

White Paper

Digital Transformation in Life Sciences and Pharmaceuticals

Accelerating Data-centric Initiatives with Nutanix

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Introduction

As healthcare undergoes massive digital and technological changes to improve patient care, it's easy to get lost in seemingly limitless possibilities when it comes to treatment options, preventive care, and disease eradication. Next-generation technologies, such as artificial intelligence (AI), promise to enhance the way we live as we unlock the power of both human and health data. The livelihood of businesses in the life sciences and pharmaceuticals spaces revolves around improving operational efficiency, and the speed and success of collecting, processing, and analyzing high quality data. Whether sequencing the human genome, researching new drugs, or conducting clinical trials, the right data can unlock the key to enriching the future.

With today's focus on data, all eyes are on IT. It is this essential group that must be able to deliver the right technology stack, services, and enablement to leverage the value of the data in the desired way. But inefficiencies, complexity, and costs associated with traditional IT infrastructures are creating frequent roadblocks that inhibit companies from achieving their life-altering goals. Life sciences and pharmaceutical businesses are exploring new and improved methods to deliver IT services in an agile, cost-effective, and trusted manner; viable approaches that facilitate rapid provisioning of on-demand resources; improved availability of analytics and genomics applications; and real-time data processing and insights to accelerate scientific discovery.

Technology Challenges Are Holding Back Life Sciences and Pharmaceuticals Organizations

Increasingly, healthcare organizations are understanding the need to digitally transform. In fact, ESG research shows that 42% of healthcare organizations are currently in the process of implementing and executing various digital transformation initiatives.

Additionally, 22% of organizations are starting their digital transformation journeys, formalizing initiatives and goals, but not yet implementing them.¹



42% of healthcare organizations, such as those in life sciences and pharmaceuticals, are currently in the process of implementing and executing various digital transformation initiatives.

While organizations are experiencing a number of challenges during the transformative state, their top challenges are centered around technology and the integration of legacy systems, applications, and data, while also having to ensure that data governance and privacy requirements are met. With a key goal of becoming more operationally efficient, it's important for organizations to recognize the benefits they can enjoy once digital transformation is far enough along. While the speed at which data can be processed is important, the efficiency of business and application workflows that produce valuable insights is just as important. Though continual challenges can appear daunting, by consolidating IT infrastructures, the appropriate technology platform can help reduce complexity and simplify management—providing IT with time to improve its processes and embrace new initiatives that enable the business to continue advancing down the digital transformation path.

A great example of these experienced challenges can be seen in the amount of time it can take a pharmaceutical company using traditional infrastructure to move from preclinical trials through FDA approval. The lengthy process of bringing a new drug to market can include everything from identifying the right patient pool and efficacy of the potential new drug, to capturing the right information, comparing data with sample sizes, and sharing data with clinicians or regulatory bodies. Overall, the long-term goal is about bringing new, more effective drugs to market as safely, quickly, and cost-effectively as

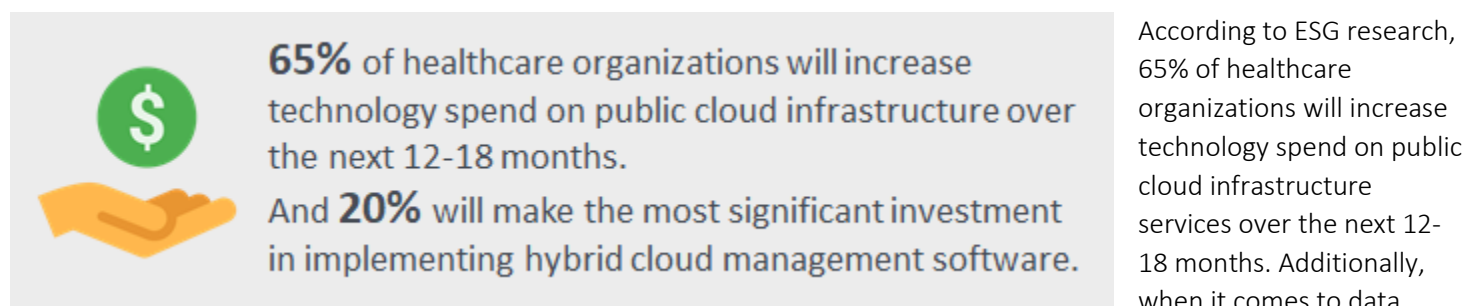
¹ Source: ESG Research Report, [2019 Technology Spending Intentions Survey](#), February 2019. All ESG research references in this white paper have been taken from this research report.

