Financial Institutions Leverage Workload Automation in the Cloud

Summary

Customer: Primatics Financial
Industry: Risk Management
Location: Washington, DC
Employees: ~100

Business Problem

- Analyzing large financial data sets is resource intensive.
- Managing Linux shell scripts across multiple servers is difficult.
- Errors are typical occurrences in cloud environments.

Solution

- Flux manages workflows across multiple distributed servers.
- Errors are handled automatically by customized workflows in Flux.

Primatics Financial is a market leading provider of enterprise-grade software solutions and advisory services that address the complex regulatory, compliance, and fair value needs of financial institutions. Primatics Financial's flagship product, Evolv, is a packaged software product that financial institutions can purchase and deploy in a private or public cloud. Evolv is used by some of the largest financial institutions to provide analysis for over $200 billion in assets.

Cloud Computing: A Necessity

The Evolv application processes large amounts of data in order to deliver financial reports to users. Analyzing large data sets is resource intensive and often requires several computers working together to deliver timely reports. Evolv users need quick access to financial reports, even as data sets grow in size. This increases the burden on the systems, which in turn creates problems for the IT staff as it tries to maintain throughput. In 2008, Primatics Financial started leveraging cloud computing by supporting both private clouds, which are built with VMWare virtualization technologies, and Amazon EC2. These cloud computing platforms allow servers to be provisioned as user load is forecasted to increase and decommissioned when load is expected to decrease.

Expect Failures in the Cloud

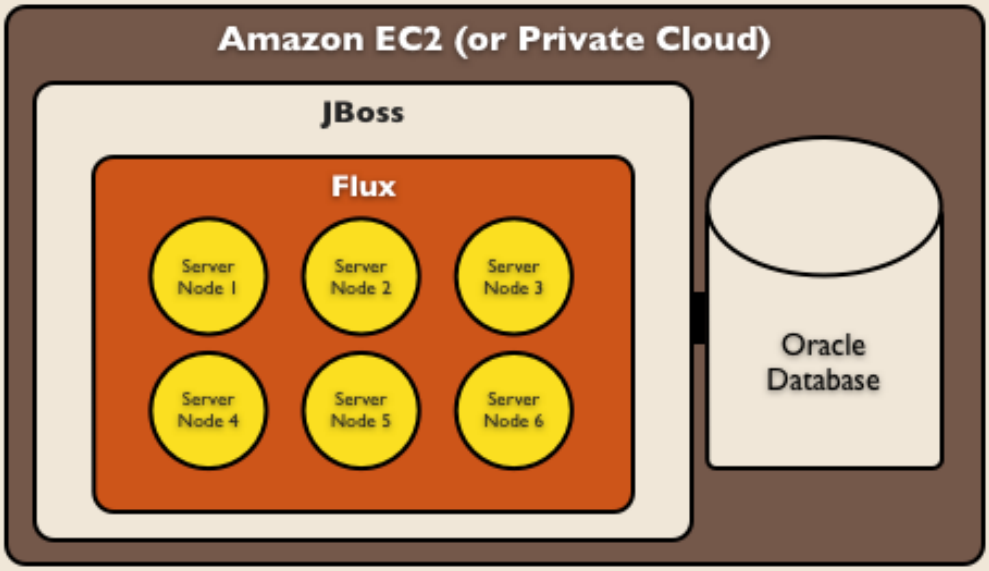
Enterprise applications depend on servers to be healthy so the application can function as expected. Disk drives can become full, networks go down, modifications break systems, etc. Failures are a common occurrence when using cloud platforms.

> "We had to expect failures to occur when you're working with virtualization and dynamic provisioning."
>
> **Umar Syyid, CTO, Primatics Financial**

Like many enterprises, Primatics Financial utilizes Unix shell scripts, SSH (Secure Shell), and SCP (Secure Copy) to execute processes across servers in the cluster. Sometimes servers are not accessible and the work which was scheduled to be performed must be moved to a healthy server that is not busy.

Enterprise-grade Architecture

Managing the expected cloud computing failures is difficult using scripts. System administrators do not have visibility into the application to allow problems to be handled quickly when processes are executed via shell scripts, SSH, and SCP.



Primatics Financial sought to create an enterprise-grade architecture for the Evolv application. Managing the workload of shell scripts and file transfers was identified as a core component when supporting dynamic and fragile cloud computing environments.

