Application Workflow Orchestration: An Introduction
What is application workflow orchestration?

If you look up the definition of a workflow, you’ll probably find a complicated, generic explanation. The same applies to orchestration. That’s because of the number of wildly different industries in which these terms are used. When it comes to IT, both workflow and orchestration (individually and as a phrase) are used in disciplines such as cloud/infrastructure management, service management, and application management.

In this eBook, we’ll focus on the use of application workflow orchestration to run stateful business applications in production. We’ll explore:

+ Application workflow orchestration in the real world
+ How it’s unique and differs from other disciplines
+ Best practices for implementing application workflow orchestration

Note: People often discuss the differences between orchestration and automation. In this eBook the terms are used interchangeably.

Application workflow orchestration defined:

Business **applications** are at the heart of digital transformation, so our definition starts there.

*Workflow*, as we use it here, implies a series of steps that make up a business service delivered by applications.

*Orchestration* means automated coordination and management.

*Application workflow orchestration* makes sure the steps of a data or application workflow are carried out in the correct sequence and at the correct time (i.e. at a specific hour/day, or for a specific event) to ensure the successful delivery of a business service.
Application workflow orchestration in the real world

Sure, definitions help. But, what does application workflow orchestration actually look like in practice? Let’s look at how Navistar uses Control-M, BMC’s application workflow orchestration platform, to manage its connected vehicle application. One of their goals was to reduce vehicle downtime by collecting and monitoring the telematics data collected from IoT sensors on the vehicle.

Extensive data is generated about every aspect of vehicle operation. That data is ingested and analyzed by machine learning algorithms to predict potential failures. If a problem is anticipated, the application correlates vehicle location to service depots with parts availability, directing drivers to complete the preventative repair in route versus a roadside repair.

The workflow includes these actions:

- Watch for telematics data arriving from a third-party provider
- Move the data on a regular basis from its cloud-based landing location to a Hadoop cluster
- Enrich the sensor data with vehicle history, fleet ownership, and warranty data by pulling those data sets from internal systems of record
- Run the analytics
- Select a service depot based on the vehicle location and parts availability
- Order a part if none are available and replenish inventory if this repair reduces the on-hand amount below a threshold
- Book a service appointment
- Notify the driver and other interested parties

Navistar created actionable data 5x faster and reduced vehicle downtime ~40% with predictive maintenance driven by application workflow orchestration.

Read the full story here.
Control-M is moving data and invoking application components to accomplish the desired business outcome. It is responsible for:

- Invoking the right process at the right time
- Ensuring that one process completes successfully before the next one starts
- Providing visualization and management of the workflow

Additional requirements are less obvious but just as critical. Control-M monitors the flow, and if errors occur, it sends notifications to interested parties. It examines the details of each workflow step to determine what is being done and what the result was, displays any messages that the processes may have generated, monitors status and progress and displays that information, and provides logging and tracking for auditing and governance purposes.

Last but certainly not least, Control-M provides a way to assign business priorities to these tasks as well as some completion or service level rules to ensure the workflow operates within a previously agreed upon quality of service definition.
Getting Started

Now that you’ve seen application workflow orchestration in practice (and some of the business benefits it can deliver), you might be wondering what you need to consider when implementing it in your organization. We’ve got you covered. This section includes a rundown of some best practices to keep in mind.

Some of the current use cases in which application workflow orchestration plays a significant role include:

- Orchestrating data pipelines
- Training Machine Learning (ML) models
- Detecting anomalies in Anti-Money Laundering (AML) flows
- Applying preventive maintenance analytics to maximize oil well production

Generally, IT focuses on the code being run by application workflow orchestration tools but rarely allocates the same level of attention to the design and maintenance of the workflows themselves. Since workflows are code, whether written in JSON, XML, Python, Perl or Bash, they should be treated like code.
**Best Practices**

**Use an “as-code” approach** – whether the workflows are authored via graphical interface or written directly in code, version control is mandatory. To enable modern deployment pipelines, it should be possible to store and manage workflows in some text or code-like format.

**Make the work visible** – process relationships should always be visible. One scenario where such visualization is particularly valuable is when everything appears perfectly normal, but nothing is running. Having a clear line of sight between a watcher or sensor that is waiting for an event and the downstream process that wasn’t triggered because the event did not occur is extremely valuable.

**Manage from a business perspective** – make sure to codify all SLAs.

**Keep track** – inquiring minds want to know everything. Who built the workflow, who ran it, if it was killed or paused, and who changed the status and why? Did the workflow run successfully, or did it fail? If it failed, when and why? How and when was the workflow fixed? There may be many more questions that could be answered for any given workflow. The recommendation is to track as much as possible.

**Prepare for the worst** – Expect problems to happen. Make sure to collect the data needed to fix them and maintain the record for a set period of time reasonable for your industry or organization.
Implementing application workflow orchestration at your company is a journey. Make sure you select a platform robust enough to meet your business requirements at scale, and one that can help you apply these and other best practices for building, defining, scheduling, managing, and monitoring production workflows to meet or exceed pre-defined SLAs.

One final tip

Implementing application workflow orchestration at your company is a journey. Make sure you select a platform robust enough to meet your business requirements at scale, and one that can help you apply these and other best practices for building, defining, scheduling, managing, and monitoring production workflows to meet or exceed pre-defined SLAs.

Ready to begin your journey?

Check out more best practices here, and visit bmc.com/control-m to see how companies around the world are using application workflow orchestration to deliver better customer experiences.
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