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How Cisco Systems Used Enterprise Architecture Capability to Sustain Acquisition-Based Growth

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How Cisco Systems Used Enterprise Architecture Capability to Sustain Acquisition-Based Growth

Value-creating acquisitions are a major challenge for many firms. The case of Cisco Systems shows that an advanced enterprise architecture (EA) capability can contribute to the four phases of the acquisition process: pre-acquisition preparation, acquisition selection, acquisition integration and post-integration management. Cisco's EA capability improves its ability to rapidly capture value from acquisitions and to sustain its acquisition-based growth strategy over time.[1,2]

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Acquisitions Are Integral to Cisco's Corporate Strategy

Enterprise architecture (EA) enables organizations to coordinate, execute and sustain business transformations, which can be triggered in various ways, including restructuring and acquisitions. This article explains how Cisco Systems, a multinational corporation headquartered in San Jose, California, with business primarily in networking equipment and related services, leverages its EA capability to support its growth-by-acquisition strategy.[3] (The research methodology is described in Appendix 1.) We show how EA contributes to Cisco's ability to capture value from its acquisitions and to sustain its acquisition-based growth strategy over time.

Acquiring other businesses is a major component of many organizations' corporate strategies. Appropriately executed, acquisitions enable business benefits of scale and scope, give access to unique resources and support strategic renewal. However, integrating acquired businesses is challenging and complex, which means that acquisitions frequently do not create financial value for the acquirer.[4] Either the potential recombination synergies are over-estimated in the pre-acquisition evaluation of the target, or the acquirer does not succeed in realizing the potential synergistic effects in post-acquisition integration.

In addition, for firms with acquisition-based growth strategies, efforts to realize short-term, direct benefits from acquisitions must be balanced against the long-term need for a sustainable growth strategy. Frequently, firms put their acquisition programs on hold

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[3] In the context of this article, "acquisition" refers to a larger organization taking ownership of a smaller one. In this type of acquisition, the acquirer decides on and drives the acquisition process. Although EA may have an equally important role to fill in the field of organizational mergers, we do not analyze the role of EA in that type of organizational transaction.

[4] Haleblian, J., Devers, C. E., Mcnamara, G., Carpenter, A. and Davison, R. B. "Taking Stock of What We Know About Mergers and Acquisitions: A Review and Research Agenda," *Journal of Management* (35:3), 2009, p. 469.

after a few acquisitions to undertake major organizational restructuring[5] because acquisition integration introduces organizational inefficiencies that accumulate across a series of acquisitions.

Acquisitions have been an integral component of Cisco's corporate strategy. Founded in 1984, it had grown by 2015 to 70,000 employees and revenues of $47 billion. Much of this growth had been achieved through the acquisition and integration of 179 business units.[6] According to Cisco's CEO, John Chambers:

> *"I think we have shown an unbelievable ability to reinvent ourselves and Cisco will be an aggressive buyer of software companies over time … Cisco's shareholders are comfortable with us being more aggressive in making acquisitions, given Cisco's recent record of holding down expenses."*[7]

Cisco's acquisition protocol, which leverages its EA capability, provides a potentially powerful framework for managing value-creating acquisitions. The EA capability contributes to: (1) the *pre-acquisition preparation* of the firm to be "acquisition ready," (2) the *selection* of acquisition targets by identifying resource complementarity, (3) acquisition *integration* by directing efforts toward desirable target states and (4) *post-integration management* by monitoring achieved integration and guiding corrective action to ensure the success of the long-term growth strategy.

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[5] Barkema, H. G. and Schijven, M. P. G. "Towards unlocking the full potential of acquisitions: The role of organizational restructuring," *Academy of Management Journal* (51:4), 2008, pp. 696-722.
[6] A full list of Cisco acquisitions can be found at http://www.cisco.com/web/about/doing_business/corporate_development/acquisitions/ac_year/about_cisco_acquisition_years_list.html.
[7] Burrows, P. *Cisco CEO Says Company Remains in Hunt for Software Makers,* BloombergBusiness, February 20, 2015, available at http://www.bloomberg.com/news/articles/2015-02-19/cisco-ceo-says-company-will-be-aggressive-acquirer-over-time.

