Actifio for DevOps

actifio

Radically Simple

Actifio for DevOps

Most organizations increasingly rely on their applications and automation to achieve efficiencies, increased productivity, increase competitive differentiation and gain larger market share. To keep up with market pressure, organizations need to develop and release applications faster. Adopting automation tools can help these organizations achieve continuous integration and maintain uninterrupted release schedules. Achieving success with this requires cooperation and coordination between application development teams and IT operations, and in many cases, creating new roles in the function of DevOps. DevOps is a methodology and set of practices that unify a team including business leadership, architecture, development, testing, deployment, and operations to be responsible for the creation and delivery of business capabilities*. Currently, over 60% of Fortune 1000 companies look for automation as a primary DevOps initiative and that number is expecting to increase.

Developers (Dev, QA, Build teams), and **Op**erations (UAT, pre-production, release management, application management and monitoring teams) make up the two key constituencies of **DevOps**. Automation tools are needed to achieve your DevOps objectives. Look to Actifio, the industry leading experts in copy data management, to help you achieve your DevOps goals with Virtual Data Pipeline™ technology by accelerating data delivery, development and test-data management, application development, and deployment cycles.

Challenges in Application Development and Release Cycles

The majority of challenges in test data management can be categorized into four key areas: Speed, Quality, Control, & Cost Issues.

1. **QUALITY** Many organizations will provision small subset of production or dummy data to test and development engineers. This practice leads to situations where the software works fine in development and QA environments but may not work in UAT, Pre-Prod environments.

   The product quality suffers because the Development and QA engineers were not able to perform scalability testing early in the development cycle. Finding critical bugs in UAT environments, so late in the development cycle, leads to software quality issues. Organizations have to make tough choices between releasing low quality code and delay release by fixing the quality issues. Either way, the organization suffers from delays.

2. **SPEED** The typical process of Development opening a ticket to get a copy of production data set, approval process (1 - 2 weeks), compute and storage provisioning process (1 week), process of creating DB clones and data masking (1 week) introduces significant delays (up to 4 weeks) before the requestor gets access to a copy of production data set that can safely be used. Many environments such as SAP, or Oracle ERP can require over ten copies. The physics alone to create so many copies of mutli-TB production data sets introduces significant delays.
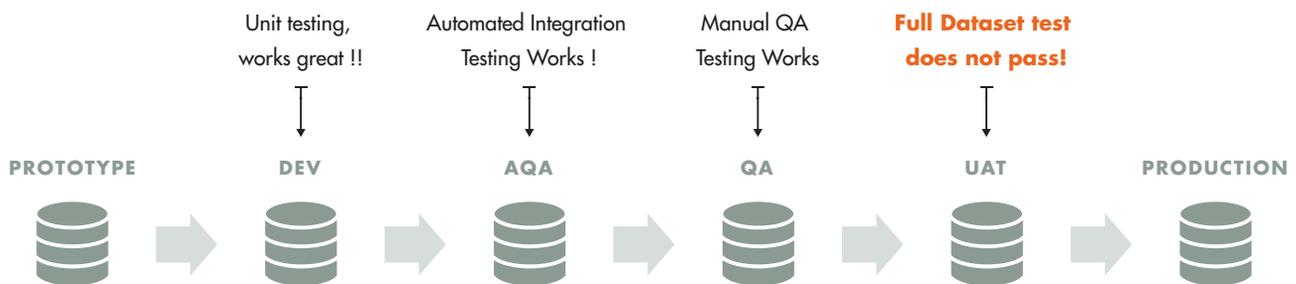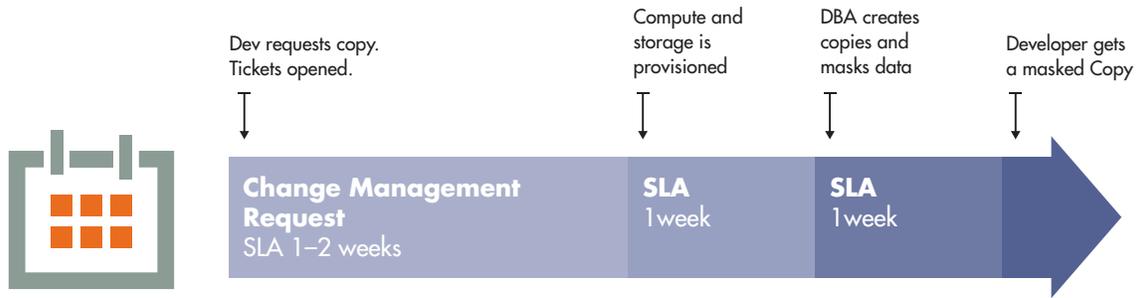
FIGURE 1 **Dummy Data Leads To Quality Problems**

Unit testing, works great !!