possible—and by leveraging the right technology stack and empowering IT to deliver the right services at the right time, the long, difficult approvals process can be greatly reduced.

Another example relates to companies that enable or conduct genomic sequencing. By ensuring data is secure and available on a modern IT infrastructure, companies are better able to identify patients predisposed to common diseases—allowing clinicians to personalize prescriptions and dosage amounts on a case-by-case basis. This highlights the need to support multiple applications within the same infrastructure and ensure that data is appropriately and securely shared. And data sharing has two meanings in this sense. It can mean sharing across environments (on-premises and the cloud) or sharing between different types of users.

Embracing the Cloud for Improved Accessibility and Collaboration

While organizations in the life sciences and pharmaceuticals spaces have been slow to adopt modern technologies (i.e., the cloud), due to compliance and regulatory concerns, the need for improved collaboration and data sharing give them no other alternative than to change.



center modernization, 20% of healthcare organizations will make the most significant investment in implementing hybrid cloud management software. These organizations recognize the value of the cloud and understand the importance of utilizing on-premises environments and cloud environments to their fullest extent based on current, *and future*, requirements.

Meeting Compliance and Stringent Regulations

There is no question that healthcare is a highly regulated industry, so while the cloud holds promise for certain applications and use cases in this space, pharmaceutical and life sciences companies must adhere to specific regulations, including: Health Insurance Portability and Accountability Act (HIPAA), General Data Protection Regulation (GDPR), and Health Information Trust (HITRUST), a certifiable framework providing organizations with a comprehensive, flexible, and efficient approach to regulatory compliance and risk management.

A great use case for where to apply this is the expanded and transparent view of drug efficacy as it relates to long-term patient impact. Due to federal regulations, pharmaceutical companies must be able to provide patients with access to all information that may impact their current, short-term, and long-term well-being. Pharmaceutical companies are creating interactive online portals and platforms (based on patients' prescribed medication and health plans), enabling patients to share and track their individual treatment programs and progress with the pharmaceutical companies. This type of information sharing aids in constantly improving effective treatment plans for the patients. In addition, by sharing information, pharmaceutical companies remain the top authorities on their own drugs, including the ability to best show patients the most effective ways to take their medications.

Good Laboratory, Clinical, and Manufacturing Practices (GxP)

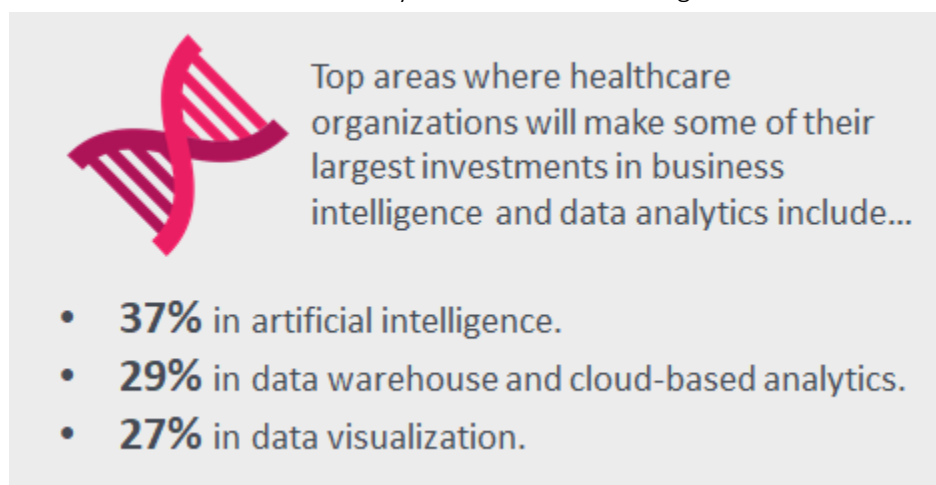
Organizations in the drug manufacturing arena are turning to the cloud to assist with Good Laboratory, Clinical, and Manufacturing Practices (GxP), a set of guidelines which was set forth by the FDA and other regulators. These practices

