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Software-Defined Networking, Payments Systems and zEnterprise

Last year, I wrote a column for *Enterprise Executive* that introduced software-defined networking (SDN) to readers. SDN is a relatively new approach to computer networking, which evolved from some preliminary research and work done at UC Berkeley and Stanford University in 2005. SDN proposes to disaggregate traditionally vertically integrated networking stacks to improve network feature velocity and customize network operation for specialized environments. At the same time, this disaggregation will improve network flexibility and manageability. SDN enables "mass customization" of network operations to better support differentiated cloud services. SDN is comprised of a group of technologies that open the data, control and management planes of the network to participate more easily in broader orchestration frameworks through application programming interfaces (APIs).

On June 10, I gave a presentation at the 2014 Enterprise Computing Community (ECC) Conference. This was the sixth ECC Conference since its inception in 2009. The ECC and Conference are hosted by Marist College. My presentation title was "Software-Defined Networking, Payments Systems and zEnterprise." Wait a minute, that's the title of this column. Well, yes indeed, and I'm glad to see you're paying attention!

What is an e-payment system? They're integral parts of modern e-commerce and range from the familiar credit card systems, debit card systems and point of sale terminals, all the way to digital currency technology such as the dreaded bit coin. One well-known example of a large, modern, electronic, network-based payments system is VisaNet. VisaNet handles 150 million transactions daily in 175 different global currencies. In 2013, worldwide, VisaNet processed 90 billion transactions with a total payment volume of $7 trillion for its 2 billion card holders and 36 million merchants.

Another well-known example is Citi's Transaction Processing System. Anthony DiSanto, managing director, global head of Core Infrastructure Services at Citi, was one of the featured speakers at the New York IBM System z Mainframe 50 event on April 8, 2014. Some highlights from DiSanto's talk:

- Citi processes 40 million U.S. ATM transactions daily.
- Globally, Citi processes 150,000 transactions/second daily on its mainframes.
- Citi processes 500 million global CICS transactions daily.
- As of March 31, 2014, Citi's Transaction

Processing System (TPS) has provided 4,591 days of uninterrupted ATM 24x7 service to customers.

The modern IBM mainframe (zEnterprise) is the centerpiece of many payments systems (such as VisaNet and Citi's TPS) used in billions of transactions processed daily worldwide. Why? It's pretty simple: unrivalled high availability, centralized data storage, recovery, workload and performance management, scalability and security/encryption capabilities. These payments systems networks have traditionally been based on hardware. SDN represents a new paradigm in networking that has the potential to significantly improve payments systems.

SDN represents a "new" approach to networking that allows network operators more control of their infrastructure, allowing customization and optimization that enables invention and delivery of new types of network services. These network services have the potential to drive new business models, products/services, technologies and/or reduce capital/operational costs. One such example would be with the growing proliferation of mobile banking technologies. Typically, for major changes to take place in network architectures, what we call a "compelling event" must occur to drive the change. Today, there are three such events ongoing with e-payment systems:

1. The ongoing reaction and actions being taken as a result of the 2013 Target data breach
2. The end of Windows XP support: 95 percent of ATMs worldwide need to migrate to a new OS. This represents a change internally to the ATM, which could lead to an internal architectural change to the ATMs themselves.
3. The long overdue move to Europay, MasterCard and Visa (EMV a.k.a. PIN-Chip) technology in the U.S. over the next three to four years as liability shifts from the card issuer to the ATM/POS terminal owner occur.

System z networking personnel are already familiar with network virtualization (VTAM anyone?) and SDN concepts via z/OS Communications Server. SDN really represents a way for financial companies to deliver a lot of innovation to customers via their networks. Finally, as you examine cloud computing further, you will see SDN is really the foundation going forward for private cloud architectures. Payment systems represent an ideal system for a private cloud and some are already there today. **EE**

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