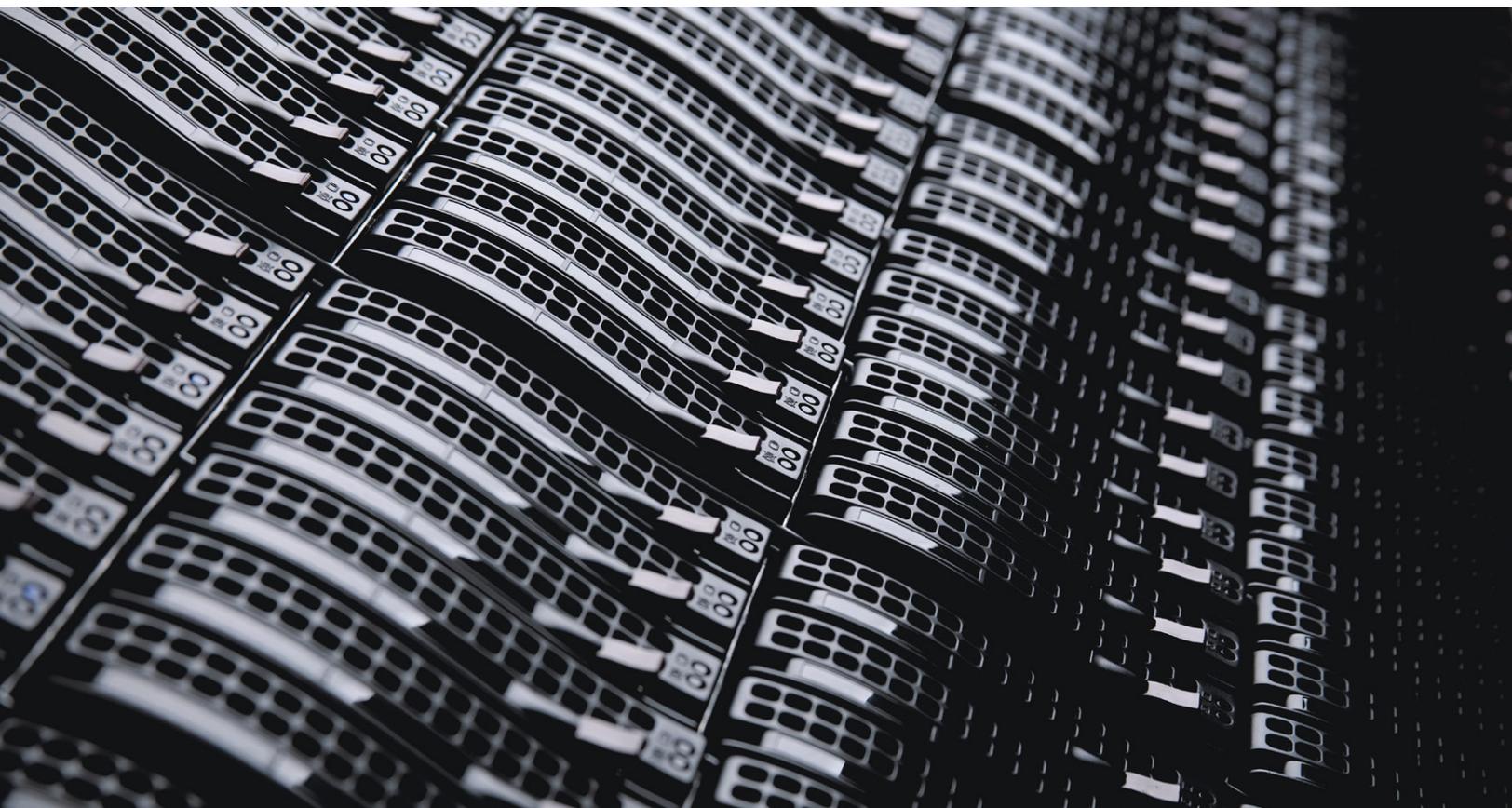


Technology, Media & Telecommunications Practice

Hardware's business-model shift: Finding a new path forward

New business models present an opportunity for IT-infrastructure providers, who are facing a migration in value as buyers demand cloud-like, customer-centric experiences.

by Himanshu Agarwal, Chandra Gnanasambandam, Mitra Mahdavian, and Srinath Nagarajan



IT-infrastructure providers face an unenviable challenge. Technological change has led their customers to view hardware appliances as commoditized. At the same time, cloud-based vendors and hyperscalers have set new norms for simplifying customers' experiences of purchasing IT infrastructure. As a result, savvy chief information officers (CIOs) and IT buyers now demand a cloud-like experience even when buying on-premises IT infrastructure, such as pay-per-use models for on-site equipment to help them manage the complexity of their hybrid deployments and IT needs.