serve as a collection of quality guidelines and regulations to ensure bio/pharma products are safe, and that companies adhere to quality processes through their lifecycles, which include research and development, clinical trials, quality/efficacy, and manufacturing procedures. By leveraging the cloud, organizations are yielding some control of the infrastructure to the cloud providers, and leveraging the saved time to improve processes, including enhanced testing and traceability of data, enabling faster audit response.

Analytics and Artificial Intelligence (AI)

In the areas of life sciences and pharmaceuticals, the value held in the data can make or break businesses. Value-based decision-making, the speed at which an insight can be derived, and the time it takes to implement or act on that insight, can make the difference between curing cancer and failing an FDA drug approval. Hence, for companies to achieve success and derive essential insights, they must make effective use of data analytics tools and technologies.

ESG research shows that enterprise organizations in the healthcare space will make significant investments in different areas of business intelligence and data analytics initiatives over the next 12-18 months, with 27% of respondents citing data visualization, 29% citing data warehouse and cloud-based analytics, and 37% of organizations citing AI.



Using data visualization, modern pharmaceutical companies recognize the importance of efficiently communicating insights or sharing results with patients. Whether a company is conducting drug trials and needs to share data with a patient based on individual results or newly available treatments, or is highlighting ways various medications or treatments affect certain areas of the body, timely access to properly visualized data for easy understanding has a direct impact on patient satisfaction.

Big Data Analytics in Genomics

Advancements in technology and the decreased cost of computer processing and storage have allowed human genome mapping businesses to thrive, enabling them to harness large data sets of structured and unstructured data to gain meaningful and actionable insights. Genomic businesses can better personalize medicine based on processing data that examines disease conditions, available sets of normal genes, and statistical differences ascertained upon seeing the interaction of the two. What's more, AI is being used to identify patterns within genetic data sets. Based on those recognized patterns, AI models may be able to predict a patient's chances of developing a disease or determine the patient's response to various types of intervention and treatments.

Predictive Analytics to Improve Supply Chain Efficiency

Predictive analytics can enable a drug manufacturer to drastically improve a costly supply chain. From gaining insight into ordering patterns or better understanding supply utilization and expected order counts, the advantage of timely, accurate insights can assist organizations in optimized order processing, faster production, timely deliveries, advantage in pricing negotiations, and predictable supply.

