Big Switch's Coming Out Party

- **Open SDN private company, Big Switch, announces product availability**
  Big Switch, a pioneer in open Software Defined Networking (SDN), announces the general availability of its product suite comprised of an SDN Controller and two SDN apps - a network virtualization app (BVS) and network monitoring app. The controller scales to a 1000+ switches while BVS enables up to 50% more VM’s per rack, resulting in $500K/rack in capex savings and $30K/rack/yr in opex savings.

- **Extensive ecosystem includes networking, security, chip, software firms**
  Big Switch also unveiled an extensive ecosystem of partners including Broadcom, Brocade, Citrix, Dell, F5, Fortinet, Juniper, Microsoft, and Palo Alto, amongst others (Cisco, VMware notably absent). Quotes from customers Goldman Sachs and Fidelity further speak to the promise of SDN in enabling more robust and responsive IT infra., and in bringing transformational change to networking.

- **Still early days for SDN but gaining momentum**
  While our most recent CIO survey highlighted most of our respondents still foresee SDN deployments more than 12-24 months away, we believe these announcements from Big Switch are evidence of increasing momentum for SDN in the industry.

- **Investment Implications: No change to thesis; Foresee Cisco responding**
  We continue to view SDN as less about HW commoditization and more about increased network agility and efficiency, though open interfaces and apps like BVS allow for vendor choice and potentially lower demand long-term. We expect Cisco to respond likely by embracing a more open view of SDN as well. With a large installed base, PE of 8x, EV/FCF of 5x, a lot of negativity is priced in. Retain Buy.

**Chart 1: Big Switch Logo**

Source: Big Switch and UBS
Summary

There has been much buzz in the networking industry on software defined networking (SDN), especially over the past year, and rising in amplitude following VMware’s acquisition of Nicira, and likely to move a notch higher now with Big Switch announcing the general availability of its product suite. Big Switch, a private company based in Palo Alto, California, is among the more prominent proponents of open SDN - with a focus on industry standards, open application programming interfaces (APIs), and platform independence supporting both physical and hypervisor switch, security, cloud orchestration, and application vendors. This open SDN approach differs from the current model where networking hardware and software for routers and switches is vendor proprietary (i.e. locked) and distributed, making it more difficult and costly to reconfigure or upgrade the network, and more of a challenge to interconnect with other hardware elements.

Big Switch's vision for SDN is centered around a simple 3-tier architecture comprised of a data plane tier (physical and virtual switches); a control plane tier (the smarts of the network); and an application tier, allowing for existing functionality to be ported and net new networking functionality to be created. The interfaces between the application layer and control layer, and control layer and data plane (OpenFlow protocol), are open allowing for flexibility in network design and choice of vendors. The Big Network controller is an open-source based controller.

Chart 2: Big Switch 3-Tier SDN Open Architecture

Big Switch, one of the more prominent proponents of open SDN, unveils product suite and an extensive ecosystem of partners
Product Suite Now Generally Available

The product suite unveiled by Big Switch, which is generally available now, comprises of a Big Switch Network Controller (BNC), and two applications - a network virtualization application, or Big Switch Virtual Switch (BVS), and a network monitoring application, or Big Tap. The BNC supports 1000-plus physical and virtual switches and 250K new host connections per second, while BVS network virtualization application supports 32K virtual network segments and will enable a level of network agility and dynamism that should allow for up to 50% more virtual machines (VM’s) per rack. Big Switch’s own analysis suggests that these higher VM densities could result in capex savings of up to $500K/year and opex savings of $30K/rack/year.

Both applications are meant to overcome static inflexible configurations today, either between server racks and subnets or between ports and network monitoring tools that limit network scalability and agility.

