THE MULTI-CLOUD MAZE:
5 PRINCIPLES FOR SUCCESS

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Just as virtualization revolutionized IT infrastructure, the rise of the cloud has changed the playing field again.

Organizations can now grow and pivot with previously unimagined agility. Enticed by the promises of the cloud, businesses of all sizes race toward digital transformation. Since 2009, spending on cloud computing has grown at 4.5 times the rate of IT spending—exploding from $67 billion in 2015 to a projected $162 billion in 2020.[1] By that same year, up to 75 percent of all businesses will be digital.[2]

What we're experiencing today is nothing less than a seismic change in the way organizations operate and evolve. But innovation can often outpace planning in this multi-cloud world, and businesses hoping to drive growth confront a host of complexities. With several major public cloud providers continuously developing and offering new services, you'll probably be pressured to use the one that seems most attractive at the moment. And when one provider introduces a new service that better aligns with your security objectives, but another offers long-term archival storage for a fraction of the cost, you can find yourself stuck in a multi-cloud maze—with all the twists, turns, and choices that implies.

The fact is, while this multi-cloud world offers nearly limitless opportunities, it also presents a series of operational challenges. Managing multiple platforms with their various APIs and feature sets can dramatically increase operational overhead. Plus, delivering the same service level in multiple places, with different controls and interfaces, can make adopting new clouds difficult and expensive. Architecting a multi-cloud strategy that maximizes efficiency and agility can be just as much an organizational challenge as a technical one.

In a 2016 survey, nearly three-quarters of tech CFOs said that cloud computing would have the most measurable impact on their business in the future.[3] If you want to reap the benefits of the multi-cloud world— while minimizing the headaches—it pays to plan ahead and consider a few key principles.

4.5x

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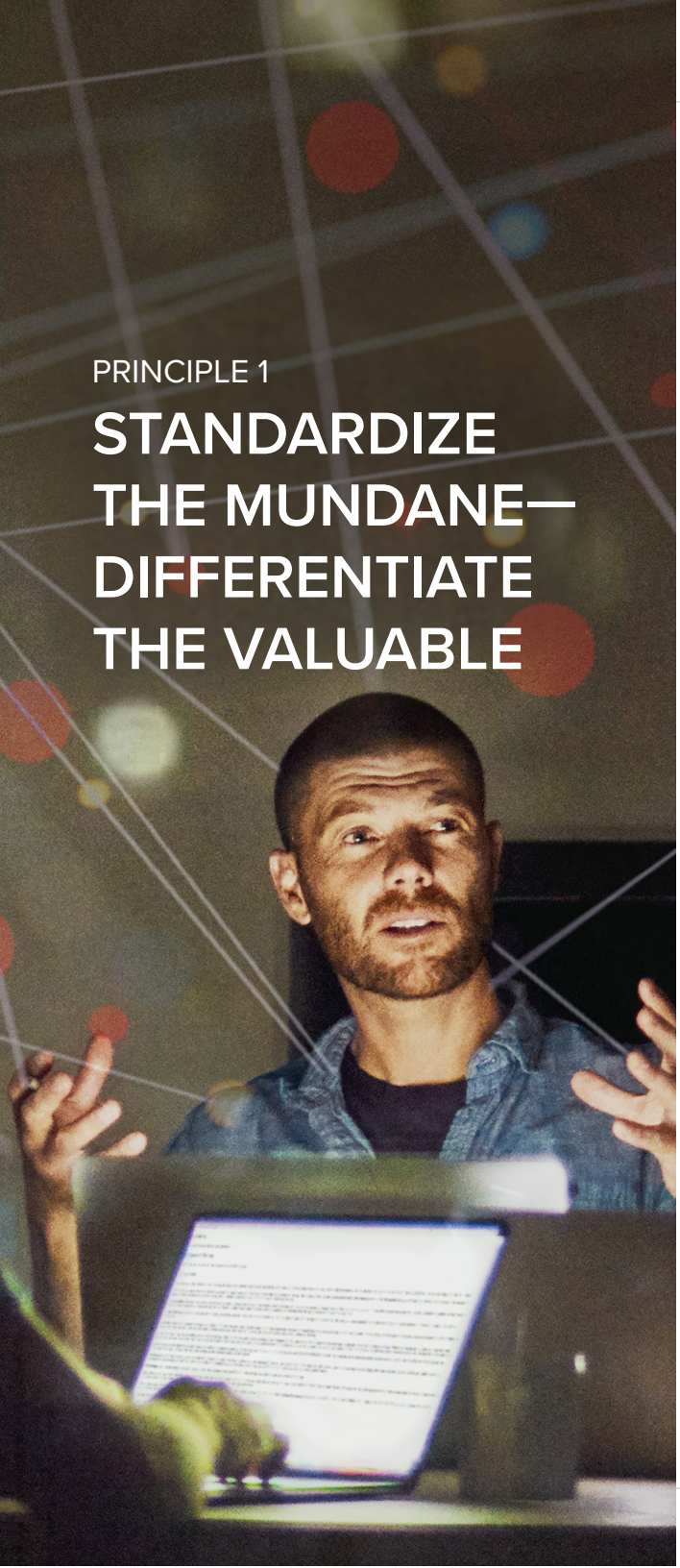
[1] http://www.salesforce.com/assets/pdf/misc/IDC-salesforce-economy-study-2016.pdf | [2] Gartner Tech Growth & Innovation Conference | [3] https://www.bdo.com/getattachment/022227f4-aa2e-4a8b-9739-b0ad6b855415/attachment.aspx?2017-Technology-Outlook-Report_2-17.p