Automated Integration Testing Works !

Manual QA Testing Works

Full Dataset test does not pass!

PROTOTYPE → DEV → AQA → QA → UAT → PRODUCTION

FIGURE 2 **The Speed Problem**

Dev requests copy.
Tickets opened.

Compute and
storage is
provisioned

DBA creates
copies and
masks data

Developer gets
a masked Copy

**Change Management
Request**
SLA 1–2 weeks

SLA
1 week

SLA
1 week

3. **CONTROL** When organizations figure out a way to create many copies of production data sets, operations teams struggle to provide role based access controls (RBAC) on who has access to copies of which production data sets. Neither do they typically have an audit trail mechanism. Operations also do not have easy, automated mechanisms to mask and refresh copies of production data sets.

4. **COST** When organizations decide to create copies of production data sets, they unfortunately end up creating many physical copies. This leads to massive storage expenses. Additionally, this puts a huge burden on DBAs since they are the ones who have to create DB clones, mask the data, create many copies, and then bring the DB online on all the test environments. This raises the infrastructure costs and operational costs significantly.

Find out how Actifio solves all these problems providing efficiencies that drive effective DevOps teams. The next section provides a high level overview of how Actifio technology works.

Actifio's Virtual Data Pipeline™

Actifio Virtual Data Pipeline™ (VDP) technology delivers application-centric, SLA-driven automation to DevOps in which VDP decouples the management of data to be used for test/dev from production infrastructure. The result is a single, radically simple solution—efficiently virtualizing all copies of production data for data protection, application development and test, analytics, and more. Actifio VDP manages all of your data through a single platform, from only one golden copy of your production data. Actifio allows IT administrators to access a single, masked, any point-in-time copy of your data, through a self-service interface. The approach to properly Capture, Manage, and Use data is *Radically Simple*.

FIGURE 3 **Virtual Data Pipeline for Testing and Development**
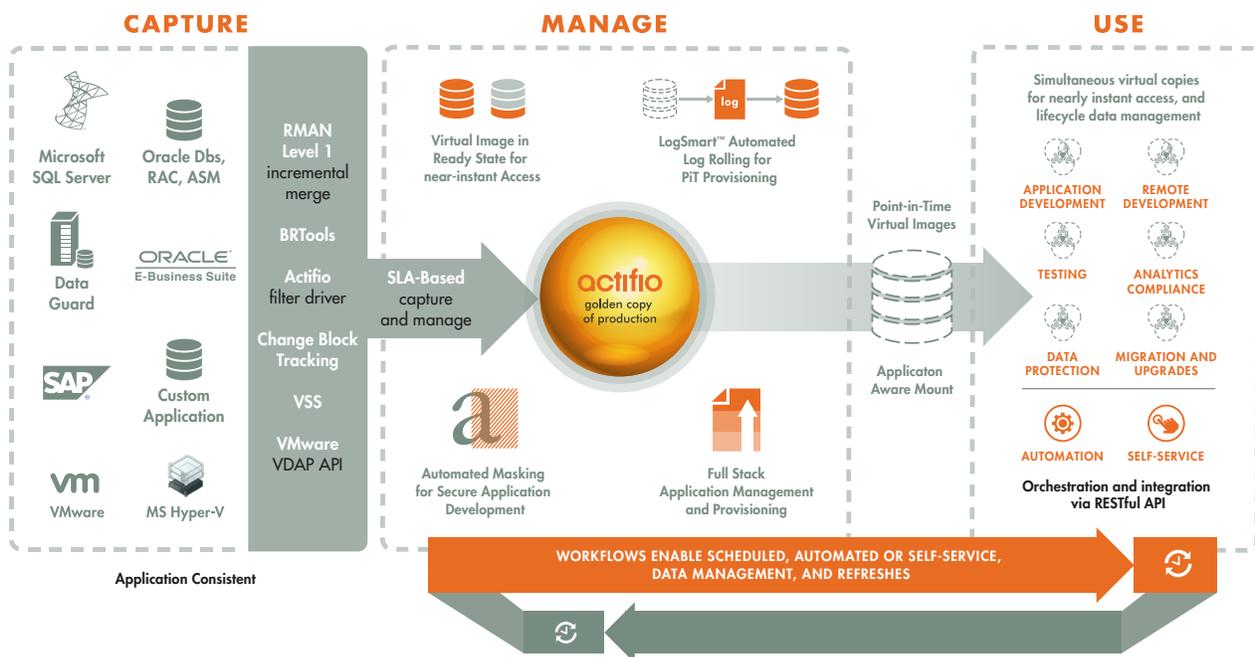
Actifio brings DevOps technology automation for application development and testing with a single tool.