This article first provides an overview of Cisco's acquisition protocol. Next, we present a four-phase model of corporate acquisition to identify the issues in the acquisition process that an EA capability can mitigate. Then, we describe how Cisco used its EA capability in a specific acquisition (of Video Solutions Group). Based on Cisco's experiences with this acquisition, we infer a general model of how EA capability contributes to the acquisition process. Finally, we present five lessons to assist organizations in leveraging their EA capability in the acquisition process.

The Cisco Acquisition Protocol

Cisco's growth from a small router manufacturer to a global network business has primarily been achieved through acquisitions. Some of these acquisitions have been of small companies with highly innovative technologies that were integrated and exploited within existing Cisco offerings. Other larger acquisitions, including Scientific-Atlanta ($6.9 billion), WebEx ($3.2 billion), Tandberg ($3.3 billion) and NDS Group ($5.0 billion), were of complete businesses in areas complementing Cisco's existing businesses or providing radically new ways of competing in areas where Cisco already had a significant presence.

Cisco typically makes acquisitions to gain access to complementary products, or to innovative technologies and associated capabilities. John Chambers, Cisco's CEO, is clear that the role of acquisition integration is to drive growth in the company:

"Instead of an R&D budget, at Cisco we buy the technology we need to grow and expand into new markets."[8]

Cisco uses three types of measure to evaluate an acquisition: long-term financial benefits, short-term success criteria and specific performance measures for the integration phase. Two long-term financial benefits are used: expected profit and free cash flow. Both are subject to market fluctuations and used more as guiding targets for the acquisition program, than as direct performance metrics for the acquisition. Instead, Cisco has identified three success criteria that are used to evaluate an acquisition in the short term. The first is to retain 100% of the employees who transition from the acquired company. The second is to sustain the acquired company's current product and service revenues (as well as current levels of service and support) during and after the transition to Cisco. The third is to launch new products based on the acquired products and technologies.

Three specific performance measures monitor the integration phase of the acquisition process:

1. *Time to "orderability:"* The time from day one of the acquisition until the offerings of the acquired company are included in the integrated Cisco offering.

2. *Time to completion:* The time from day one of the acquisition until the desirable level of integration has been achieved.

3. *Cost savings:* The total cost synergies that are realized.

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[8] Bort, J. "Cisco's John Chambers: What I Look For Before We Buy A Startup," *Business Insider,* July 23, 2014, available at http://www.businessinsider.com/cisco-john-chambers-acquisition-strategy-2014-7.

To achieve its acquisition targets, Cisco has established a centralized acquisition capability. This capability is based on Cisco's extensive experience of acquisition integration—learning by doing. The capability is structured around four building blocks:[9]

- Formalized and centralized integration management, which is the responsibility of a designated team in the Cisco Business Development Group.
- Cross-functional teams that plan, manage and monitor integration activities across Cisco.
- Standard metrics, tools, methods and processes that can be repeatedly applied to new integration efforts, yet are adaptable to the unique issues and parameters of each deal.
- Principles for aligning the acquisition integration work with other major concurrent strategic changes, including divisional consolidations, divestitures and other acquisitions.

