The autonomous digital enterprise includes five fundamentals:

1. **A transcendent customer experience** fosters real connections through technology that feel human while giving both customers and employees what they need.

2. Customer-facing operations benefit from **automation everywhere**, which, combined with strategic and complementary customer-service personnel, results in lower costs, reduced errors, and faster execution.

3. By optimizing the rapid and continuous delivery of applications and services through **enterprise DevOps**, organizations build a frictionless development environment that can respond to the business with agility.

4. **A data-driven business** captures more data from multiple sources, and derives value from all those data assets through AI and analytics.

5. Threat detection and response must be automated across organizational infrastructure to ensure **adaptive cybersecurity**, while inherently meeting regulatory requirements.

Ultimately, all these areas must come together and work in tandem. However, this requires a journey.

To get started on that path, organizations should address three fundamentals — automation, DevOps, and the data-driven business — by simplifying application workflow orchestration. Taken together, they speed the ability to become an autonomous digital enterprise.

**Automation Everywhere: Providing Agility**

Complexity has grown throughout IT organizations, from the way applications and business services are delivered to the numbers of IT teams that must support them. The adoption of cloud and emerging technologies, while digitizing business processes, also has created new complications across the application, data, and infrastructure stack.

All this complexity calls for workflow automation to power critical business processes to deliver business services on time, every time, while ensuring governance and compliance requirements. However, with disparate applications, data sources, and infrastructure, as well as automation siloes, it’s a challenge to achieve end-to-end automation from a single point of control — especially when business services are delivered across multiple geographies and time zones.

To become truly agile and autonomous, enterprises must tackle this complexity in a way that allows for continued evolution of applications, workloads, and infrastructure.

**What It Means to Be an Autonomous Digital Enterprise**

This means a growth-oriented, value-driven organization with intelligent, interconnected systems, and an ecosystem of partners. It delivers value with competitive differentiation to provide agility, customer centricity, and actionable insights. Individuals are freed from mundane tasks to take on more strategic, higher-value responsibilities.
According to the CIO Tech Poll, most companies (70%) have workflow/business process automation initiatives in place. Yet, they’re typically not tied together or orchestrated across the enterprise. This must be resolved to unlock business value.

Enterprises must ensure business application workflows can span across and connect to all infrastructure, data, and application platforms — today and tomorrow. The goal is to move with agility, like a born-in-the-cloud company, even as new technologies are incorporated into this ecosystem.

Becoming truly autonomous also means addressing the agility needs of multiple users across the enterprise, while maintaining compliance, governance, and security. The ability for orchestration platforms to strike this balance, ensuring core operating principles can be “built-in” as applications, data, and infrastructure are developed and managed, is a requirement to deliver the speed and market responsiveness with stability and scalability in production.

The key to satisfying these requirements is: automation everywhere. Automation platforms must be capable of serving as an abstraction layer that provides a single end-to-end view across all technology platforms. This layer integrates, automates, and orchestrates application and data workflows to deliver digital services on time, every time, for true business agility.

The characteristics of an enterprise that has adopted automation everywhere include:

- **Hyperautomation**: Machines automate business processes by automatically following a set of procedures and minimizing human involvement
- **Operations automation**: Starts with full-stack, automated infrastructure monitoring, which extends to auto-remediation and self-healing capabilities
- **Enterprise service management**: Evolves traditional IT service management to deliver services via a structured system with an automated process framework
- **Artificial intelligence**: Incorporates AI-enabled process automation with AI Operations (AIOps) to automate IT operations at speed

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**Control-M: Simplifying Workflow Orchestration**

Control-M accelerates application development and deployment by delivering automation everywhere.

It is the ultimate abstraction layer — integrating, automating, and orchestrating application and data workflows to deliver digital services on time, every time, for bottom-line business outcomes:

- **Deliver** data-driven, actionable insights faster
- **Extend** Dev and Ops collaboration
- **Simplify** workflows across hybrid and multi-cloud environments
- **Achieve** self-service functionality with orchestrated workflows

Get more information at [bmc.com/control-m](http://bmc.com/control-m)

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**Enterprise DevOps: Establishing Customer Centricity**

The autonomous digital enterprise meets customer expectations for personalized, fast interactions. This requires an agile application lifecycle that constantly adapts to feedback and demands. This is enterprise DevOps, a foundational element of the autonomous digital enterprise, which involves increasing use of automation, as well as greater collaboration between development and IT operations teams.

However, implementing DevOps is challenging. It’s not just a technology implementation; it’s a process methodology that requires entire cultural and philosophical shifts — which can be fraught with friction.