PRINCIPLE 1

STANDARDIZE THE MUNDANE—DIFFERENTIATE THE VALUABLE

One of the key concepts in deriving value from the cloud is standardization. In order to standardize, you have to make your infrastructure—and a good portion of your network architecture—unavailable to users. Why? Because allowing customers to make changes to the network layers of public cloud providers could result in increased costs, and application and system outages. Standardization delivers what most customers want: cost savings and a stable, consistent environment.

While standardization is essential to a successful multi-cloud architecture, you can only standardize so much. You'll always have some applications that have to be cared for in different ways. But by standardizing most of your infrastructure deployments, you can free up resources to differentiate where it counts. For example, you could hand-craft unique security policies for every application. However, a set of more generic policies that can be routinely applied to most applications will provide a good level of protection, while creating more time for better threat research or patch management.

STANDARDIZATION CAN IMPROVE THE DEPLOYMENT, MANAGEMENT, AND RELIABILITY OF YOUR APPLICATIONS.

Standardization can improve the deployment, management, and reliability of your applications. But remember that standardizing your deployments is only half of the battle: it's also essential to standardize your processes. A multi-cloud environment can be extremely complex, but understanding and documenting the process of standardization will decrease the operational burden, simplify management, and speed deployment.

PRINCIPLE 2

AUTOMATE AND INTEGRATE—MOVE AT MACHINE SPEED

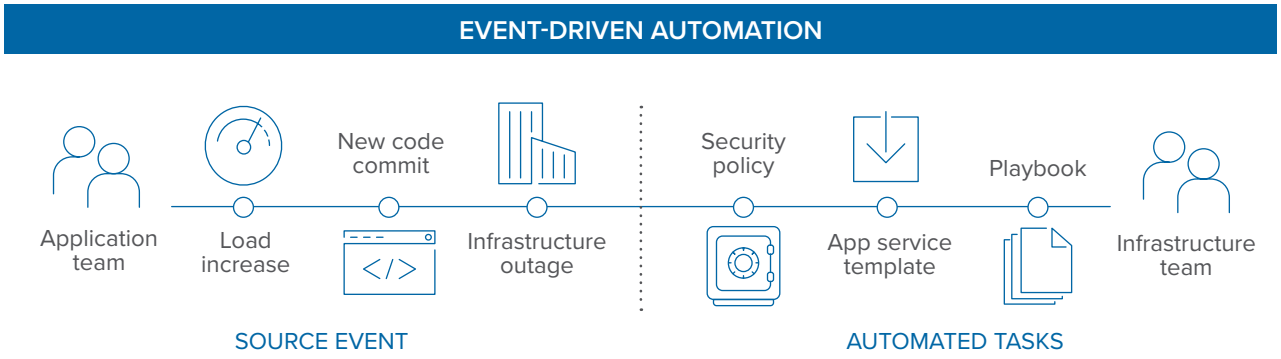
To keep up with the ever-increasing pace of business in a multi-cloud environment, automation is non-negotiable. The goal of your organization's first wave of automation might be to make it quicker for people to complete human-initiated, machine-enabled tasks. For example, onboarding a new network device is a laborious, multi-step process involving installing the correct OS version, provisioning IP addresses, and managing licenses. All of this mundane work can be effectively replaced by an automation script, saving your IT staff time, and freeing them to work on larger issues.

DON'T JUST AUTOMATE WHAT YOU HAVE; AUTOMATE WHAT YOUR BUSINESS NEEDS.

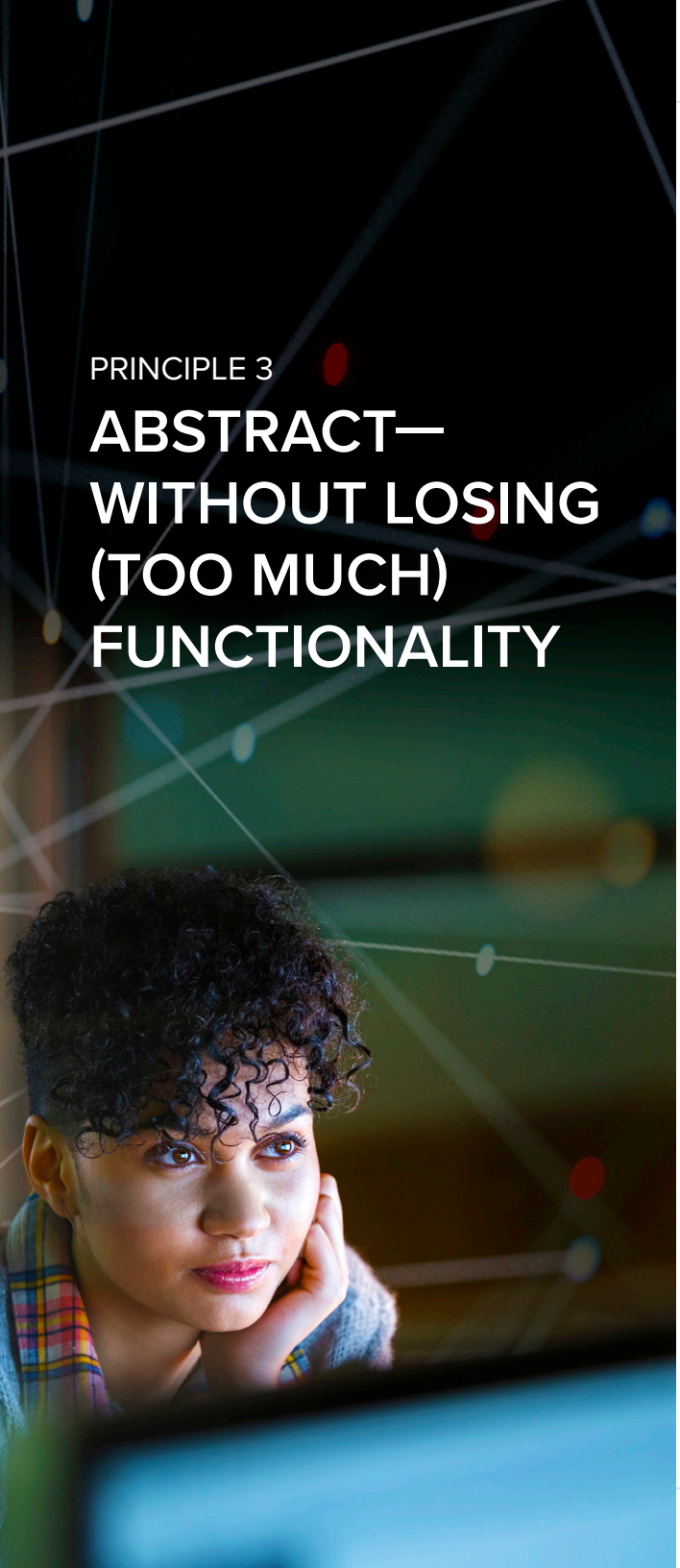
However, if you see automation as simply a faster way for humans to initiate change, you're only going to realize a portion of its potential benefits. Where things get really interesting—and valuable—is when you can tie the automation of routine tasks to the initial event that makes them necessary. The more that your systems are able to manage themselves, the greater the return on automation for the business. It's really an issue of process: build systems that capture the intent at the source, and architect your infrastructure to match. True automation doesn't just speed the task. It minimizes human involvement in the task, allowing your infrastructure to move at machine speed rather than getting stuck at human chokepoints.