Take the case of networking. Advancements in software-defined networking (SDN) help centralize the network's intelligence and control to the software layer, resulting in the standardization of the underlying hardware. The opportunity for OEMs to compete on hardware-feature innovation has all but dried up as a result. Intense competition from new software-led competitors and cheaper substitutes coming onto the market further accentuate this challenge.

Given these forces, IT-infrastructure OEMs have little choice but to reinvent their business models to increase the share of recurring revenue from subscription, software, and services. Yet many OEMs struggle with their business-model-transformation strategy and its execution. A successful transition requires four key elements, starting first and foremost with selecting a new business model that works best for that particular company. After that critical decision is made, the process involves reinventing core business functions, managing the economic risks of such a major shift, and embracing a flexible and agile new organization and operating model.

The rewards of a business-model transformation

IT-infrastructure providers typically adopt a combination of different approaches to reinventing their business model. When done right, IT-infrastructure providers can see an increase in market share and improvements in customer experience. For example, Hewlett Packard Enterprise (HPE) says its Greenlake 3.0 solution—a bundle of traditional computing and storage hardware with software products and services that is priced using a single “unit of consumption” such as terabytes or number of virtual machines—has onboarded more than 1,000 customers with over \$4 billion in total contract value within three years of its launch. In 2019, it also said that the consumer-satisfaction rating for the Greenlake 3.0 solution is more than 80 percent, which is in the 99th percentile for IT-service delivery.

Furthermore, we believe that investors will reward new business models with a higher enterprise value if providers can consistently demonstrate that revenue is recurring in a manner that's disconnected from the life cycle of the hardware and that's subject to low customer churn while sustaining or expanding profit margins. Drawing a parallel, software companies that underwent successful business-model transitions from perpetual software-license models to software as a service (SaaS) or SaaS-like recurring-revenue models were rewarded with higher enterprise valuations. The most well-known example is Adobe's switch to subscriptions, which is widely cited as evidence of what is possible with the model: the multimedia- and creativity-software provider increased its share of subscription revenue from 10 percent to 88 percent between 2010 and 2018.¹ During the same period, its price-to-sales multiple increased from 4.1 to 12.2.²

¹ Adobe SEC filings, US Securities and Exchange Commission, sec.gov.

² Trailing 12-month price-to-sales ratio as of December 31, 2010, and December 31, 2018 (Source: Thomson Reuters, reuters.com).

Finding the right model and approach

In our research, we have observed four principal ways that IT-infrastructure providers can transform their business model. They involve redesigning offerings, for example, to separate the use of software from the underlying hardware appliance it runs on, or to allow the software to operate across cloud or hybrid setups, or to provide for subscription options (Exhibit 1).

Each model comes with its own set of considerations, so selecting the right model involves fully understanding how it would play out for a particular OEM and the type of products it sells.

Software-led product restructuring

Recognizing the migration of value from hardware to software, some IT-infrastructure providers have restructured their products and offerings to separate the use of embedded software from the

hardware to offer it on a stand-alone basis. For example, in 2017 Nutanix, a leading provider of hyperconverged-infrastructure (HCI) technology,³ began to shift its focus from sale of hardware appliances with integrated software to the sale of HCI software (Acropolis, sold in software-only form) to be run on hardware appliances from any IT-infrastructure provider. Since then, it has seen its high-margin stand-alone-software-based billing grow in share to about 90 percent of its bookings (a large share of the company's increased software bookings is also from stand-alone-software additions and cloud products). The company reported its overall gross margins increased to 82 percent in 2020, compared with 66 percent in 2016.⁴

However, embracing a software-led product restructuring presents a risk of loss in market share to other hardware-appliance vendors. For example, most IT-infrastructure vendors that run Nutanix HCI

Exhibit 1

Four paths have emerged for IT-infrastructure original-equipment manufacturers to reinvent their business models.

Reinvented business model



Software-led product or offer restructuring

Products and offers redesigned to separate use and deployment of software from underlying hardware appliance



Public-cloud and hybrid-cloud extensions

Products and offers redesigned to operate across cloud as well as hybrid-cloud environments



Software-adjacent portfolio expansion

Product suite expands to include software add-ons to complement core hardware appliances



Cloud-like subscription-pricing models

Pricing models allow customers to pay for technical outcomes (eg, input/output operations per second or latency) on recurring-payment models such as pay per use or subscription

³ A hyperconverged infrastructure is a turnkey data-center hardware that combines server, storage, and networking into a single appliance prebundled with server and storage virtualization software.