Impressive Ecosystem with 25-plus Partners

In addition, Big Switch unveiled its partner ecosystem, an impressive list of vendors comprised of 25-plus networking, security, chip, cloud orchestration, and application partners, including Broadcom, Brocade, Citrix, Dell, F5, Fortinet, Juniper, Microsoft, Palo Alto, amongst others. Quotes from customers Goldman Sachs and Fidelity further speak to the promise of SDN in enabling more robust and responsive IT infrastructures, and in bringing transformational change to networking. We believe Big Switch’s open SDN architecture has the largest ecosystem of partners with potential to support a broad range of network apps, and a wide variety of deployment options.
**Subscription-based Pricing Model**

All three products are available now from Big Switch, with a subscription-based, flat pricing model, typical of many other enterprise software models. Annual subscription fees start at $20K for BNC, or less than $1,700/month; $6K for Big Tap, or about $500/month; and $50K for BVS or less than $4,200/month.

We believe BNC pricing is for a base product that should not increase, unless redundancy is required, which we anticipate most customers will want. Under that scenario, we believe customers will pay a discounted rate for the second clustered controller.

We believe Big Tap pricing is based on a per tool basis, with the first tool priced at $6K/year, and additional cost as customers add tools.

Finally, we believe pricing for BVS is based on a starter kit supporting 25 switches or virtual network segments (similar to legacy VLAN’s), and increases as customers add more switches or virtual network segments. We believe to-date Big Switch has seen over 10,000 downloads of the BNC.

**Flexible Deployment Options**

In the chart below, we show the deployment options available from Big Switch, including a pure overlay solution on top of a non-OpenFlow physical network; a pure OpenFlow solution with native OpenFlow in physical switches; and a hybrid approach supporting OpenFlow physical switches and OpenFlow overlay.

*Source: Big Switch and UBS*
Although Cisco’s dominant market share in enterprise networking (65-70% share of the global Ethernet switch market per Dell’Oro) means it has the most to lose from an architectural shift to SDN, we expect Cisco to respond in time, potentially by embracing a more open view of SDN as well. And while open architectures offer the promise of increased flexibility and agility, in practice more proprietary or hybrid solutions from existing networking vendors may hold their own advantages in terms of raw performance particularly for those IT organizations that prefer to buy from a single provider.

We believe Cisco will likely move towards a solution that preserves some integration between its hardware and software, leveraging development out of its spin-in Insieme (likely working on a new SDN controller and new switch
hardware). We believe the Cisco solution is unlikely to be entirely open, with network intelligence distributed across the controller and network elements with open API’s exposing the network to applications. With this approach, we believe Cisco will attempt to mitigate the “dumbing” down of its network elements. Just as in the mobile world with iOS (more tightly coupled hardware/software model) and Android (open operating system), we believe we are likely to see multiple SDN models thrive.

Given Cisco’s large installed-base, we believe they will have to be a significant player in SDN development especially if dictated by customer requirements. With a PE of 8.5x and EV/FCF of 5x, both at significant discounts vs. its historic average, we think a lot of negativity is already priced in the share price and we maintain a Buy rating in light of Cisco’s solid return profile.

We continue to believe Juniper faces challenges, though near-term a T4K upgrade cycle, PTX deployments, and cost-cutting could provide some tail winds. If concerns from SDN are taken to the extreme with fears of hardware commoditization, we believe Juniper remains vulnerable as well. With the stock trading at ~18x UBSe CY13 EPS estimate of $1.00, and with only one pillar, routing, showing meaningful traction, we continue to retain a Neutral rating on Juniper.

Finally, we continue to assess the potential impact of SDN on F5. We believe F5 continues to evolve into a strong platform company, leveraging its operating system and iRules framework to branch into several adjacencies including security, policy management, traffic steering, and diameter routing. The exact impact of SDN remains less clear to us at this juncture for F5. We continue to retain a Neutral rating on F5.

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**Statement of Risk**

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<th>UBS 12-Month Rating</th>
<th>Rating Category</th>
<th>Coverage</th>
<th>IB Services</th>
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<th>UBS Short-Term Rating</th>
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<tr>
<td>Sell</td>
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1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Rating allocations are as of 30 September 2012.

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<td>Sell</td>
<td>Sell: Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.</td>
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<th>Short-term rating</th>
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Source: UBS. All prices as of local market close.
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Cisco Systems Inc. (US$)

Source: UBS; as of 12 Nov 2012

F5 Networks, Inc. (US$)

Source: UBS; as of 12 Nov 2012
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