Capture

Actifio VDP performs a deep discovery of applications, databases, Virtual Machines (VM), volumes, and file systems. Actifio uses the most efficient way possible to capture the data. Typically snapshots along with changed-block-tracking technology are used to capture application-consistent copies of data. This data is then transported at the block level over the LAN or the SAN. This technology is the industry's fastest, most efficient and scalable method of data capture, eliminating the traditional "backup window" while delivering efficiencies previously impossible using traditional technology.

VDP is incremental-forever architecture. An application consistent "golden image" will be maintained and only changed blocks will be sent. This process is also done in the most efficient way possible depending on the application an/or database type and based on administrator defined Service Level Agreements (SLAs). For example, when capturing Oracle Data, VDP will use RMAN Level 1 incremental backup. When systems are virtualized using VMware vSphere, VDP will leverage vStorage API's for Data Protection (VADP) for Changed Block Tracking (CBT). In instances of physical environments, a lightweight Actifio Connector with change tracking driver is used to track changed blocks and provide application consistency.

VDP will capture and hold a virtual image in its native format for efficient usage. All common storage formats are supported, including raw volumes, file systems, and ASM.

Manage

Actifio VDP manages changed blocks in such a way that a point in time full "virtual" copy can be synthesized in a near instant fashion. Based on administrator driven SLAs, Actifio can retain data for certain duration, deduplicate the data for log term retention, and replicate the data to a remote site for remote development or disaster recovery purposes. Based on the SLAs and defined workflows, administrators can determine how often to refresh the data and run the data through masking scripts or software, automating the end-to-end process of data refresh and masking. Actifio LogSmart™ gives you the flexibility of automated log roll-forward to a user-specified point-in-time during the provisioning process.
Consistency groups can even allow this to be performed across multiple databases at once for supported database platforms.

Use

Actifio VDP delivers the unique capability of enabling applications to immediately use point-in-time copy data, without the need for a traditional "restore" operation. Application data from any available point-in-time can be accessed on any authorized system for development, testing, analytics, recovery or dozens of other common use cases. Actifio VDP offers vast flexibility when accessing data with options for secure, roles-based control of data management for multi-tenancy, virtual images from any point-in-time, and various image types.

Automation Requirements to Improve DevOps

By working with many customers in banking, insurance, healthcare, retail, manufacturing, and SaaS verticals, Actifio understands the needs of application development, testing, and DevOps. Scalability, consistency, data control, and ease-of-use are all fundamental needs when incorporating automation technologies into an existing environment. There are many key requirements that need to be satisfied to help DevOps improve quality and accelerate application development and release cycles.

1. Near Instant Multiple Copies
Provision dozens of near instant copies, with minimal storage consumption

2. Data Masking
Data must be **masked automatically** before DEV & QA teams get access

3. Data Refresh
Enable teams to test on most recent copies of production data-sets with **automated refresh**

4. Self-Service
Enable Dev and QA teams to **browse** and **access** point-in-time, masked copies without having to disturb IT Operation teams

5. Role Based Access Control
Allow IT administrators or application owners to set roles based access control policies on **WHO** can access **WHAT** masked copies on **WHICH** test servers

6. Bookmarks
Allow users to **bookmark** their test environments so they can roll back to a given point

7. Database Integration
Enable users to specify database **environment customization**, and bring them online with the specified customization automatically

8. Test Data Protection
Enable users to **protect** and save their Dev & QA data sets so that only the changed blocks are protected and stored in the most space efficient manner. It allows users to browse back in time to access various point-in-time data-sets, and then return if desired.

7. Compliance
Many industries have specific regulations that may require the organization to "stand-up" a database or application at a past point-in-time for analytics or forensic analysis.

