IBM Z Healthcare Industry Point of View

Healthcare is an industry primed for a radical transformation of its digital infrastructure. A fundamental shift in the expectations of all stakeholders - patients, governments, payers, employers and providers - is driving transformation across the entire industry. Processes, professions, models and structures across healthcare are all in need of reinvention. Leaders in the industry are aggressively pushing innovation into the core of their business and service models to radically change their way of delivering service. They are focusing on wellness and outcomes as well as managing risk. Data portability and interoperability of records between systems is needed to enhance communications and allow patients and practitioners to seek the best data-led outcomes. As value becomes understood as a measure of health and well-being, leading healthcare organizations are responding by establishing the characteristics for a more coordinated efficient and purposeful healthcare system.

In 2016, over 2.5 quintillion bytes of healthcare data was created every day. Healthcare institutions can harness this massively increasing volume of data to deliver meaningful insights and inspire action to improve care, quality, outcomes and innovation. The wealth of patient medical records and data that healthcare institutions own, both structured and unstructured, is key to building these personalized experiences. IBM LinuxONE™ is a highly engineered data centric system focused on capturing critical data systems and extending capabilities around them. LinuxONE addresses a client's need to have real-time, consistent data to quickly make business decisions and improved patient experiences based on the data. LinuxONE is a highly secure data serving and transactional system for both the cloud and non-cloud environments. It is centrally aimed at capturing traditional Relational Database workloads like Oracle and Db2®, as well as open source workloads based on MongoDB, Postgres and MariaDB. Once the data is captured, the growing ecosystem can be leveraged to add additional capabilities such as analytics and cognitive solutions. With IBM's DBaaS reference architecture, service providers can deploy new LinuxONE based services. This foundation provides access to new transactional systems like Blockchain and the High Security Business Network (HSBN) through cloud based IBM Cloud offerings.

With analytical technologies on LinuxONE, healthcare institutions can leverage self-learning behavioral models to anticipate patient needs and apply insight to take action in real time. These capabilities enable sophisticated, highly optimized analytic processing where the most highly sensitive patient data resides with no data movement required. Healthcare institutions can improve outcomes with point of care insight achieved by combining real time and historical patient information with data from Internet of Things connected devices and other sources to suggest possible patient diagnosis, identify patients with high readmission rates, define thresholds for abnormal lab results and more. Analyzing data in-place significantly reduces the security risk and data governance complexity associated with copying highly sensitive healthcare data. These technologies can also be used to rapidly identify emerging patterns of fraud, as they are occurring, to minimize losses, reduce investigation and recover costs. Additionally, LinuxOne operations analytics solutions integrate cognitive capabilities to optimize performance and availability of critical healthcare systems.

Healthcare is a complex ecosystem with hundreds of clinical and business processes made up of thousands of sub-processes. When properly integrated, these processes should seamlessly unite all stakeholders - patients, governments, payers, employers and providers, assets and information, delivering the right information and resources at the right time to the point of care. Highly flexible, agile systems that can respond quickly to consumer needs, technology innovations and regulatory requirements and are enabled to connect and interact with the ever expanding ecosystem of partners are essential for healthcare institutions to remain competitive and relevant.

Healthcare institutions are transforming core business applications and processes using APIs and microservices to increase agility and flexibility and reduce cost. Without changing backend systems or requiring IBM Z® skills, mobile and cloud app developers can create new services using APIs and microservices to connect to the existing data and transactional systems on LinuxONE by utilizing the IBM Cloud Private. IBM's Cloud Private provides a single platform that enables enterprises to both innovate and optimate. IBM Cloud Private empowers both developers and administrators to meet their business demands instantaneously. Developers can utilize a rich stack of built-in

development tools and services, while operations teams are able to access a powerful set of enterprise management tools. Customers can accelerate their application and middleware modernization by using container-based middleware, data and analytics, as well as by integrating within the enterprise and to the public cloud services using API connectivity and management.

Healthcare institutions are also looking at innovative new technologies such as Blockchain to reimagine key business processes such as medical/health record management, regulatory compliance and asset management. IBM Blockchain platform offerings include a High Security Business Network, a cloud services offering underpinned by IBM LinuxONE that provides a permissioned network with the highest transaction rates and a hardened security environment with unique features including the Secure Service Container – a virtual appliance lockbox.

The current healthcare infrastructure is challenged to support the security or interoperability requirements of connected lives. Privacy and security of health records and personal medical data is vitally important, yet cyberattacks are becoming more sophisticated and data breaches are increasing with the financial impact of a healthcare data breach averaging $4M per event. In this environment, the ability to distribute medical records safely between medical institutions for both ongoing and urgent care remains a huge challenge. The use of mobile healthcare apps and health related data being collected by Internet of Things (IoT) connected devices is exploding. To harness the power of these new data sources, the information and the data flows need to be highly secure and yet accessible by healthcare practitioners.

Extensive use of encryption is one of the most effective ways to help reduce risks and losses of a data breach and help meet complex compliance mandates. LinuxONE has unrivaled encryption capabilities to help defend and protect business critical data at rest and in flight – transparently – with no changes to applications with IBM Pervasive Encryption. Centralized data encryption policy-based controls significantly reduce the costs associated with data security and achieving compliance mandates such as HIPAA (Health Insurance Portability and Accountability Act), General Data Protection Regulations (GDPR) and others. Integrated encryption, data protection, identity and access management and security intelligence and audit on LinuxONE provide healthcare institutions with a highly optimized, cost effective security environment.

LinuxONE helps the world's most complex organizations and quickly growing enterprises outthink the competition. Rely on LinuxONE to deliver agility and efficiency through cloud, transact faster through Blockchain, create outstanding consumer experience through analytics, and ensure service and data protection through the world's most secure systems.