Digitally Transforming Life Sciences and Pharmaceuticals with Nutanix

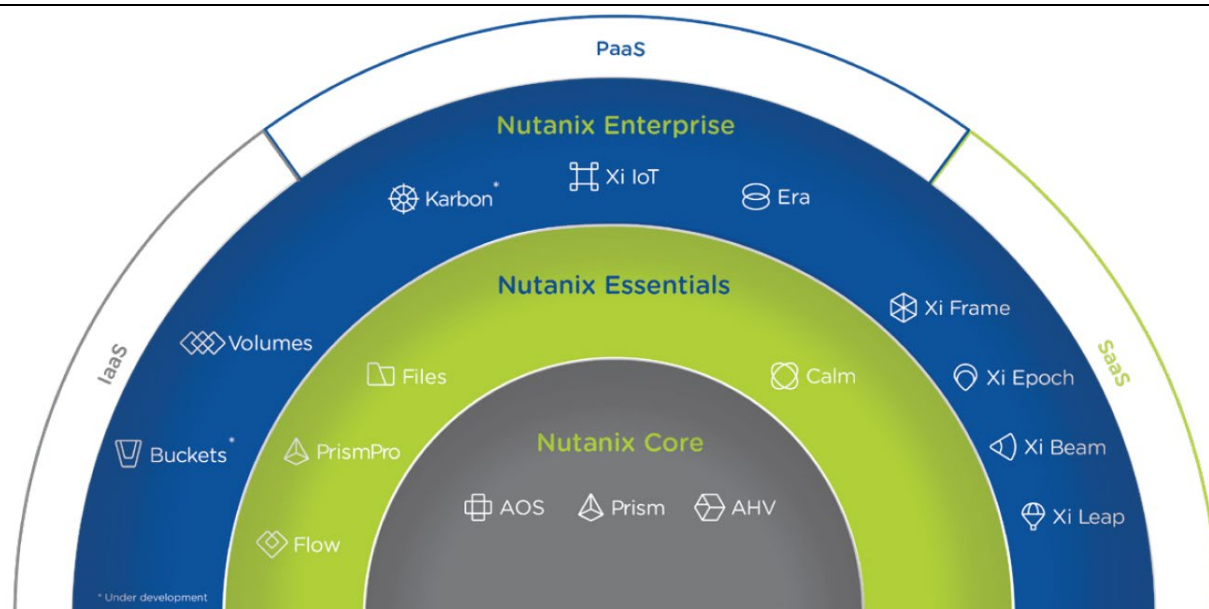
Growing and maintaining a successful business in the life sciences and pharmaceuticals industry can't be done alone. This not only requires the right solutions and tools, it requires partners with expert knowledge to support the unique needs and challenges of an organization as it progresses along the path to digital transformation.

Nutanix is a global leader in cloud software and hyperconverged infrastructure solutions. Nutanix Enterprise Cloud brings together compute, storage, networking, virtualization, data protection, security, and application automation—enabling life sciences and pharmaceutical organizations to streamline deployment and operations, while also supporting new and innovative ways to effectively interact with their most valuable asset: data.

With Nutanix Enterprise Cloud, one-click management can simplify daily operations, freeing up IT resources to focus on value-added initiatives (such as becoming more data-driven), by leveraging tools that aid automation and real-time analytics. Life sciences and pharmaceutical organizations can realize several improvements across a globally distributed IT infrastructure stack—from performance and scalability, to security and accessibility—allowing greater control over business-critical workloads, clinical- and research-based data sets, and service levels.

By providing a secure and scalable infrastructure and application stack that tightly aligns to the formidable goals of life sciences and pharmaceutical businesses, Nutanix Enterprise Cloud can assist those organizations in attaining enhanced levels of organization-wide productivity. And with Nutanix complementary cloud-based services, organizations receive assistance in minimizing resource constraints. This helps to improve the speed and efficiency of predictive analytics and genomics applications/workloads, and accelerate R&D to facilitate drug discoveries and breakthroughs in life sciences with innovative approaches to personalized/individualized medicine.

Figure 1. Nutanix Solution Portfolio



Source: Nutanix

Nutanix Prism

Nutanix Prism offers administrators a simplified means of infrastructure and application management using a single point of control across the organization—allowing valuable IT resources to concentrate on value-added initiatives that help drive the bottom line, rather than on routine, time-consuming tasks. Nutanix Prism offers easy cluster management, quickly deploying clusters for storage and virtualization. When organizations gain visibility into cluster statistics, downtime is

decreased, with little to no impact to productivity. Prism streamlines workflows through the full VM lifecycle—from creation, through IP network configuration, to protection and migration. By reducing management complexity and optimizing key business processes, organizations can reap the rewards of improved operational agility and efficiency.