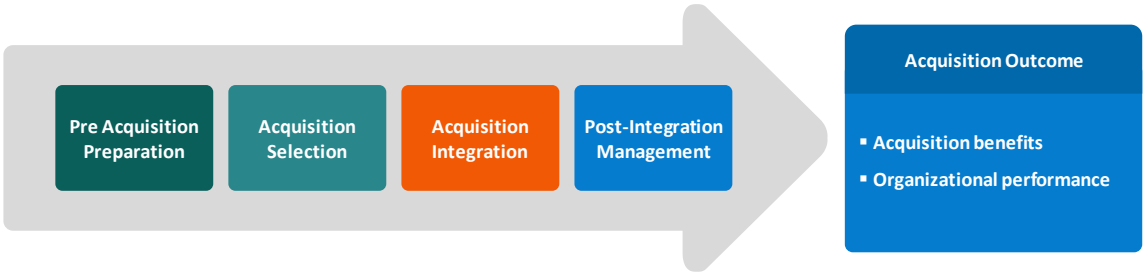
The Acquisition Challenge

Cisco's acquisition protocol allows the company to effectively manage its four-phase acquisition process[10] (see Figure 1). The first phase starts well before a potential target has been identified. The challenge here is to make the acquirer "ready to acquire."[11] The *Pre-Acquisition Preparation* phase*,* including the development of the specific

[9] For further details on Cisco's integration strategy see *How Cisco Applies Companywide Expertise for Integrating Acquired Companies,* Cisco IT Case Study, available from Cisco's website.
[10] See, e.g., Barkema, H. G. and Schijven, M. P. G., op. cit., 2008.
[11] Yetton, P., Henningsson, S. and Bjørn-Andersen, N. ""Ready to Acquire": The IT Resources Required for a Growth-by-Acquisition Business Strategy," *MIS Quarterly Executive* (12:1), 2013, pp. 19-35.

capabilities required to support acquisitions, takes place over a period of time measured in years.

Figure 1. Cisco's Four-Phase Acquisition Process



In the second phase, *Acquisition Selection,* the acquirer selects the right target to acquire, identifies threats to and opportunities for post-acquisition resource combinations and estimates their potential value. This requires deep understanding of the acquirer's own resources, and the capability to assess the target's stock of resources and the cost of integrating the two sets of IT resources.

In phase three, *Acquisition Integration,* the acquirer integrates the target. This entails devising and implementing the IT integration strategies to realize the benefits of scale, scope, resource addition and strategic renewal, which all depend on different integration mechanisms. Frequently, acquisition integration is suboptimal, and introduces organizational inefficiencies, such as increased complexity, and reduced business/IT alignment. Suboptimal solutions may be necessary in the short-term but, if not corrected, will likely have a long-term cumulative adverse effect on the acquirer.

Therefore, in the fourth *Post-Integration Management* phase, the acquirer must address the organizational inefficiencies created during the integration. Achieving acquisition benefits without compromising long-term firm performance is of particular

importance for "serial acquirers" such as Cisco because inefficiencies would rapidly accumulate, threatening the firm's growth strategy.

Within this generic acquisition process, a specific acquisition can take various paths. The literature typically considers four paths—absorption, preservation, symbiosis and renewal—as generic acquisition strategies.[12] Each of these strategies involves fundamentally different activities. For example, in the absorption strategy the target ceases to exist and is completely assimilated by the acquirer to form one new entity. In the preservation strategy the capabilities of the acquired company are nurtured and maintained to allow it to further exploit and develop its capabilities for the benefit of the acquirer.

Thus, depending on the outcome of one phase, the activities in the next phase are frequently very different. For example, if the Acquisition Selection phase identifies an opportunity for an absorption acquisition, the Acquisition Integration phase would require fundamentally different tasks to be completed than for a symbiosis acquisition. Many large acquisitions are justified by a range of distinct acquisition benefits and therefore progress through the phases of the acquisition process will require parallel work streams seeking to leverage each benefit.[13]

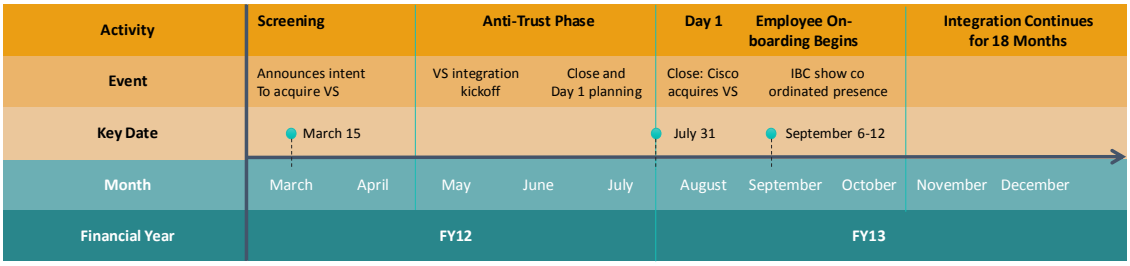
Cisco's Acquisition of Video Solutions

The successful acquisition of Video Solutions (VS) Group illustrates the contribution made by Cisco's EA capability to the acquisition process. The intention to acquire VS was announced in March 2012, orderability was completed in September 2013 and VS

