CHAPTER 2

第二章

Adopting DevOps in Financial Systems

在金融系统中采用DevOps

Enough of the challenges. Let’s look at the drivers for adopting DevOps in financial systems, and how it can be done effectively.

挑战已经足够多了，让我们看看在金融系统中采用DevOps的驱动因素，以及如何有效地实现它。

Entering the Cloud

进入云端

One of the major drivers for DevOps in financial enterprises is the adoption of cloud services. Online financial institutions like exchanges or clearinghouses are essentially cloud services providers to the rest of the market. And most order and execution management system vendors are, or are becoming, SaaS providers to trading firms. So it makes sense for them to adopt some of the same ideas and design approaches as cloud providers: Infrastructure as Code; virtualization; rapid, automated system provisioning and deployment.

金融企业中采用DevOps的主要驱动因素之一是云服务的采用。像交易所或票据交换所这样的在线金融机构基本上是通过云服务提供商的方式向市场提供服务。大多数订单和执行管理系统供应商现在或正在成为贸易公司的SaaS供应商。因此，他们采用与云提供商相同的一些想法和设计方法是有意义的：基础设施即代码；虚拟化；快速、自动化的系统供应和部署。

The financial services industry is spending billions of dollars on building private internal clouds and using public cloud SaaS and PaaS (or private/public hybrid) solutions. This trend started in general-purpose backend systems, with HR, CRM, and office services using popular SaaS platforms and services like Microsoft’s Office 360 or Azure. Then it extended to development and testing,

providing on-demand platforms for Agile teams.

金融服务业正在花费数十亿美元建造私有内部云，并使用公共云SaaS和PaaS（或私有/公共混合）解决方案。这一趋势始于通用后端系统，包括使用流行的SaaS平台和服务（如Microsoft的Office 360或Azure）的HR、CRM和Office服务。然后，它扩展到开发和测试， 为敏捷团队提供随需应变的平台。

Now more financial services providers are taking advantage of public cloud platforms and tools like Hadoop for data intelligence and analytics, using cloud storage services for data archival. NASDAQ, for example, uses Amazon’s Redshift platform to run a massive data warehouse for data analytics and surveillance applications, adding several billion records per day.

现在，越来越多的金融服务提供商正在利用公共云平台和诸如Hadoop等工具进行数据智能和分析，并将云存储服务用于数据存档。例如，纳斯达克（Nasdaq）利用亚马逊的Redshift平台运行一个庞大的数据仓库，用于数据分析和监控应用，每天新增数十亿条记录。

Today, even regulators are in the cloud. The UK’s Financial Conduct Authority (FCA) is operating its new regulatory reporting systems on Amazon AWS, and FINRA’s new surveillance platform also runs on Amazon AWS.1 The SEC has moved its SEC.gov website and Edgar company filing system, as well as its MIDAS data analytics platform, to a private/public cloud to save operations and maintenance costs, improve availability, and handle surges in demand (such as the one that happened during Facebook’s IPO).2

如今，甚至连监管者也在云端。英国金融行为管理局（FCA）正在亚马逊AWS上运行其新的监管报告系统，Finra的新监控平台也在亚马逊AWS上运行。SEC已将其sec.gov网站、Edgar公司备案系统以及Midas数据分析平台移至私有/公共云，以节省运营和维护成本，提高可用性和应对需求激增（如Facebook IPO期间发生的情况）。

Cloud adoption has been held back by concerns about security and data privacy, data residency and data protection, and other compliance restrictions, according to a recent survey from the Cloud Security Alliance.3 However, as cloud platform providers continue to raise the level of reliability and transparency of their services, and improve auditing controls over operations, encryption, and ediscovery, and as regulators provide clearer guidance on the use of cloud

services, more and more financial data is making its way into the cloud.

云安全联盟（Cloud Security Alliance）最近的一项调查显示，由于对安全和数据隐私、数据驻留和数据保护以及其他合规性限制的担忧，云应用受到阻碍。然而，随着云平台提供商不断提高其服务的可靠性和透明度，并改进对操作、加密和电子数据展示的审计控制，随着监管机构对云服务的使用提供更清晰的指导，越来越多的金融数据正在进入云。

Cloud infrastructure giants like Amazon, Microsoft, and Google have made massive investments over the past few years in upgrading their data centers and improving their operational security and governance programs, learning with, and from, their customers along the way.

过去几年中，像亚马逊、微软和谷歌这样的云基础设施巨头在升级其数据中心、改进其运营安全和治理计划等方面进行了大量投资，向客户学习并和客户一起成长。

Amazon has worked with government regulatory agencies and industry pioneers including Intuit and Capital One to build advanced operational, security, and compliance capabilities into AWS. Unlike 10 years ago, when Netflix and a few internet startups gambled on moving their operations to the cloud despite major reliability and security risks, financial services organizations are now looking to cloud platforms like AWS to take advantage of its security and compliance strengths, as well as operational scalability.