Don't forget to automate the entire lifecyle of your applications—not just their deployment. Make sure that you can make changes to a running system in an efficient and logical way. And you need to be able to roll back as fast as you roll out, because things don't always go exactly the way you expect. Keep in mind that your automation and source management tools are critical, and need the same services (high availability, security, backup, and recovery) that you provide for your enterprise applications.

The bottom line with automation? Don't just automate what you have; automate what your business needs. Architecting for a multi-cloud world presents you with a unique opportunity to evaluate how you supply services to the organization—and then optimize those processes to better deliver value and speed innovation.



Achieve machine speed by enabling source events to trigger automated responses.



PRINCIPLE 3

ABSTRACT—WITHOUT LOSING (TOO MUCH) FUNCTIONALITY

Achieving the right level of abstraction with regard to your services enables you to reduce the complexity of your infrastructure and increase efficiency across your organization. The simplest and easiest way to abstract your services is to remove functionality. However, if you do that too aggressively, you'll hear from dissatisfied users who can't access the resources they need because functionality has been over-restricted in the service of abstraction. Simplifying can be very attractive to operations groups, but constraining your services has a limited lifespan in terms of utility.

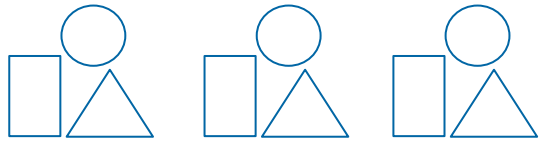
SPEND SOME TIME IDENTIFYING THE SWEET SPOT OF ABSTRACTION FOR YOUR ORGANIZATION.

Instead, spend some time identifying the sweet spot of abstraction for your organization. How can you best provide a foundation of services (security, availability, performance) for all your applications, while enabling certain additional services to be customized and turned on and off for specific apps? Consider using the same tools and services, rather than trying to abstract them all.

Another great way to reduce complexity in a multi-cloud environment is with templates, which can help you simplify configurations and deployments—without losing any of their inherent value.