Nutanix Calm and Nutanix Beam

As part of Nutanix Enterprise Cloud’s ability to consolidate key applications and workloads onto the same infrastructure stack using one-click management and multi-cloud integration, Nutanix Calm simplifies application lifecycle management by automating application creation, consumption, and governance.

Nutanix Calm offers unified application orchestration and lifecycle management for hybrid cloud environments, enabling an organization’s infrastructure to become more agile by scaling multi-tiered and distributed applications across a multi-cloud environment.

Addressing the issue of cost in a multi-cloud environment, Nutanix Beam offers organizations deeper insights into the public cloud aspects of hybrid cloud. Beam helps organizations gain visibility into cloud costs and utilization, assisting with the recognition of unused or underused cloud resources, and enabling the selection of more appropriate cloud resources per application.

Nutanix Beam also provides organizations with a means for actively analyzing cloud security operations and employing real-time scans to ensure regulatory compliance. This serves as an extension of Nutanix’s ability to deliver purpose-built security and compliance as a key differentiator, enabling organizations in the life sciences and pharmaceuticals space to more easily achieve and maintain regulatory compliance. With Beam, organizations can realize maximum agility with all of their applications—from SAP deployments (managing and gaining insight into an organization’s supply chain), to predictive analytics and genomics associated with bringing a new drug to market.

Nutanix Xi IoT

Streamlining IoT and edge computing, Nutanix Xi IoT application development platform offers local compute, machine learning, and intelligence for an organization’s intelligent edge. Centrally managed from the cloud, the Xi IoT platform offers an easy-to-use developer interface that leverages role-based access control, while real-time edge computing speeds development and deployment of data-centric applications powered by AI. With the solution, organizations can reap the benefits of a virtually invisible infrastructure, where the training, time, and expense of building next-generation applications can be considerably reduced.

Nutanix Mine

Nutanix Mine provides a single platform for organizations utilizing the Nutanix Enterprise Cloud Platform. Organizations can easily extend their existing integrated data protection to include secondary data backup and archiving—all in a turnkey, hyperconverged backup solution managed from a central console, and powered by Nutanix platform partners (Commvault, HYCU, Unitrends, Veeam, and others).

The Bigger Truth

For life sciences and pharmaceutical companies, the speed at which value can be found in data is paramount to success. Data must be accessed, processed, and analyzed quickly. Efficient business processes must be in place to ensure insights gained can be quickly made available and applied to the relevant areas of the business.

As organizations in this space progress down the digital transformation path, throughout the data lifecycle it's more important than ever for data to be properly stored, controlled, and secured to ensure compliance. This is especially crucial as new technologies are added to an already complex data pipeline, including big data processing, advanced analytics, and machine learning.

So, what should you do if you're in the life sciences or pharmaceutical space on the digital transformation path in need of IT modernization to better support the needs of the business? First and foremost, understand the specific benefits you are hoping to achieve. Find out which applications are in the greatest need of modernizing. Are there clear and distinct areas where the infrastructure is holding not just an end-user but the entire business back due to some form of limitation and/or complexity? If you're looking to embrace next-generation technology, it is likely that a legacy infrastructure will not be able to support the performance and scalability demands placed upon it. Understand workload requirements, formulate migration plans (if workloads will be moving from legacy to a modern infrastructure), and establish metrics to measure success.

Whether consolidating legacy infrastructures, simplifying management, aligning IT to embrace a cloud-operating model through hybrid cloud infrastructure, or integrating next-generation technologies such as AI and IoT, life sciences and pharmaceutical organizations recognize the importance of becoming more agile, efficient, and cost-effective in meeting operational requirements. With Nutanix, organizations gain the tools and experience to help achieve those goals.

To learn more about Nutanix in life sciences and pharmaceuticals, visit <https://www.nutanix.com/pharma>.

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