

# Software Defined Anything seeks to challenge the way we use technology

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## **Software Defined Anything seeks to challenge the way we use technology**

Software Defined Anything (SDx) is set to change the world as we know it by the same proportion that the internet has changed the business landscape over the last decade. With SDx, if you can think it, it has the potential to become reality. The framework behind SDx enables applications to understand, predict and deliver reliable capabilities and experiences to the end user regardless of location or device. As a result, conventional technology restraints such as storage, network access and physical access controls will become irrelevant. The results will yield repeatable, sustainable, secure solutions that reduce costs and quickly deliver innovation into the hands of users securely, and without traditional constraints.

Netflix is one of the first to take a leap into the realm of SDx. The company's initial offering in 1997, included the ability for individuals to rent DVDs which were then delivered and returned via the U.S. Postal Service without late fees. Netflix made the leap to streaming movies online in 2007. The streaming service now includes the ability for Netflix to understand user preferences, make recommendations based upon watch history, reliably stream movies from any of thousands of internet-enabled devices, and resume playback from the point a viewer's experience was interrupted. Prior to 2007, the capability to select and play a movie on demand from almost anywhere was unfathomable. In today's world, Netflix subscribers have the freedom to watch movies without traditional hardware constraints such as being in possession of and configuring a recording device or being at home in front of a television.

Netflix and others are only scratching the surface for how SDx can be successfully applied to innovate the end user experience. With the nearly endless possibilities of SDx, a team of researchers at Idaho National Laboratory (INL) decided to create a proof of concept to emulate the use and security of the laboratory's business systems accessed by a large number of Virtual Machines (VM). INL's team was led by Wayne Simpson, Innovation Architect. The first challenge the team had to overcome was traditional ways of thinking about application development and implementation. In considering how SDx can be applied to the business environment, Simpson says, "regular controls now can be software defined and hardware will no longer be required to possess the intelligence to implement controls."

By overcoming conventional hardware-based controls, INL succeeded in its development of a virtual environment for its business systems, fully emulating the configuration and usage of each VM upon which the business systems run. This was accomplished by Robert Murray, INL's Oracle Technical Database Architect. He first developed a template for the VMs. Once constructed, the template was cloned and tested - a process that took a developer approximately 45 minutes from start to finish. Each clone was isolated from the others using logical separation. During testing, the team discovered that changes made to the template's security and enclave configuration controls were applied to the clones automatically in a secure and repeatable manner. Moreover, during additional testing, the developer made configuration changes to the template while simultaneously creating additional clones. Despite logical separation, all clones implemented changes automatically and identically. The template remained secure and pristine, keeping all clones in sync.

Through the development of this prototype, INL succeeded in proving the potential for SDx to deliver amazing outcomes. The virtual environment created at INL demonstrates how SDx can be used to improve security, repeatability of processes and consistency in results. By adopting SDx as an innovation tool, it is readily apparent that organizations will ultimately reap benefits such as reducing employee workload, improving security controls and optimizing investment in technology.

As the use of hardware for the intelligence necessary to implement access and security controls diminishes, organizations must overcome traditional thinking in applying technology constraints and seek to drive changes in regulatory restrictions. As these challenges are addressed, SDx will become more widely adopted to change the world in terms of how information is accessed and consumed world-wide.