[12] Haspeslagh, P. C. and Jemison, D. B. *Managing Acquisitions: Creating Value Through Corporate Renewal,* 1991, The Free Press.

was fully integrated in 2014 (see Figure 2). Because of reasons (external factors) explained below, the target for time to completion was not met, but was judged acceptable.

Figure 2. Timeline for VS Acquisition



The primary motivation for acquiring VS, a provider of video software and content security solutions, was to rapidly extend Cisco's product offerings in video services. VS's major product was VideoGuard, which was used by 85 pay TV operators around the world. VideoGuard was designed to help TV operators seamlessly extend their pay TV services to other media devices, enabling secure delivery and enjoyment of premium content. VS's software, customer segments and services model complemented Cisco's Videoscape **[OK?]** networked video offerings. Videoscape enables Cisco's service providers and media companies to deliver streaming video. A secondary motivation was to extend Videoscape's reach to the service provider market in China and India, where VS had an established customer footprint.

Integrating VS into Cisco involved a mix of approaches, including migrating VS business capabilities to Cisco technology capabilities, retaining unique VS business capabilities, and reverse integration where VS best practices were deployed throughout

[13] Henningsson, S. and Carlsson, S. A. "The DySIIM model for managing IS integration in mergers and acquisitions," *Information Systems Journal* (21:5), 2011, pp. 441-476.

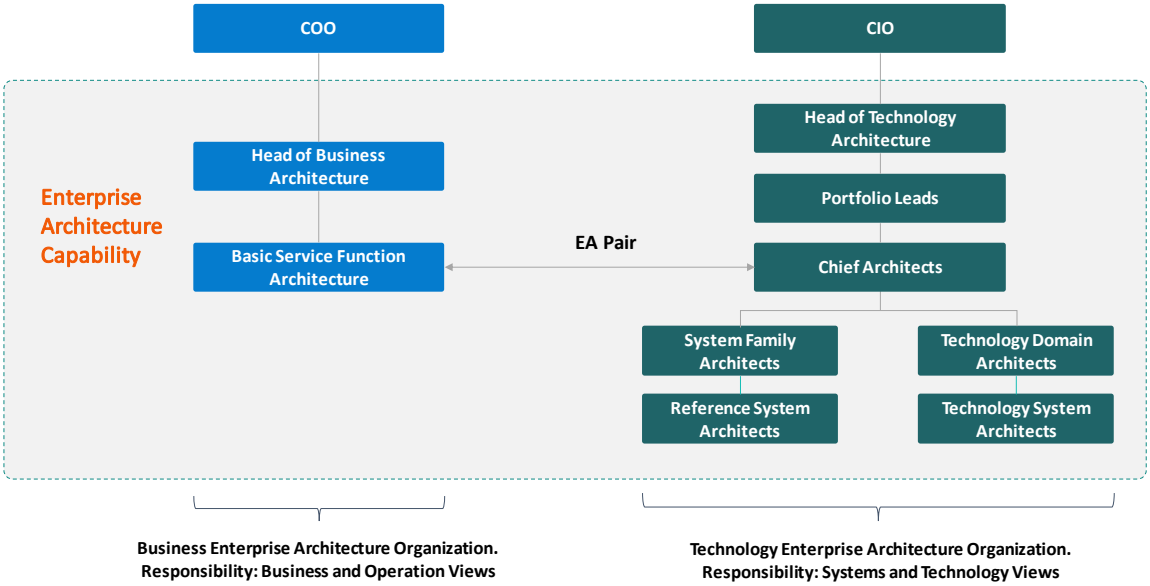
Cisco. Some cost synergies were realized, but most synergies were due to increased revenue from new combined offerings to customers.

