Large Paradigm Shifts in Software Within Cloud Computing and Data Centers

MATT HEDBERG — RBC CAPITAL MARKETS

MATT HEDBERG, Analyst, joined RBC Capital Markets in 2006. While at RBC Capital Markets, Mr. Hedberg has published multiple white papers on the software industry and has deep knowledge of both public and private software companies. His current software coverage universe focuses on application, security and data center-related names where he was named as a "Rising Star of Wall Street" by *Institutional Investor* in 2012. Matt is a frequent contributor to CNBC and Bloomberg television and is often quoted by leading publications including *The Wall Street Journal* and *Barron's*.

SECTOR — MULTIMEDIA SOFTWARE

(AFJ801) TWST: What is your coverage in the software space?

Mr. Hedberg: I have fairly extensive coverage in the space. I cover about 26 names across security, applications and infrastructure.

TWST: There are a lot of different definitions for some of these terms. How do you define the application space?

Mr. Hedberg: In general, it refers to applications a business owner would interface with, like **salesforce.com** (CRM). There is a fine line, to be quite honest, but a lot of times application software focuses on the productivity side or the user-interface side. A company like **VMware** (VMW) provides infrastructure for data center and does not really provide applications in the traditional sense. **Citrix** (CTXS) has some applications, plus they also have infrastructure software. We generally think of application software having a user interface.

TWST: What are the trends we are seeing in the space right now?

Mr. Hedberg: There are some large paradigm shifts going on right now in software. If you think about historically, we came from a mainframe era that was defined by **IBM** (IBM) and others that was very much what we call the distributed architecture, or you had all the processing going on in central locations and the interfaces was through what we called dumb terminals. Then **Microsoft** (MSFT) and **Intel** (INTC) came around and introduced the personal computer or the PC, and then we went from a mainframe to more of a distributed computing environment called client/server. That moved a lot of the processing from a data center to a workstation. That was a huge paradigm shift.

Now with cloud computing, we are almost seeing a little bit of reversion to a mainframe-like environment, where you are seeing more processing in the cloud, for instance **salesforce.com** rather than our own desktop and users interface to the cloud through an Internet browser. The other big paradigm shift right now is what data centers look like. Historically a lot of the processing took place on hardware and software interfaced with the hardware. When **VMware** came around, they introduced the hypervisor, which allowed IT to streamline how they run their processing, which we call compute. You were able to get a lot more compute done on less hardware because you were virtualizing these operating systems, and you had much higher density, higher throughput, which was very, very cost effective. You could reduce your capex spending with similar or even more compute power.

When you think about a data center, there are three components: compute, which is the servers; and then you have networking gear from vendors such as **Cisco** (CSCO) and **Juniper** (JNPR); and then you've got storage, so **EMC** (EMC), **NetApp** (NTAP), things of that nature. Now we

Highlights

Matt Hedberg discusses his coverage of the software space, which ranges across security, applications and infrastructure. Mr. Hedberg says there are large paradigm shifts going on in software, with cloud computing creating a reversion back to a mainframe-like environment and a shift to software-defined data centers.

Companies discussed: Salesforce.com (CRM); VMware (VMW); Citrix Systems (CTXS); International Business Machines Corporation (IBM); Microsoft Corporation (MSFT); Intel Corporation (INTC); Cisco Systems (CSCO); Juniper Networks (JNPR); EMC Corporation (EMC); NetApp (NTAP); Red Hat (RHT); RealPage (RP); Q2 Holdings (QTWO); Fleetmatics Group PLC (FLTX); Oracle Corporation (ORCL); SAP AG (SAP); ServiceNow (NOW); PTC (PTC); Proofpoint (PFPT); Imperva (IMPV) and Qualys (QLYS).

are seeing a paradigm shift called software-defined data centers, where people are taking similar principle that we apply to servers, i.e. **VMware** virtualization, and we are applying some of those same principles to storage and networking gear to try to put more of this logic in the software layer, effectively trying to do more with software and do less with hardware. That is called software-defined data centers. It's a huge paradigm shift that certainly plays a role in cloud computing as well, but this is a 10-year or more trend that we think is certainly very disruptive.

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TWST: Are you seeing companies adjust to these trends across the board, or is it a case where those that are able to adjust are better positioned for success than those that are not?

Mr. Hedberg: You have certain verticals that are more on the cutting edge, if you will. These verticals tend to be financial institutions, insurance, health care, things of that nature, with the primary vertical being financial institutions. They are adopting software-defined data centers at an increasing pace, and oftentimes we see what plays out in a vertical like financial services over a decade, eventually starts to play out in other vertical like retail, like transportation, things of that nature. The same early adopters that we've seen in other paradigm shifts, it tends to largely be financial institutions where they have large IT budgets, and they've got the expertise to be able to realize some of these savings.