Large enterprises have focused on reducing this friction in the areas of code integration, infrastructure automation, and release activities. Now, they are applying DevOps practices to streamline production activities such as workflow orchestration, which often is subject to bottlenecks because of traditional methods of Dev and Ops collaboration.
For example, developers build and test their code and, when ready, typically open a ticket and push it to operations. Ops then reviews the request, determines whether it is complete and ready to implement into production, builds site standards, and determines automation parameters so the application will run as the developers intended. Yet, even in the most well-organized DevOps teams, there typically are change requests that require back and forth between Ops and developers before the application can be deployed. So, despite having many automation tools helping to make the software development lifecycle more agile, the final-step process of moving new applications or changes into production gets slowed down — and the business and its customers must wait.

With enterprise DevOps, developers add production orchestration “as code” early in the software-development lifecycle. They then can send the fully instrumented application through the DevOps automation toolchain, so production workflows can be tested collaboratively by Dev and Ops prior to deployment.

Although many CI/CD tool chains are highly automated, enterprise DevOps makes the deployment more fluid. This means organizations have an automatic, constant loop: Customer feedback instantly flows to lines of business and product leaders, who generate new products or enhancements. These innovations enter the DevOps process, which is orchestrated for maximum speed for production.

The characteristics of an enterprise that has adopted enterprise DevOps include:

- **End-to-end workflow connectivity** for any application, any data source, and all critical systems of record, from mainframe to cloud
- **Improved service-level agreement management** with intelligent predictive analytics
- **Automated auditing** for compliance and governance
- **Proven stability** with proactive event-driven workflows

**A Data-Driven Business: Delivering Actionable Insights**

Data is the lifeblood of business. It is the core of every application — internal and customer facing. It touches every aspect of operations, and empowers business growth. Yet, data volumes are growing at exponential rates worldwide, and are expected to reach 175 zettabytes by 2025, according to **Statista**. This expansion will exacerbate the challenges enterprises currently face with ingesting, storing, and processing data, considering its multiple sources and formats.

Most big data workflows are immensely complex, even before they get to analytics systems. Too often, data scientists and administrators waste time with siloed automation approaches, wrangling data and data pipelines rather than maximizing data models and analytics to drive better, faster decisions.

These obstacles must be overcome for data to be turned into actionable insights that deliver true business value, including improved customer experiences and business workflows.

The autonomous digital enterprise simplifies complex data pipelines with an enterprise-capable application workflow orchestration platform. This delivers data-driven insights faster and at scale. Automation runs throughout, from data ingestion across multiple sources to storage and processing.

The characteristics of an enterprise that is a data-driven business include:

- **Captures exponentially more data** from many sources: Internet of Things, social media, customer engagement systems, as well as traditional back-end and middle-office applications
- **Treats data like any other business asset** and seeks opportunities to monetize its data
- **Utilizes AI and analytics** to extract value from data assets, leveraging the right technologies for the business case under consideration
Control-M: The Ultimate Driver for the Autonomous Digital Enterprise

All these fundamentals — automation everywhere, enterprise DevOps, and the data-driven business — work interdependently. They come together in Control-M to drive forward the autonomous digital enterprise.

The Autonomous Digital Enterprise

Control-M is an application orchestration and automation platform that does the following:

- **Abstracts and simplifies** the complexity of delivering digital services and business outcomes by automating workflows across diverse application, data, and infrastructure domains
- **Provides foundational DevOps automation** and orchestration. Control-M eliminates the manual dev-to-ops deployment to production hand-off that is a recurring CI/CD toolchain bottleneck

- **Delivers data-driven business outcomes** faster. From data ingestion to processing and analytics, Control-M automates and orchestrates data pipeline workflows across on-premises, hybrid, and multi-cloud in a scalable way
- **Unlocks automation** everywhere

Navistar International demonstrates why these fundamentals work in tandem.

**Navistar Achieves Improved Business Outcomes with Control-M**

Navistar, founded in 1902, manufactures heavy, over-the-road trucks, engines, and school buses. Its customer base includes fleet owners and more than 1,000 vehicle dealers, located worldwide.

“We’re a legacy company, and we’re trying to become a data-driven organization — both in the business and in IT,” said Todd Klessner, Senior Data Operations Specialist at Navistar.

The company’s evolution started several years ago, when Navistar developed and launched its OnCommand Connection system. It’s a digital business offering to improve vehicle-service information for Navistar’s fleet customers.

OnCommand starts with Internet-of-Things data generated on a daily basis by up to 100 different sensors in each Navistar vehicle. That data is fed into a public cloud, then ingested into an on-premises data lake. There, the sensor data is combined with structured data, such as parts and warranty information from databases and ERP systems (see Figure 1 for an example workflow).