In the VS acquisition, Cisco's EA capability contributed to a range of tasks throughout the acquisition process (see Appendix 2 for a complete list of contributions). Four specific EA artifacts were of particular importance: the reference model, capability heatmaps, capability roadmaps and the infrastructure health dashboard. These artifacts and their use are described in Appendix 3.

Phase 1: Pre-Acquisition Preparation

Preparations started many years before VS was identified as a possible acquisition target. In 2007, Cisco decided to reposition its EA capability from a technology-centric to a business-centric focus. The EA function was structurally positioned as a cross-functional capability, sitting between the business and IT functions (see Figure 3). By 2015, 70 people were working in various roles related to systems and technology architecture, and 30 were employed to manage business and operations architecture. The head of business architecture reports to the COO and is responsible for the business and operations views of the architecture. The head of technology architecture reports to the CIO and is responsible for the systems and technology views.

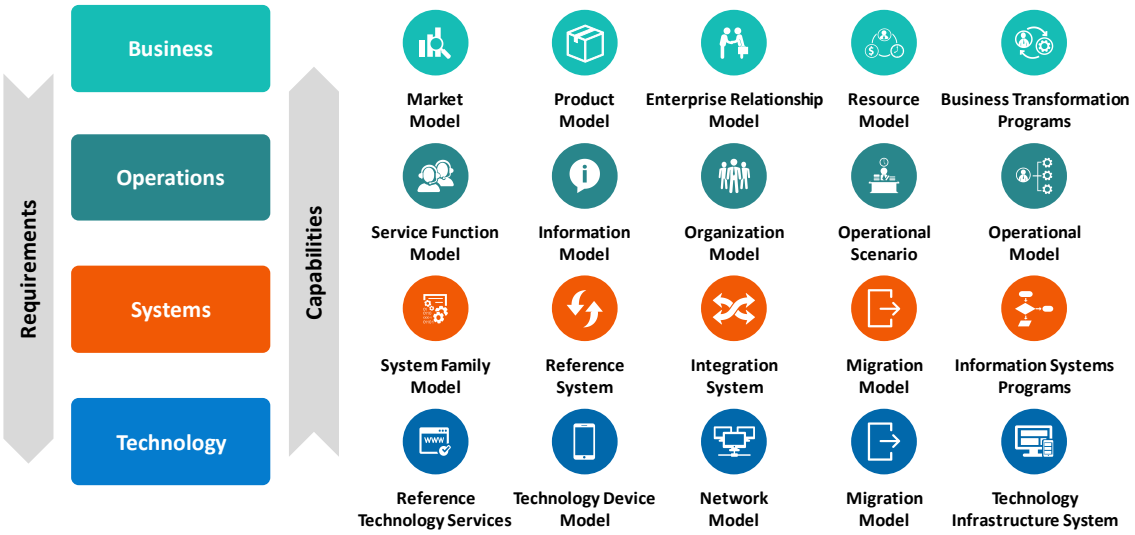
Figure 3. Structure and Placement of Cisco's EA Function



Cisco's EA capability is based on the BOST architectural framework, which includes business, operations, systems and technology views (see Figure 4). This framework is a generic EA framework developed by Informatica (formerly Proact) that includes a set of industry-specific reference models as a starting point for companies to develop their specific reference architectures.[14] The BOST framework was chosen because it was considered best suited for Cisco's strategic focus on business architecture. The model repositories serve as "a single source of truth" for Cisco's EA, but the reference models are never complete. Instead, the models are supposed to be "accurate enough" at a given point in time. In practice, architects update the models with the level of detail needed for the specific transformation at hand. For example, an organizational reference model in the operations view would indicate the human resources needed for the company to execute a business process such as payroll.