8. Test in Cloud
Allow masked copies of on-premises data-sets to be made available in a remote office or in the cloud so Dev & QA users can use cloud compute to test

Bring Technology Automation to DevOps

To accomplish their objectives, DevOps leaders are looking more-and-more toward automation and tools that help achieve continuous delivery to their customers and stakeholders. Actifio delivers a platform bringing unmatched data management automation that meets needs shown under the "Automation Requirements…" section.

1. Near instant virtual copies

VDP will ingest data, incremental forever, based on a defined SLA and will store a single, golden image tracking each point-in-time. Actifio has the data virtualization technology that can synthesize and mount a 'virtual full' image nearly instantaneously to any number of devices. Actifio presents the near instant 'virtual copy' to any physical server or virtual machine using iSCSI or Fiber Channel protocol. It does not matter whether it's a 1 TB data set or an 80 TB data set; Actifio VDP makes multi-TB data sets accessible in a near instant fashion.

FIGURE 4 **Near Instant Virtual Copies**
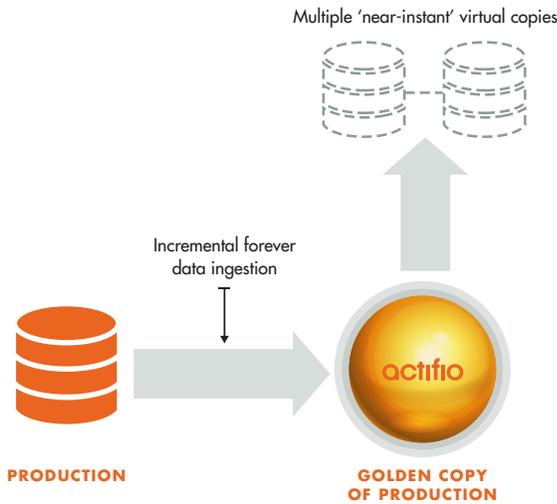
2. Data Masking

Within their databases, organizations will have sensitive data that can include anything from social security numbers and pay rates to intellectual property or customer financial information. When using data for development and testing, this can require custom logic and rules to mask the data before being presented to another system. Some may have simple scripts, and some may use 3rd party tools to mask or sanitize the data. Using Actifio workflow feature, an administrator can specify their data masking script, a data-masking server, and schedule the tasks. Based on the schedule, Actifio will mount an image to the data-masking server and invoke the data masking script. Once complete, Actifio marks it as 'masked'. All further virtual copies would be created off this masked copy ensuring a "safe" copy will be used.

This ensures that

- Only IT administrators or DBAs control and specify the scripts to mask the data
- Data masking is automated thus eliminating any manual intervention
- DEV & QA engineers access only the masked virtual copies.

3. Automated Refresh

Developers often request fresh or updated data when testing applications. Actifio automates the process to provide an updated copy on a schedule or on-demand.

Refreshes for developers leverage the efficiency of the VDP engine, which ensures only changed blocks are copied. The data movement is SLA driven, which means the data is immediately available when it comes time to refresh the copy being used by a developer. Data masking can even be incorporated into the refresh process, having an updated and masked copy always ready for an on-demand refresh requested by a developer.

4. Self Service

Once the administrator gives access rights, developers and QA engineers have the ability to login to Actifio user interface (UI) with their own account. They will be able to browse only the 'masked' data sets of granted databases
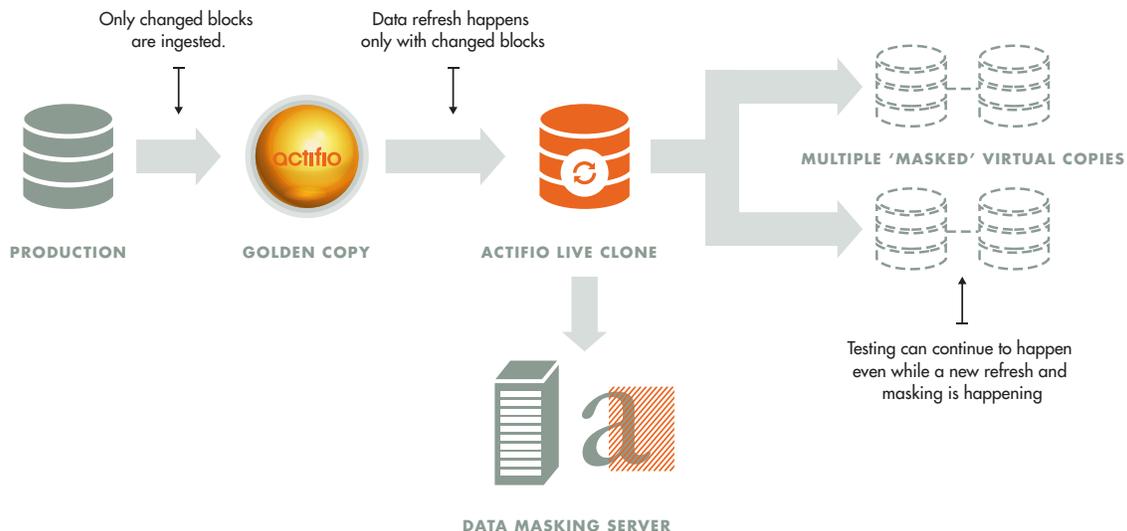

