appropriate hardware accessories/capabilities, the Cloud approach makes it easy to assign bots to different tasks.

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> *— Melonee Wise, CEO, Fetch Robotics*

A set of bots could be used to transport hot orders to a pack out area for one shift, and for the next shift, be assigned to transport replenishment totes to an ASRS. Similarly, it's possible to move robots from one facility to another, which can be useful for regional DCs or plants that have slightly different peak seasons.

A Cloud platform is also a source of business insights that allow managers to track metrics such as travel time and distance per route, robot utilization, and congestion of aisles or lanes in automated areas. For example, managers can see a "heat map" view of how busy the aisles are in automated zones.

In addition, a Cloud robotics solution can offer efficiency information through software for users who want to use robots for order picking support. The software not only seeks to reduce walking or "travel" for human pickers in the automated zone, but also ensures that robot utilization is kept high, while reducing congestion in aisles.

Some AMR solutions end up with under-utilized robots in the effort to maximize worker efficiency, but the goal of Cloud robotics is to optimize both types of resources: the robots and the workers. With Cloud robotics, the software finds a balance in which the robots meet up with the human pickers at the right place at the right time so that workers aren't travelling or waiting, robot utilization is high, and congestion is avoided.

The ability of a Cloud robotics platform to easily configure robots for new tasks or switch between tasks allows an operation to do more with less, while keeping up with the spikes in fulfillment work that come with peak seasons. Importantly, mobile robotics governed by a Cloud platform don't need to be a one-trick pony for ecommerce DCs—the platform allows for a wide variety of workflows that free up labor and speed up materials movement.