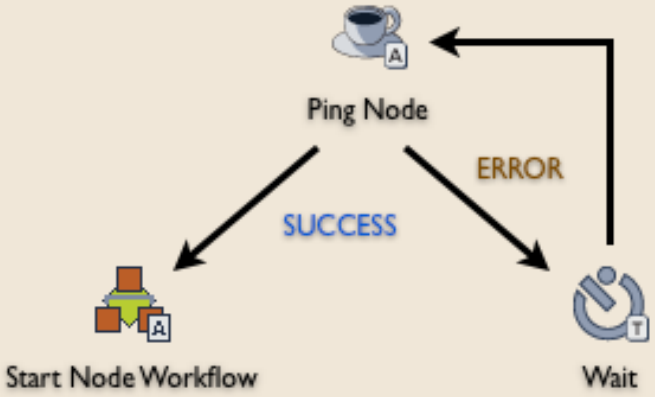
Evolv is packaged as an enterprise application in WARs (Web Application Archives) and deployed to JBoss containers. Primatics Financial embeds Flux inside the Evolv application, which allows the lifecycle of Flux to be tied to the lifecycle of the Evolv application, starting and stopping with Evolv.

Flux Workload Automation Solves Cloud Computing Problems

Organizations have been burdened with the overhead in maintaining Unix shell scripts in a distributed enterprise application. Modifying existing scripts or adding new functionality to the system must be done by someone with in-depth knowledge of the scripts. Engineers rely on comments embedded inside scripts to determine how to maintain the

> “As products like Flux continue to mature, I see them becoming the backbone of hybrid clouds.”
>
> **Jonathan Lampe, President, File Transfer Consulting**

system. This creates a fragile environment that is difficult to change and test. Visibility of processes is only accessible by system administrators who connect to servers and execute system commands to determine which scripts are running and their status. Did a process complete successfully? Does a process need to be re-executed manually? Should an email or SMS notification be sent? These questions are difficult to answer in a distributed scripted environment where all the details of processes are hidden deep inside scripts.



Primatics Financial leveraged Flux by migrating problematic portions of the Evolv Unix shell scripts, which handled assigning work to server nodes and ensuring the work completed successfully, to visual workflow models. This allowed engineers to visualize how the process worked without trudging through shell scripts. Primatics Financial can now easily see fragile process details that were previously embedded in Unix shell scripts.

> “ Flux has been flexible enough to help us in building a computation framework that can tolerate and recover from failures. ”
>
> **Umar Syyid, CTO, Primatics Financial**

Flux made the processes transparent by exposing fine-grained execution details about the workflows distributed across servers. Flux records the start time, running time, and end time of each workflow and step. This allows Primatics Financial to view reports showing resource utilization bottlenecks, what server each step of a workflow executed on, the data available to the workflow, and the completion status of workflows.

Primatics Financial used newly introduced features in Flux to allow for automatic handling of process failures. Custom events were created to capture high level process details and allow for customized error handling.

With Flux Workload Automation, Primatics Financial was able to reduce the Mean Time to Recovery (MTTR) when responding to process failures. The central web-based Flux Operations Console allowed Primatics Financial to see all processes and their current status in

a single view. Logs and workflow history are now easily accessible to assist in locating and correcting system failures quickly.

Workflows in Evolv are systematically event-driven. When data processing fails on a node, the workflow moves the data and restarts the data processing tasks. Flux provides out-of-the-box customizable event capabilities to allow workflows to respond to events such as data processing failures, node communication failures, and application failures.

Everything would be fully automated, in a perfect world. However, sometimes manual intervention is necessary due to unforeseen circumstances. Workflow events can be manually triggered to drive Flux workflows. Workflows in Evolv are designed to allow manual intervention by responding to events, which are typically generated by other workflows but are sometimes created manually, when necessary. Besides ad-hoc events, workflows can also be paused, resumed, restarted, and expedited from the web-based Flux Operations Console.

Flux Benefits

- Recover from cloud computing failures automatically.
- Visualize complex distributed processes.
- Transfer files securely between systems.
- Administer, monitor, and maintain workflows using a web browser.

Summary

Leveraging Flux workload automation allowed Primatics Financial to provide an enterprise-grade application for its customers for both on-premise and off-premise cloud computing platforms. Flux is the driving force behind the Evolv application, automating workflows in the cloud to allow automatic error recoveries for expected cloud computing integration problems.

For more information about the Evolv financial risk analysis solution, visit Primatics Financial at primaticsfinancial.com.

To learn more about how Flux Workload Automation can solve your cloud computing problems, visit flux.ly.