That tends to be where we are seeing some of the early adaption, but we expect that to certainly follow trends like we saw in other areas. Companies like **Red Hat** (RHT) saw a trend of moving operating systems from UNIX to Linux and have been taking advantage of this trend for last 10 years, but they saw early adopters in some of these leading-edge verticals, and now they're starting to see some proliferation to what they call mainstream verticals. So we would expect similar trends in software-defined data centers in terms of adoption.

TWST: We also talked about the cloud, which definitely seems to be pushing everyone in that direction. Is that accurate?

Mr. Hedberg: Yes. **Salesforce.com** was really the poster child for the cloud computing revolution, and now we are realizing more and more that there are very few limitations to what can be delivered as a cloud service. That is certainly the case in some of this next crop of software as a service — SaaS — or cloud computing vendors.

Vertically, specific applications are popping up all the time, so trying to apply principles that have worked for say sales force automation — SFA — to say real estate for a company called **RealPage** (RP) or for banking by a company called **Q2** (QTWO) or for fleet management by a company called **Fleetmatics** (FLTX). We are seeing a lot of these core tenants that work for companies like **Salesforce.com** now spill out into other verticals.

Salesforce.com was the first real evangelist, if you will, for cloud computing, and you are seeing other waves of this. You saw whole wave of what we call human capital management vendors, so companies like Taleo and SuccessFactors and Kenexa, all kind of pop up and subsequently now largely have been acquired. You are seeing companies like **Oracle** (ORCL) and **SAP** (SAP) and **Salesforce.com** buy some of these next waves that we have seen of cloud adoption and consolidating; now itself they get to really critical mass. But we absolutely think there is really very few limitations to what will be delivered as a cloud service in the future.

TWST: You just talked about consolidation a little bit. Is that something we're going to continue to see in this space?

Mr. Hedberg: I would expect so, yes. Software by its very nature is a consolidating market, and we would certainly expect that to continue not just within software as a service but within some of the security names. We have seen a lot of consolidation there. Over the past five to 10 years we would expect that to continue.

Oftentimes you see a lot of the innovation coming from early VC-backed companies that continue to really try to look at a problem in a very disruptive sort of manner, and they are able to think outside the box and really be disruptive. Oftentimes what you will see is these smaller companies largely go unnoticed at first, but as they get bigger and more critical mass, they become more of a nuisance to the larger companies to the point where it becomes easier for them to just buy smaller company and absorb that into the larger organization.

TWST: Who are some of your favorites, and why do you like them?

Mr. Hedberg: We are trying to identify some of these more disruptive companies that can be tomorrow **salesforce.com**, if you will. Some of them are bigger, some of them are smaller, but universally they are all generally benefiting from some of these big themes. One of the themes we talk about is Big Data and historically, a lot of data has remained unused. Now we are able to have tools that harvest this data.

1-Year Daily Chart of VMware

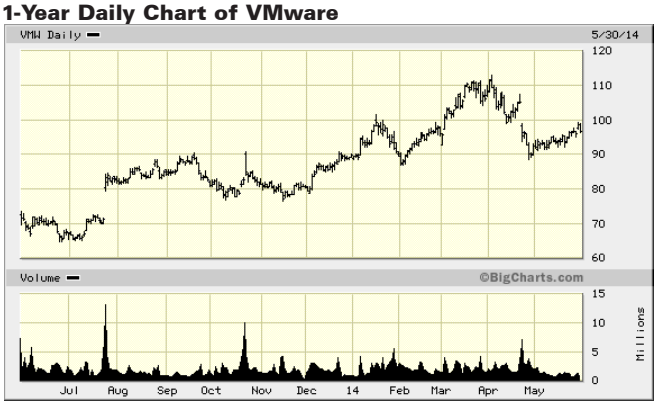

Chart provided by www.BigCharts.com

Another big trend that we are watching is the Internet of things. We have written on in the past, Internet-connected devices, it's almost like the universe is developing a nervous system with

all these interconnected devices; it's really limitless what data individuals can harvest from devices including washing machine, shoe, blender — it's really quite amazing. So the common theme with a lot of our favorite picks are names that we feel that can really capitalize on some of these larger trends.