FIGURE 5 **Automated Refresh**

FIGURE 6 **Actifio Benefits**

AUTOMATED PROCESSES
Workflows

SELF SERVICE
Roles-Based Access Controls

SPACE EFFICIENT
Data Virtualization

UP-TO-DATE COPIES
On-Demand or Scheduled

UNIVERSAL COVERAGE
Databases, Hypervisors, OSs, Physical or Virtual

set by administrator using roles based access controls. A masked virtual copy is selected, mounted to their test server, and they can start accessing the data set. This whole process, being self-service, is not only fast but also eliminates burden on IT staff and DBAs.

Development and QA engineers can also achieve this functionality by leveraging the Actifio REST API and/or CLI.

5. Roles-Based Access Controls

To ensure proper data control, Actifio administrators can specify WHICH users can access WHAT data sets on WHAT server. Administrators can also specify that only the masked copies be accessible by particular users. Reporting and audit logs list all user activities, including mount and unmount operations and what data sets were accessed.

6. Bookmarks

Actifio allows users to bookmark their virtual copies, and provide and search on a label name. Multiple virtual copies can be created off these bookmarks for multiple people within the team.

7. Database Integration

When mounting a database, Actifio allows users to specify database customization parameters as shown below. This makes it easy for users to focus on their test cases instead of burdening DBAs with requests to customize the database environments and bring the databases online in test environments.

When users perform a mount operation, they are prompted for these provisioning options when using common databases such as Oracle and Microsoft SQL Server. Additionally, users can custom define an application class to include provisioning options and scripts needed to perform application aware mounts for any application.

8. Test Data Protection and Rewind

Actifio allows users to maintain multiple points in time (PIT) virtual copies, thus allowing them to pick and choose any of the available PIT versions and perform their testing. Actifio allows virtual copies to be protected by specifying a simple SAL such as how often to protect and how long to retain.

9. Compliance

Many industries have specific regulations that may require the organization to "stand-up" a database or application at a past point-in-time for analytics or forensic analysis. Actifio provides the ability to keep both a short-term history, or images deduplicated and compressed for long-term retention.

10. Test and Development in the Cloud

Actifio appliances can be deployed as a physical or virtual machine in a remote location including a remote office, service provider, or the public cloud including Amazon AWS. Images can then be efficiently replicated from the primary datacenter to the remote or cloud location.

All data is ingested and deduplicated at primary site. Only deduplicated data is replicated to the remote Actifio instance, thus ensuring bandwidth needs are minimal. Users can instantiate VMs and mount 'masked', near instant virtual copies of data sets from Actifio to those VMs, bring databases online automatically, and start testing.