[14] See *An Introduction to the BOST Framework and Reference Models,* Informatica White Paper, December 2014, available at https://www.informatica.com/content/dam/informatica-com/global/amer/us/collateral/white-paper/Introduction-to-BOST-Framework-Reference-Models-whitepaper_2753.pdf.

Figure 4. Cisco's EA Framework: A set of Models Based on the Generic BOST Framework



The EA function was given the authority to monitor and, if needed, take corrective action to ensure the integrity of Cisco's business architecture and was tasked with maintaining the enterprise reference model. This reference model contains an overview of all capabilities across the business, operations, systems and technology levels. Business and technology architects working in pairs were assigned to specific verticals in distinct areas of the company (e.g., market model, product model, enterprise relationship model) in the BOST framework.

The benefit of this revitalized EA function for pre-acquisition preparation is illustrated by Cisco's work on software consumption models. In 2007, Cisco offered software to its customers in 32 different ways. Starting in 2007, Cisco standardized on four consumption models: own up-front, lease, software as a service and utility. For each consumption model, there were sets of standardized operations, systems and technology capabilities to support the business capabilities. In addition, a specific pair of business and technology architects was given the task and authority to ensure that the four software consumption models remained the only models, regardless of any future

organizational transformations. This meant that all future acquisitions would fit into the architecture. In this way, Cisco had become "ready to acquire" VS long before it became a potential acquisition target.

Phase 2: Acquisition Selection

As mentioned above, Cisco offered four standardized consumption models when it evaluated VS as a potential acquisition in 2012. These models were easy to deploy in different contexts and were well documented in the enterprise reference model. With the relevant Cisco reference models as a starting point, the acquisition team investigated VS's practices using the Cisco template for due diligence.

The team developed capability heatmaps to identify the areas that needed particular attention. These indicated areas in Cisco's reference models, where different behavior by VS could have significant implications for time to orderability, time to completion and cost savings. In many areas, for example marketing, supply chain management and financial control, differences would not be important and would not threaten value creation. In contrast, differences in the area of software consumption models could be critical.

The acquisition team identified that VS provided its software to customers in a different way to Cisco's video solutions business area. Whereas Cisco used partners to sell its existing video solutions and services, VS had direct relations with its clients (the service providers that offer streamed media). The EA function was asked to evaluate if this could constitute a roadblock to integration and, if necessary, to develop a reference model for VS in this particular area.

A pair of business and technology architects responsible for Cisco's reference models was tasked with the work. Sufficient information was obtained to sketch out the workings of the VS consumption model and to verify that it would be possible to support it with existing Cisco operational systems and technology capabilities. Because the EA function could rapidly assure the acquisition team that Cisco already provided the capabilities to support VS's software consumption model, the issue was removed from the list of acquisition risks.

Furthermore, VS's unique consumption model was identified as a potential opportunity for reverse integration. Cisco's video solutions business could learn how to reach customers without using partners. It was, however, decided to retain VS's consumption model, at least for the time being, and mobilize Cisco's pre-acquisition capabilities in the operating, systems and technology views of the BOST framework to enable a dual-mode business approach.

Phase 3: Acquisition Integration

In the integration phase of the VS acquisition, the emphasis on time to orderability led to an initial focus on integrating the different consumption models that were identified in the selection phase. First, further details were added to the "to-be" scenario to take account of the two different consumption models. Second, the transformation needed to cross-sell within the two independent units was enabled by providing Cisco's partners with the opportunity to also offer VideoGuard as a component of the Videoscape solution.

As a consequence, VideoGuard was offered through two consumption models. Cisco's EA team updated the reference architecture to take account of this situation. After sales integration was completed, Cisco next addressed the other business

capabilities of VS to realize potential cost synergies. This started with organizational design; plans were developed for absorbing VS people and assets (including, for example, customer and financial data) into Cisco's corresponding functions. For example, VS's marketing function remained in charge of marketing VS products but, post-acquisition, was part of the video solutions business unit. Entire VS teams were relocated to perform the tasks they were doing pre-acquisition, but in a new context.