Some of our favorite names, a name like **VMware** in the large-cap space, it certainly is playing a predominant role in this whole concept of software-defined data centers that we talked about. They are applying these similar principles from the compute layer to both the networking and now more recently the storage layer. So we think that the company is doing a great job of reinventing themselves away and trying to diversify themselves away from their core hypervisor server virtualization market to some of these newer, more nascent opportunities that we are starting to see early traction. So we like **VMware**.

One of our favorite cloud companies, software-as-a-service vendor, is a company called **ServiceNow** (NOW), another large-cap name that we feel is taking some of these principles that **salesforce.com** really brought to light in for sales force automation. They are applying those to the IT market, so they are helping companies of all sizes think about how they deploy and run an IT organization.

It involves capitalizing on some of the cloud-computing trends we have talked about. That is a very interesting name that could be become a real platform not only within the IT organization but I think even more importantly expanding beyond IT into applying principles that they learned to other services like HR, financial. So to me that's a very, very interesting name to look at on a longer-term basis.

There is a midcap company called **PTC** (PTC) that is, I think, interestingly positioned to benefit from the Internet of things. They are deeply involved in the manufacturing of devices, helping companies model devices, and along the way they can help companies Internet-enable these devices and now have the ability to have developers write applications that harvest all this information these Internet-connected devices are producing. It is a great way to play this Internet of things opportunity, which can be quite large and daunting to the average investor, but I think **PTC** to me is a real tangible way to play that trend, and I don't think it's fully discounted in the stock today; I think it's a more of a call option for those guys.

Within the security space, some of the big trends we are talking about here, it's cloud computing, it's software-defined data centers, it's Big Data, it's Internet of things, but it's also security. You are seeing more and more breaches. So security is always very, very topical for organizations; it's always top of mind, and the security companies are always trying to stay one step in front of the hackers, and so thematically we like the security space.

One of our favorite names as a company called **Proofpoint** (PFPT); it's a little smaller, small-cap security company, but we think it's disruptive in taking share from larger competitors and quite frankly in a market that we think has significant greenfield in front it. So thematically we do like security; **Proofpoint** is one of our favorite small-cap names in that space.

The other two that we like — company called **Imperva** (IMPV) and another company called **Qualys** (QLYS) — all three small-cap security names that I think should benefit from not only this ongoing security trend but ultimately could be consolidation candidates as well.

TWST: Are valuations similar in the application and security space?

Mr. Hedberg: Generally valuations are higher in cloud computing names. Security companies generally speaking collect revenues in a license and maintenance model, and now with **salesforce.com** and other cloud computing names, we realize there is a different way for software vendors to charge customers rather than upfront license and on ongoing maintenance payments. Software-as-a-service vendors offer subscriptions to their services, so oftentimes you get a lower upfront payment just like the difference between buying and renting a car.

The same sort of principle applies here. Over time you're generally paying more for a lease than you would if you were to just buy the car, hold it for 10 years. So generally investors are willing to pay a premium for subscription-based names, because there is often perceived to be a higher long-term value associated with names like that, so the valuations for software-as-a-service names tend to be elevated beyond, say, security names for instance. Generally speaking, we think that subscription model is the model that wins out longer term; investors are willing to pay premium for names like that.

TWST: What do you suggest that investors focus on when they are looking at the space?

Mr. Hedberg: I think ultimately the software space overall is still a very dynamic market, evolving at a very rapid pace. The trends tend to change very rapidly, which can cause sometimes wide swings in valuations. We certainly saw that during the first quarter of this year, where results were generally better than we and the Street expected, but because valuations had such a big run, there was oftentimes fairly large price movements even after good results. So it's a market that is evolving at very rapid pace, which tends to lead to volatility.

Depending on the risk tolerance, there are certainly other avenues for less volatile movement. That would typically mean **Microsoft**, **Oracle**, larger-cap companies like that that actually have had very nice runs here recently, less volatility there then say, **ServiceNow** for instance that they can move around. It sort of depends on the risk tolerance of investors, but we would generally continue to look for what are the larger trends that the software landscape is undergoing. I think the biggest one, if you had to isolate, is still cloud computing software-as-a-service, because it does play into a lot of these other trends to a certain extent. Generally we are bullish toward cloud computing and SaaS, software-as-a-service, and so we would tend to have people focus on thematic ideas within that space, if the risk tolerances is appropriate.

TWST: Thank you. (LMR)

Note: Opinions and recommendations are as of 05/13/14.

MATT HEDBERG
Analyst
RBC Capital Markets
One Liberty Plaza
165 Broadway
New York, NY 10006
(212) 858-7000
(212) 428-6200 — FAX
www.rbccm.com