FIGURE 6 **Test and Development in the Cloud**
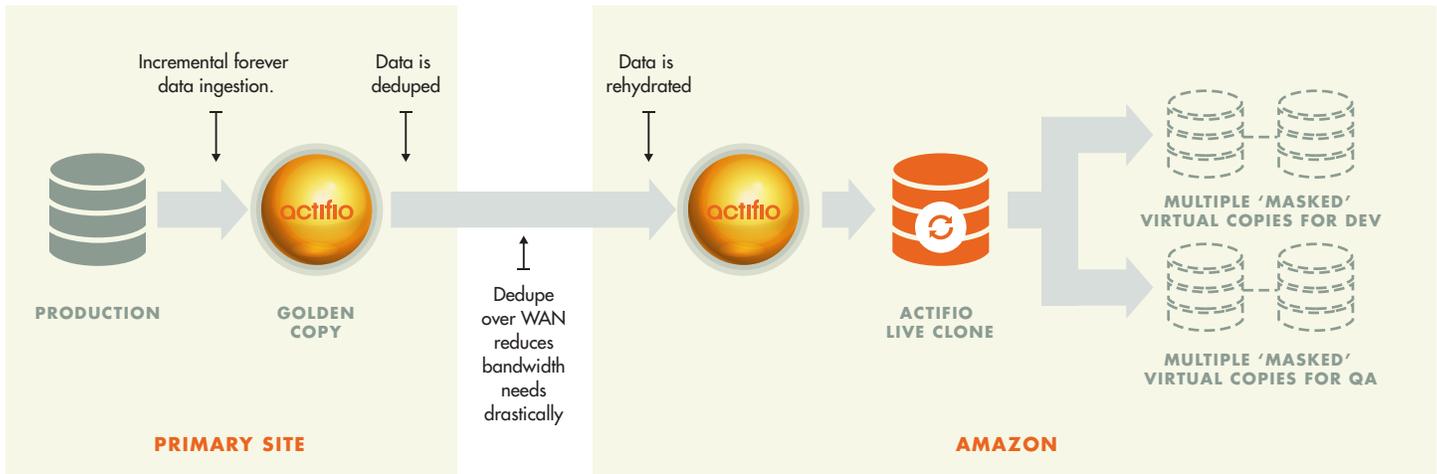
Actifio Copy Data Virtualization Benefits for DevOps

Accelerated time-to market Actifio data management provides data automation tools for DevOps. This, along with best practices such as continuous integration and delivery, lets organizations bring new software releases faster to customers. This helps organizations add value to customers faster, and stay ahead of competition.

Large infrastructure savings Actifio virtual copies are storage efficient ensuring significant storage savings in your datacenter, remote office, and in the cloud.

Time savings Actifio automation for data refresh, data masking, role based access control, database customization and integration ensures significant time savings for DBAs, storage administrators, and IT administrators.

Reliable releases With unit testing by developers, automated build testing, functionality and regression testing performed on full virtual copies of production data-set from day one, there is a significant reduction in risks associated with a release.

Improved product quality Actifio data management enables critical bugs to be caught early in development life cycle and significantly improve the product quality & predictability.

Control of sensitive data Reducing the exposure by having a single golden image along with roles based access controls and automated masking provides for a more protected development environment.

Universal coverage A single platform for the entire physical, virtual, application, and multiple databases means flexibility, easier administration, lower costs, and avoidance of additional point-tools and infrastructure silos.

Secure and efficient remote development Achieve effective remote development through replication optimization, continuous updates, and automated data masking.

Improved customer satisfaction Improved product quality and predictable roadmap execution leads to a very high customer satisfaction

Business pressures will continue to push developers, QA, and IT to move faster, release error free software more quickly and respond more rapidly to the dynamic needs of the market. The DevOps approach will increase the need for automation, consistency, functional testing, and flexibility of infrastructure. There are many tools DevOps can use to achieve Continuous Integration & Continuous Delivery. But those tools by themselves don't give developers, QA engineers, and automation platforms the ability to test on a rich set of data. Testing software on a subset of production data sets reduces test quality. Data management and automation are a very important aspect for DevOps. During the entire release process when unit testing, functionality testing, performance testing, regression testing, and security testing is being done, it can now be accomplished on copies of production data sets in a safe, secure, and self service fashion with the help of Actifio. Actifio helps DevOps with data management functionality in their own private or public cloud environment with virtual copies in a safe & secure, self-service manner.

About Actifio

Actifio delivers copy data virtualization to hundreds of global enterprise customers and service provider partners in more than 30 countries around the world. Our Virtual Data Pipeline™ technology decouples data from infrastructure, enabling dramatic improvements in business resiliency, agility, and access to the cloud. Actifio replaces siloed data management applications with a radically simple, application centric, SLA-driven approach that lets customers capture data from production applications, manage it more economically, and use it when and where they need to. Actifio is headquartered just outside Boston, Massachusetts, and can be reached via the web (actifio.com,) Twitter (@actifio,) or email at info@actifio.com

For additional information, visit Actifio at www.Actifio.com or contact Actifio at info@actifio.com or 877.282.5373

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