Subsequently, the EA team investigated what changes in IT-enablement might be necessary to support the absorbed operations. It discovered that only marginal adjustments were needed to systems and technology capabilities. For example, a minor extension of a product database and an extension of the technology infrastructure were required to support the former VS offices. The EA team adjusted the capability roadmaps for the affected capabilities to reflect these adjustments.

At this point, Cisco identified one issue and one opportunity that affected the integration schedule. It discovered that VS provided its customers with a higher number of customized solutions than had been anticipated. VS manufactured on-demand and tailored products for each customer. This caused much discussion in Cisco about what to do about this different way of operating.

One option was to keep the on-demand customized solutions and potentially adopt this way of working for the whole video services area. Ultimately, Cisco saw no long-term profitability in this mode of operation, and used the extended integration time to rework the VS solution as a standard offering. As a consequence, VS lost some customers that could not be supported by the standard solution. However, satisfaction among the remaining customers grew rapidly, as the standard offering was better supported and updated. Profit margins also improved.

The opportunity arose because Cisco discovered that VS had a security solution as part of its offering that outperformed some of Cisco's own solutions. Consequently, this feature was technologically and organizationally carved out from the VS offering and made available as a feature of other Cisco products.

Phase 4: Post-Integration Management

After the integration of VS, the EA team verified that the reference model had been updated to include the changes to the to-be scenario that had been made during the integration phase. The EA health metrics dashboard was also reviewed to see if it needed to be updated to capture changes made during in the integration phase. No major issues were found. The acquisition team then compared the initial reference models, heatmaps and roadmaps with the post-integration models. They found that, despite the challenges during the integration phase, time to orderability, the most critical part of the integration, had been achieved. Reusing current in-house Cisco capabilities allowed the company to meet the target time to orderability for the acquired VS products, services and solutions.

However, because of the extended time for the integration phase, the target for time to completion was not met; integration was only realized 18 months after the acquisition. But the delay was deemed acceptable because it was caused by an explicit decision to prioritize the infrastructure project. When integration had been achieved, the targets for cost savings through synergies were fully realized. Cisco's ability to support the integration of new business models and technologies with current operational capabilities eliminated the need for duplicate capabilities. Faster transition from the to-be business scenario to integration design, and decreased need for new developments, enabled a more rapid path to stable integration.

Moreover, all three short-term success criteria were met. Although a few individuals decided to leave, all key VS people were retained. VS sustained its product and service revenues throughout the acquisition process. Post-acquisition, VS's capabilities in the security area were used to launch added services with existing Cisco products. The EA team contributed to retention of employees by enabling a rapid transformation process and by eliminating the need for two organizational transformations. The EA team contributed to the launch of additional services by identifying VS's unique security capabilities in the integration phase. It also identified the possibility of reverse integrating VS's customized consumption model, although this option was eventually not implemented.

Overall, the improvements resulting from the integration of VS into Cisco and meeting the short-term success criteria positively impacted long-term financial performance. However, the extent of this impact is hard to isolate, because of the many other changes affecting financial performance that occurred during the 18 months integration process. Nevertheless, the EA team's mandate to orchestrate all organizational transformations, including acquisitions, had a positive impact on factors that enable profit and free cash flow. These factors included reduced organizational and IT complexity, fewer simultaneous projects because of rapid integration cycles, and synchronization with other transformation initiatives. In the VS acquisition, the EA team enabled Cisco to transform as a coherent whole across business and technology layers.

Reflecting on the outcomes of the VS acquisition, the acquisition team noted two major deviations from the expected process. One issues resulted from VS's customized manufacturing. Here, the acquisition team decided to update its standard acquisition practice to also cover the possibility that the target might offer highly customized

solutions. An EA member of the acquisition team was tasked with investigating this issue in future acquisitions and, as required, to call on the rest of the EA function to investigate what it would mean for the acquisition target's customers to move from tailored to standardized solutions. Although Cisco's EA function is primarily internally facing, it was given this task because it was considered to be the Cisco department that would best understand how changes in technology enablement would affect the business of the target's customers.