“All that data is married up with parts inventory, driver behavior metrics, parts information relative to cost, and supplier information — up to 20 million records daily – all compiled into an analytics platform,” Klessner said.

Using machine learning models and data-visualization tools, OnCommand predicts and notifies drivers of potential vehicle failures. The system automatically will schedule service and direct the driver to a service center that has the right parts, as well as service bay and technician availability.
The results: Using Control-M’s workflow automation and orchestration platform, Navistar’s OnCommand system has reduced unplanned repairs for its fleet customers and downtime, while maximizing each vehicle’s earning potential.

**Navistar and Control-M Drive Business Outcomes**

- **40% reduction in vehicle downtime**
- **80% reduction in unplanned repairs**
- **5x faster delivery of actionable data**
- **20% improved time savings for Hadoop engineers**

Navistar is well on its way to becoming an autonomous digital enterprise due to the following:

- **Automation everywhere:** Control-M automates and orchestrates the complex web of applications, data sources, and infrastructure of Navistar’s OnCommand system.

**Enterprise DevOps:** Navistar’s Hadoop team uses Control-M to set up and schedule data streams. Application developers now define and create their own jobs in a non-production environment based on data ingested into Hadoop, before migrating them to production.

**Data-driven business:** Data collected now is used to monitor every critical performance metric of each vehicle, including driver performance, fuel economy, geographic location, idle time, and potential parts or systems failures.

**Start Reinventing Now**

It takes effort to master the fundamentals of the autonomous digital enterprise. Yet, as the Navistar example demonstrates, by leveraging existing investments in concert with Control-M, companies can run and reinvent at the same time.

However, it’s critical to start now. Infrastructure will become more complex as companies push into multi-cloud environments and grapple with expanding volumes of data, applications, and workloads.

According to an article in VentureBeat, “By 2025, every successful company will be a tech company. Now is the time to start reinventing, embracing a next-gen business model in order to meet that deadline.”

Control-M cohesively brings together workflow automation and orchestration to drive the autonomous digital enterprise — delivering agility and business value for whatever lies ahead.

**Learn more about the autonomous digital enterprise by visiting:** [bmc.com/ade](http://bmc.com/ade)
Predictive maintenance, which analyzes sensor data to predict equipment failures, has emerged as one of the most common business use cases of machine learning (ML) and the Internet of Things (IoT).

To build and train ML models, you need data science expertise. If you’re going to run those ML models in production at scale, you need data engineering expertise to build a pipeline for data ingestion, storage, processing, and analytics.

Amazon Web Service (AWS) offers a diverse collection of services for data scientists and data engineers. If, for instance, you need a Hadoop cluster or data warehouse, you can deploy it in a few hours using AWS services.

However, coordinating and monitoring the actions across the data pipeline in a way that consistently delivers results in the expected timeframe remains a complex task. You need a way to orchestrate the steps in the pipeline and manage the dependencies between them.

Control-M, a workflow orchestration solution by BMC Software, Inc., simplifies complex application, data, and file transfer workflows, whether on-premises, on the AWS Cloud, or across a hybrid cloud model. BMC is an AWS Partner Network (APN) Advanced Technology Partner with AWS Competencies in DevOps and Migration.

In this post, we will walk through the architecture of a predictive maintenance system that we developed to simplify the complex orchestration steps in a ML pipeline used to reduce downtime and costs for a trucking company.

Five Orchestration Challenges

Five challenges stand out in simplifying the orchestration of a machine learning data pipeline.

**CHALLENGE 1**
The first challenge is understanding the intended workflow through the pipeline, including any dependencies and required decision tree branching. For example, if data ingestion succeeds, then proceed down path A; otherwise, proceed with path B. And so on.

**CHALLENGE 2**
Multiple teams may be involved in creating the flow. They all must have a way of defining their specific aspect of the workflow from a standard interface, and then have the ability to merge their respective workflows that will make up the pipeline.

To read the rest, [click here](#).
Unum Group, a longtime Control-M customer, acquired Starmount Life Insurance Company in 2016, adding dental and vision plans to Unum’s employee benefit portfolio. Following the acquisition, Zach Warren, an experienced leader in automation projects, was part of a team who assessed Control-M automation opportunities for Unum’s new dental and vision operation. He shares that experience in this blog. To learn about Zach’s previous successes at Unum, check out this blog and video.

I have seen firsthand how Control-M can improve IT operations by automating many IT processes and supporting DevOps data initiatives. However, these recent projects provide excellent examples of how Control-M can have positive and immediate impacts to the overall business – far beyond IT.