⁴ Nutanix investor presentations for fourth quarter 2020 and first quarter 2018.

IT-infrastructure OEMs have little choice but to reinvent their business models to increase the share of recurring revenue from subscription, software, and services.

software also offer their own competing HCl offerings. To manage these risks, hardware companies need to avoid the trap of offering embedded software on its own without added features or functionality. Customers rarely perceive such offers as sufficiently differentiated and independent from the underlying hardware. Such moves done poorly could prove counterproductive since customers often view them as mere payment-model changes.

In our experience, companies that successfully restructure their solutions to be software-led follow three steps. First, they disaggregate the hardware appliance down to its granular features and performance attributes (throughput, input/output operations per second, and latency, for example) and match them to their users' performance needs. Second, they create a wholly new solution entirely of software, operable on any hardware appliance featuring an integrated control center to manage hardware-performance attributes and adjust underlying hardware or virtual resources as needed. Finally, they offer several value-added software features (performance monitoring and administration, advanced analytics on usage, and proactive maintenance of underlying hardware, for example). Only with these changes do customers view the software form-factor product as a viable stand-alone offer independent from the underlying hardware appliance.

Public-cloud and hybrid-cloud extension

Today, IT buyers manage their workloads seamlessly across multiple deployment models, including on-premises data centers and private-cloud, public-cloud, and remote environments. Many IT infrastructure OEMs have embraced the change by extending their product and offers to cloud and hybrid-cloud deployment models. For example, NetApp is a leading provider of on-premises file-based storage technology.⁵ NetApp has teamed up with Microsoft Azure to help offer file-based storage technology on the public cloud, which allows enterprises to run file-based applications in Azure. Another example is Palo Alto Networks, which not too long ago was a cybersecurity company predominantly focused on selling on-premise enterprise firewall hardware. Over time, the company has expanded its offerings to include a wide selection of software-based cloud and hybrid-cloud security applications such as threat prevention, SaaS security, and cloud network protection. As a result, the company's share of software and services revenue has steadily increased from approximately 40 percent in 2014 to approximately 60 percent in 2018. These cloud-based offers are viewed as differentiated and command higher price-to-sales multiples (typically between five and seven times) than traditional on-premises hardware offers (which are typically between one and a half and three times).⁶ During this period, Palo Alto Networks' share price

⁵ A storage technology best suited for hosting high-performance computing workloads, enterprise web applications, databases, et cetera.

⁶ Palo Alto Networks SEC filings, US Securities and Exchange Commission, sec.gov.

increased from an average of just over \$80 per share to approximately \$190 per share, an increase of about 130 percent, which is about 1.3 times the approximately 98 percent increase that the S&P 500 Information Technology Index experienced in that same period.⁷ (Of course, multiple market factors affect share prices, and the percentage of recurring software revenue a company generates is just one of them.)

Public-cloud and hybrid-cloud product extensions often expose the companies offering them to competition from software-only players and public-cloud providers that are increasingly looking to offer value-added hybrid-cloud service. In our experience, companies that have successfully scaled such public-cloud and hybrid-cloud extensions do three things. First, they position the cloud offers with their existing customers as an extension of their on-premises value proposition in the cloud. Second, they design creative buying programs that allow buyers to migrate their spending seamlessly between on-premises and cloud products. That drives a preference for the company's cloud offerings over others as customers migrate their workloads to the cloud. Finally, they enter partnerships with one or more public-cloud providers to tap into a new customer segment of cloud-first buyers previously not exposed to the company.

Software-adjacent portfolio expansion

Another approach adopted by companies to reinvent their business models is to expand their portfolio of software products. Typically, these expansions center on software add-ons that can serve various parts of the technology stack.

Companies that have expanded their portfolio of software products have often relied on acquisitions of stand-alone software products. For example, Cisco has strengthened its presence in networking and security by acquiring software companies in this space. Since 2017, the company purchased

three companies: Viptela, which offers SDN in a wide-area network (SD-WAN); AppDynamics, which offers application-performance management and IT-operations analytics; and Duo Security, which offers unified-access security and multifactor authentication delivered through the cloud. Since the acquisitions, Cisco's price-to-sales multiple increased from 3.1 to 3.9.⁸

Companies that expand their portfolio in this way face the risks of low return on investments, whether that's in-house R&D spending or acquisition costs. They also face the risk of improper integration of new products with existing hardware-based offers.