FIND THE RIGHT LEVEL OF ABSTRACTION

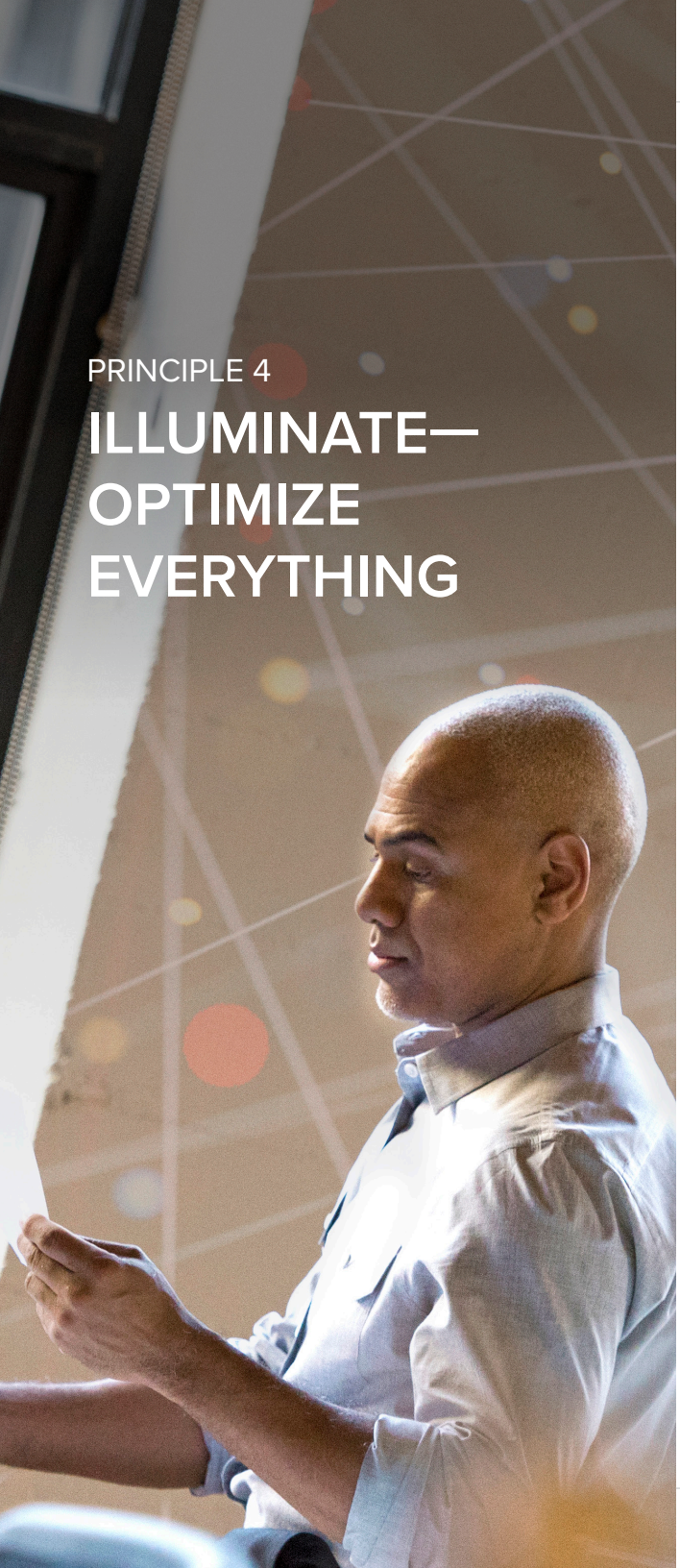
Not enough abstraction—too complex



The sweet spot of abstraction—consistent services deployed in different locations

Too much abstraction—loss of functionality

The sweet spot allows you to balance service richness with speed and supportability.