亚马逊已经与政府监管机构和行业先锋（包括Intuit和Capital One）合作，将先进的运营、安全和合规能力构建到AWS中。与10年前不同的是，当Netflix和一些互联网初创公司冒着重大的可靠性和安全风险冒险将业务转移到云计算领域时，金融服务组织现在正寻求像AWS这样的云平台，以利用其安全性和合规性优势以及运营可扩展性。

This has provided financial technology startups like Monzo in the UK and Nubank in Brazil with a fast, scalable, and cost-effective path to launching new cloud-native services. But it is also clearing the road ahead for enterprises.

这为英国的Monzo和巴西的Nubank等金融技术初创企业提供了一条快速、可扩展且经济高效的新云本机服务发布途径。但这也为企业扫清了前进的道路。

One example: after running a series of experiments and successful production pilots, Capital One is now moving all of its business systems to AWS, and plans to completely shut down its internal data center operations within the next five years. According to Rob Alexander, Capital One’s CIO, they selected AWS because they could see clear advantages from a security and compliance perspective:

举个例子：Capital One在进行了一系列试验和成功的生产试点后，现在正将其所有业务系统转移到AWS，并计划在未来五年内完全关闭其内部数据中心运营。根据Capital One首席信息官Rob Alexander的说法，他们之所以选择AWS，是因为他们可以从安全和合规的角度看到明显的优势：

The financial service industry attracts some of the worst cyber criminals. We work closely with AWS to develop a security model, which we believe enables us to operate more securely in the public cloud than we can in our own data centers.

金融服务业吸引了一些最严重的网络罪犯。我们与AWS密切合作，开发一种安全模型，我们相信这种模型使我们能够在公共云中比在我们自己的数据中心中更安全地运行。

Operating a core financial service in the cloud still requires a lot of work. In the cloud provider’s Shared Responsibility Model, they set up and run secure data centers and networking for you and provide a set of secure platform configuration options and services. But it is still up to you to understand how to use these options and services correctly—and to make sure that your application code is secure.

在云端运行核心金融服务仍然需要大量的工作。在云提供商的共享责任模型中，他们为您设置和运行安全数据中心和网络，并提供一组安全平台配置选项和服务。但是，您仍然需要了解如何正确使用这些选项和服务，并确保应用程序代码是安全的。

Containers in Continuous Delivery

持续交付中的容器

Containers, and especially Docker—a lightweight and portable way to package and ship applications and to isolate them at runtime—are quickly becoming a standard part of many organizations’ DevOps toolkits. Now that Docker has mostly stabilized its platform ecosystem and APIs and is focusing on addressing security and enterprise management requirements, containers are making their way out of innovation labs and into enterprise development and test environments— and even into production.

容器，尤其是Docker——一种轻量级的、可移植的打包和运输应用程序以及在运行时隔离应用程序的方法，正在迅速成为许多组织的DevOps工具包的标准部分。现在，Docker已经基本上稳定了平台生态系统和API，并专注于解决安全和企业管理需求，容器正在走出创新实验室，进入企业开发和测试环境，甚至进入生产。

Some of the organizations that we’ll look at in this report, such as ING, Intuit, and Capital One, are using Docker to package and ship applications for developers and for testing as part of their build pipelines, and in production pilots.

我们将在本报告中看到的一些组织，如Ing、Intuit和Capital One，正在使用Docker为开发人员打包和发布应用程序，并将其作为构建管道以及生产试点的一部分进行测试。

Others have gone much further. PayPal, which operates one of the world’s largest private clouds, managing hundreds of thousands of virtual machines in data centers across the world, has moved thousands of production payment applications onto Docker in order to reduce its operations footprint and to speed up deployment and rollback. PayPal is also using containers to run older legacy applications on modern OS kernels. The International Securities Exchange runs its low-latency production data centers on CoreOS. And Goldman Sachs is in the process of moving thousands of applications into Docker to simplify operations and reduce costs. It expects to shift 90% of all its production computing workloads into containers.

其他组织走得更远。PayPal运营者世界上最大的私有云之一，管理着世界各地数据中心的数十万台虚拟机，已经将数以千计的生产支付应用程序移到了DOCKER上，以减少其业务占用，加速部署和回滚。PayPal还使用容器在旧OS内核上运行旧的遗留应用程序。国际证券交易所在Coreos上运行其低延迟生产数据中心。高盛正在将数千个应用程序转移到Docker中，以简化操作并降低成本。它预计将把90%的生产计算工作转移到容器中。