The companies that have made successful portfolio moves first start by understanding their target decision makers' typical buying processes. They then expand to other products that these decision makers either already need or are likely to want in the future. Once launched, companies integrate these new products with their existing portfolio and create packages or bundles that holistically address those target customers' needs.

Cloud-like subscription-pricing models

IT buyers desire a seamless purchasing experience from their on-premises OEMs that parallels the experience they get from their cloud-service providers. IT-infrastructure providers can respond to these demands with cloud-like subscription-pricing models for both software and hardware.

Companies that introduce software products (through one of the approaches already discussed) often offer the hardware on an up-front-payment model while increasing profitability through subsequent sales of software on a subscription model. For example, since moving to a software-led model, Nutanix's subscription-based billing has grown. In the fourth quarter of 2020, about 65 percent of its billing was subscription-based, compared with 31 percent in 2017 (when it first started reporting subscription-software revenue).⁹

⁷ Palo Alto Networks' average stock price for 2014 was \$82.95 and for 2018 was \$215.59; the S&P 500's Information Technology Index for 2014 was 630 and for 2018 was 1,210 (Source: S&P Dow Jones Indices, spglobal.com).

⁸ Trailing 12 months price-to-sales ratio as of December 31, 2016, and December 31, 2018 (Source: Thomson Reuters, reuters.com).

⁹ Nutanix investor presentations for first quarter 2019 and first quarter 2018.

Even for traditional hardware products, IT-infrastructure providers are innovating on pricing models by offering hardware with turnkey on-site deployment, flexibility to scale on demand, and seamless periodic upgrades. Also, they can offer customers the option to pay on a per-use or consumption model. HPE Greenlake, for instance, is a leading example of such a cloud-like subscription model for hardware. Another example is the data storage provider Pure Storage's Pure as-a-Service product, which commits to technical outcomes around input/output operations per second (IOPS), effective capacity, and uptime of 99.999 percent. Pure Storage then delivers and installs the appropriate equipment at the customer's premises with additional storage media preinstalled to cater to on-demand storage needs.

Almost all major infrastructure providers offer cloud-like subscription-pricing models for their storage, server, and hyperconverged offerings. And cloud-like subscription-pricing models for hardware appliances are gaining adoption among customers. Yet these cloud-like recurring-pricing models are easier to pull off for high-margin, software-only products than for hardware appliances.

For that reason, cloud-like pricing models for hardware appliances are suitable only for certain offerings and providers. Companies that launch and scale hardware appliances successfully make this pricing model's economics viable by using

contracting levers such as minimum contract commitments or cancellation fees. In the case of Pure as-a-Service, Pure Storage requires customers to reserve capacity (at a set cost per gigabyte) and pay in 12-month installments. True-consumption-based pricing is offered only for the on-demand add-on capacity. (For more on best practices in moving to flexible subscription models, see the article "Subscription myth busters: What it takes to shift to a recurring-revenue model for hardware and software.")

The right business model will be bespoke

IT-infrastructure providers looking to change their business model will likely need to come up with their own tailored combination of the models we describe here to pivot away from appliance-based, low-margin, lumpy revenue to sustainable recurring-revenue business models. In our experience, providers identify the right combination by defining their business-model-transformation aspirations in one or more of the following ways:

- Increase the percentage of software revenue
- Increase the percentage of subscription or recurring revenue
- Increase the services mix
- Improve the customer experience

To succeed at transforming a business model, IT-infrastructure OEMs have to embrace fully the new organization and operating model around it.

The right combination of business-model moves to achieve these aspirations is company specific and needs to be decided based on in-depth research into, first, customer demand, buying preferences, and life-cycle journeys and, second, company opportunities to unlock additional value with premium pricing, new upsell and cross-sell pathways, and new total-addressable-market unlock.

Regardless of the path chosen to reinvent the new business models, successful shifts of this kind require transformation across three major areas—key business functions, economics, and governance.

Pulling it off

Overhauling a business model requires reinventing all core business functions. In our experience, changes to six of these functions have a disproportionate impact on success (Exhibit 2). These include the following changes:

- **Offer design, packaging, and pricing execution.** Simplify product pricing and packaging.
- **Sales and marketing.** Revamp sales and marketing for new business models.
- **Services, customer success, and renewals.** Define your North Star for post-purchase customer journeys and tailor your go-to-market strategy.
- **Operations.** Redefine the supply chain and invest in capabilities for asset-life-cycle management.
- **Systems and IT.** Digitize end-to-end administration of new offers.
- **Product and engineering.** Restructure products and solutions to be software-led and backed by customer needs.