PRINCIPLE 4

ILLUMINATE—OPTIMIZE EVERYTHING

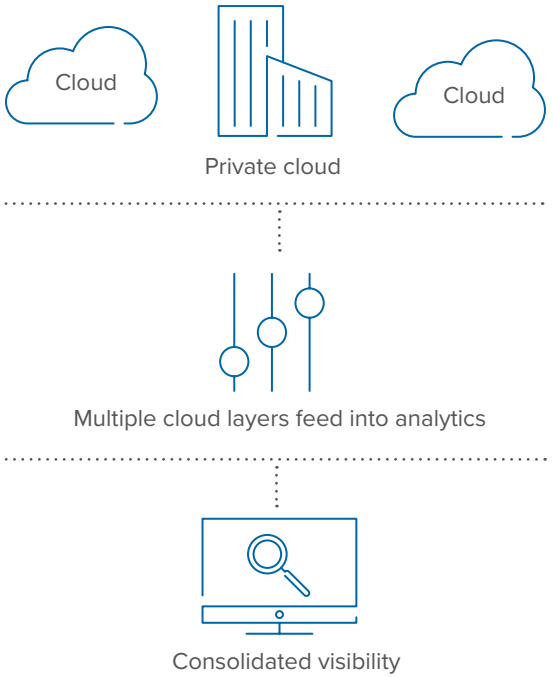
OK, so far you've standardized what makes sense to standardize; automated your processes to move at machine speed; and reduced complexity by abstraction. You're helping build a business that's more dynamic and responsive to the needs of your users—and you're well on the road to a flexible, holistic multi-cloud strategy. But don't forget the last piece of the puzzle. Without visibility into what's going on in an increasingly heterogeneous and complex environment, it's hard to be confident that you're delivering all of the necessary services in the most efficient way.

THE GOALS OF A CONTINUOUS IMPROVEMENT MODEL CAN ONLY BE REALIZED IF YOU HAVE A FEEDBACK LOOP FROM DATA THAT'S BEEN COLLECTED, ANALYZED, AND ACTED UPON.

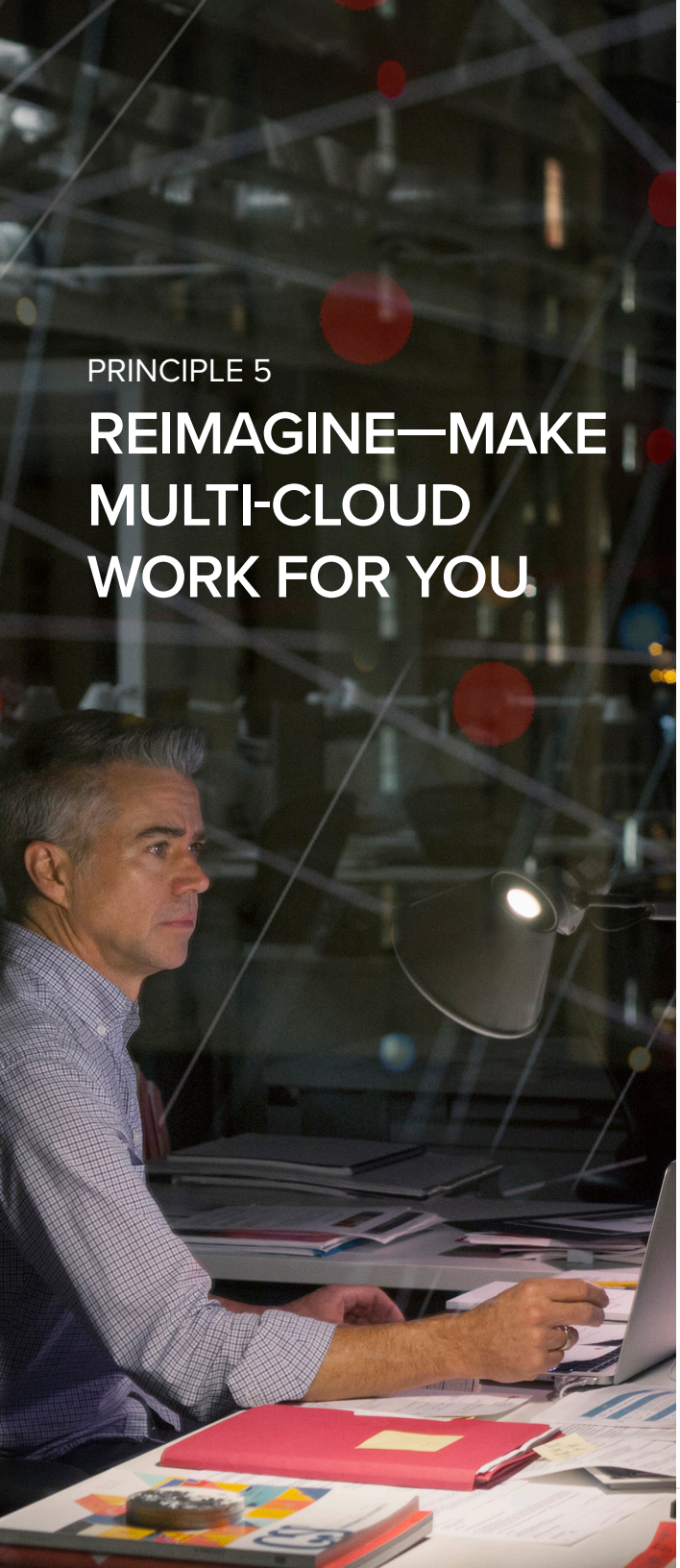
To achieve visibility, you need a comprehensive, actionable, analytics solution that pulls in data from multiple sources, correlates it, and alerts you to anomalies that need to be addressed. For example, imagine a system that generates a routine level of logs, but also monitors the server error response rates. You could set it so that it looks for more than a threshold number of 400 or 500 server HTTP response errors per minute, and then automatically increases the logging level until the errors return to an acceptable level. By the time an actual human investigates, the system has already enabled rich logging of application traffic, dramatically speeding problem resolution.