Through the acquisition of Starmount, Unum business leaders saw an opportunity to expand market share and further business objectives by adding dental and vision benefits to Unum’s growing product portfolio. After Unum acquired the dental and vision carrier, the IT team saw an opportunity to apply automation that would help scale the new business and position the operations for highly anticipated growth.

There is a strong correlation between how our IT systems run and how we provide dental and vision benefits to our customers, as well as how responsive we are to our dental and vision care providers. From processing claims to paying our provider partners, our IT systems are a central part of our day-to-day operations and customer satisfaction.

Here are three examples of how we used Control-M to improve our operations and business:

**Streamline automation and IT processes**

Without a strong automation solution, batch cycles can be quite demanding on IT teams by requiring a tremendous amount of manual effort to support and maintain. Additionally, these manual tasks are time-consuming and can regularly impact the availability of business applications. Automation can eliminate the need for unnecessary manual attention while increasing efficiencies for a solid batch cycle environment. More importantly, automation of the batch cycle can transform a daily headache into a highly streamlined and efficient workflow.

That was certainly the case after implementing Control-M into our dental and vision operations. However, we took the Control-M solution far beyond batch processing to even improve other business applications. One of those applications is at the center of our business – claims adjudication.
The process of reviewing, approving and paying a dental claim involves multiple business users, databases and other systems. Therefore, claims processing can be time consuming without the right systems. With Control-M for Databases, we created various scripting and reporting techniques to automate workflows, enhancing our claims adjudication capabilities. Automatic claims adjudication increased significantly and reduced the workload for both the IT team and the Claims Department. In addition, the automation updates and the associated operation improvements positioned the company to better handle an increase in claims volume associated with expected future growth.

**Create more efficient data management systems**

We’re getting similar operational and business benefits for our monthly and other periodic processes. For example, every month we receive a historical file from our vendor that contains updated contact information, statuses (active or not, accepting new patients or not, etc.), and other details from our provider networks. To keep our systems up to date, we need to import the file each month in a timely manner. After reviewing the end-to-end process, we recognized that Control-M could improve the flow of multiple data transfers and create a more efficient data management system.

Control-M has bridged all data transfers for a completely automated process into our internal systems and eliminated almost all need for manual attention. Our data management system for provider information now runs more efficiently and 95% percent faster.

**Improve overall business operations**

We are also expanding our use of Control-M’s self-service capabilities to allow the business to get more out of our systems and data. Non-IT users can run complex and dynamic reports through a simplistic web interface. The business no longer needs to submit such requests to the IT team and wait for the team to execute the request. It’s an IT solution that has improved overall business operations by empowering the business to access data quicker and reducing IT requests by at least 200 to 250 per month. That’s taken a huge burden off our IT staff. Considering the average cost to process such a request, the cost savings and productivity improvements add up to tens of thousands of dollars each month. Plus, we’ve been able to scale our operations and position them to grow significantly more without corresponding growth in our IT staff.

To read the rest, [click here](#)
CUSTOMER STORIES / NAVISTAR

Leading commercial truck manufacturer harnesses big data to improve efficiency and uptime

With Control-M for Big Data, Navistar manages big data job streams with the same solution that supports its other critical business processes.

Business Challenge

Navistar, a leading manufacturer of commercial trucks, buses, defense vehicles, and engines, uses big data to generate new, value-added services that empower truck drivers and improve vehicle uptime. This starts with its OnCommand™ Connection remote diagnostics system, which captures data from over a dozen telematics providers to create 20 million data records per day. To aggregate, normalize, move, and process this data, big data teams were spending significant time and resources moving data and running scripts manually. They needed a faster, more efficient way to get that job done.

BMC Solution

Control-M for Big Data automates and manages complex workflows and large-scale data moves by speeding the consolidation of data from internal and external sources and moving it into Hadoop for analysis.

Business Impact

Control-M manages Navistar’s day-to-day business operations, performing tasks such as database updates, data extractions, updates to price and parts masters, integration with distribution center and warehouse management systems, and financial reporting. With Control-M for Hadoop, the staff now manages job streams for big data projects using the same solution that supports its other critical business processes.

Previously, two engineers worked full time collecting and transforming OnCommand data. Now the task is done automatically and immediately.

To read the rest and watch the video, click here

CUSTOMER STORIES / CARFAX

CARFAX — Driving Digital Transformation with DevOps

CARFAX started in 1984 and is the leading source of vehicle history information of used cars in North America. They leverage data from 100,000+ sources, including U.S. and Canadian motor vehicle agencies, auto auctions, collision repair facilities, fleet management and rental agencies, and more, to help customers buy, sell, service and maintain their vehicles. They have information for cars dating back to 1981.

To watch the video, click here