Exhibit 2

Changes to six core business functions have a disproportionate impact on business-model-transformation success.

6. Restructure products and solutions to be software-led and customer-needs driven

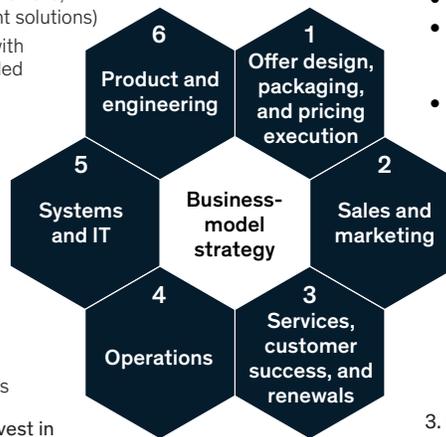
- Integrated solutions across hardware, software, and services (vs point solutions)
- Standardized configurations with performance controls embedded into intelligent software layers
- Cloud-native, microservices-enabled architecture for new software offerings

5. Digitize end-to-end administration of new offers

- Embed product telemetry, licensing, metering, and monitoring capabilities within products
- Redefine lead-to-cash processes with digital channels

4. Redefine supply chain and invest in asset-life-cycle management capabilities

- Design to value for new software-led products and offers
- Standardize hardware configurations
- Redefine asset-life-cycle practices that recycle used assets and optimize the supply chain to deliver and recover assets



1. Simplify product pricing and packaging

- Hardware SKUs minimized
- Price value migrated to software
- Subscription-based pricing models with technical-outcomes-oriented pricing metrics
- Streamlined discounting practices to improve price capture

2. Revamp sales and marketing for new business models

- Redesigned sales and channel incentives for new offers
- New sales and channel playbooks and field trainings
- Field-sales and channel evangelist pods to handhold initial field execution

3. Define North Star for post-purchase customer journeys and tailor go to market

- Dedicated customer-success function to drive product adoption and use
- Accountability for the customer experience across all levels of the organization

Economics of the transformation

Business-model transitions result in a radical change in revenue, margin, and balance-sheet profiles for companies. CFOs constantly fear that these changes could destroy market value and internal finance risks, such as cash-flow constraints and capital and credit risks. Four best practices for managing economic risk have emerged so far among hardware companies that have undertaken business-model transformation:

- Accelerating the pace of transition of existing customers to the new business model to minimize the period of uncertainty for them
- Creating transparency with investors around the business-model transition plan and reporting against new business success metrics
- Partnering with players along the value chain, such as suppliers, distributors, and value-added resellers, to jointly share and manage financial risks
- Exploring inorganic moves to mitigate financial risks, such as setting up a separate financing arm, or entering joint ventures with a financial institution, or undergoing corporate restructuring to separate the revenue stream of the new business model from that of the old

Governance

To succeed at transforming a business model, IT-infrastructure OEMs have to embrace fully the new organization and operating model around it. The actions required to do so fall into four buckets:

- *Aligned vision, aspiration, and direction.* The top team has to be on the same page around the aspiration for and ownership of the transition and carry out a full communications and engagement plan, just as for any foundational change.
- *Agile operating model for execution.* It will take a central control tower to orchestrate the transformation with speed, with cross-functional initiatives broken up into a manageable portfolio of workstreams.
- *Right people, right skills, and right mindsets.* This level of change means reconsidering the talent throughout the organization, to ensure the capabilities to run the new business model are in place.
- *Right goals.* Cascading objectives and key results (OKRs) designed around recurring revenue and the customer experience will hardwire the change and drive desired transformation outcomes.

We believe reinventing the business model for an IT-infrastructure OEM is an 18- to 24-month journey that requires a total overhaul of a company's approach to doing business. Gleaning lessons from similar business-model shifts undertaken by software companies, we have seen that it is critical for companies to set bold aspirations and timelines and commit to the change. Companies that adopt a slow and incremental approach to driving change often find they're not able to truly achieve it.

Himanshu Agarwal is a partner in McKinsey's Silicon Valley office, where **Chandra Gnanasambandam** is a senior partner and **Mitra Mahdavian** is a partner. **Srinath Nagarajan** is an associate partner in the San Francisco office.

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