Also, consider how you're ensuring that the right information gets to the right people. Design a model where your devices automatically generate alerts and publish them to a distribution system, which then feeds them to subscribers who can act upon that information. It's another opportunity to think about optimizing not just your deployments, but your overall processes. Remember that the goals of a continuous improvement model can only be realized if you have a feedback loop from data that's been collected, analyzed, and acted upon.

ANALYTICS DRIVES OPERATIONAL IMPROVEMENTS



Collect and analyze data from multiple sources for optimal visibility.



PRINCIPLE 5

REIMAGINE—MAKE MULTI-CLOUD WORK FOR YOU

In IDC's 2017 CloudView survey, 87 percent of respondents said that their organizations have adopted some form of a hybrid cloud strategy.[4] To adapt to and thrive within this new multi-cloud world, you have to change your way of thinking. If you move to the cloud without a plan—and a trusted partner—you're going to have the same silos in the cloud that you currently have in the data center. Without integration between multiple clouds, you'll end up with even more silos within those silos, increasing complexity and reducing visibility. Organizations that simply automate discrete processes without a holistic strategy are going to be disappointed when they find themselves lost within a multi-cloud maze that includes policy sprawl, poor cross-environment analytics, security gaps, and inconsistent application services across platforms.

There's a better way. Designing your multi-cloud strategy can speed infrastructure deployment and your ability to deliver key applications. And if done right, it can also improve human-driven processes in your organization. The end goal of making multi-cloud work for you is a more collaborative, smoother process that provides a net benefit to the business.

ACCEPT THAT THINGS MIGHT FAIL, FIX THEM WHEN THEY DO, AND KEEP GOING.

Will everything work perfectly the first time? Probably not. But that doesn't mean you shouldn't start trying. Accept that things might fail, fix them when they do, and keep going. Don't forget that you can (and should) employ the same skills you use to architect and manage infrastructure in the data center when you're in a hybrid cloud environment. In the end, successfully finding your way out of the multi-cloud maze can change the way you deliver applications—and increase your competitiveness in the market.

Learn more at **f5.com/multicloud.**

[4] https://www.idc.com/getdoc.jsp?containerId=prUS42878417