The other deviation was the VS security feature that was reverse integrated and deployed within Cisco. This led to a minor adjustment in the acquisition protocol. Scanning for reverse integration potential was already a task in due diligence, but Cisco discussed whether to increase the focus on this aspect in due diligence. This approach was rejected because the option already existed when the acquisition team thought it would affect the decision to acquire or not. However, it was made standard practice for an EA member of the acquisition team to actively investigate the potential for reverse integration.

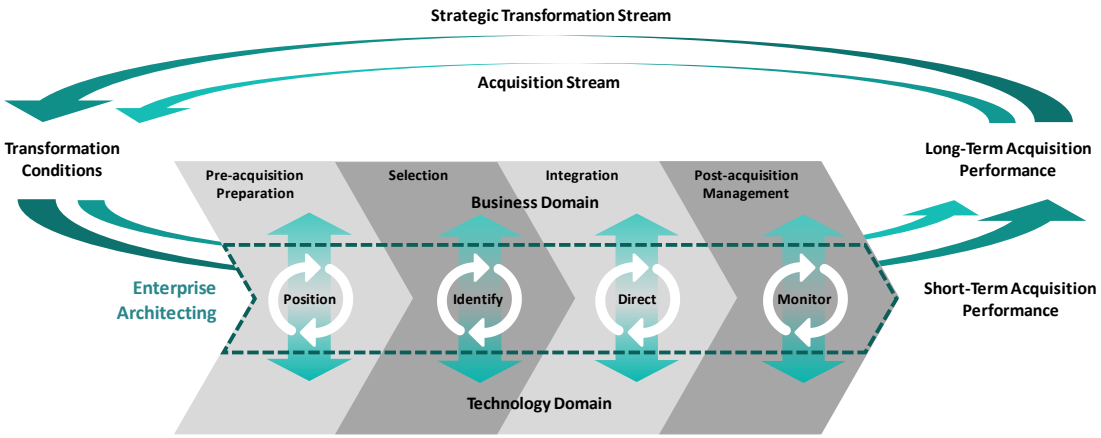
The Cisco Acquisition Model: Running Today and Building Tomorrow with EA

Drawing on Cisco's experience from using its EA capability to support the VS acquisition, we infer a general model of how EA contributes to the acquisition process. There are three key components. The first is the role of EA in aligning business and technology domains, which is critical to creating value from an acquisition. The second is the view of EA as an ongoing process of discovery, guiding the solutions to emerging problems. The third is how EA contributes to the design of organizational transformation to leverage an acquisition's potential business benefits.

EA is frequently referred to as "the organizing logic for business process and IT capabilities reflecting the integration and standardization requirements of the firm's operating model."[15] A functional EA capability is critical to maintaining alignment between business and IT strategies.[16] In Cisco, the capability of EA to maintain alignment has become an important enabler of the acquisition process.

The EA function guides the integration between business and technology domains across all four phases of the acquisition process shown in Figure 1. Managing the successful outcome of the VS acquisition was a challenge of managing the balance between accomplishing the goals of a combined organization and the potential integration challenges. The interplay between business and technology domains was critical throughout the acquisition process (see Figure 5).

Figure 5. Contribution of EA Capability to Acquisition Outcome



In Cisco, this orchestrating role is enabled by structurally positioning EA as a cross-functional capability, sitting between the business and IT functions (as shown earlier in

[15] Ross, J. W., Weill, P. and Robertson, D. *Enterprise Architecture as Strategy: Creating a Foundation for Business Execution,* 2006, Harvard Business Press, p. 9.

Figure 3). The business and technology sides of the EA capability are coupled through the link between basic service function architects and chief architects who typically work in pairs, with capabilities ranging from business to technology enablement. For example, one pair of architects is responsible for Cisco's software consumption models, which specify the four ways in which Cisco offers software to its customers. This EA pair is responsible for managing changes related to these capabilities, and to the enabling operations, systems and technology capabilities.

The second component is how EA contributes by enabling a dynamic process of discovery. This is illustrated in Figure 5 where enterprise architecting is represented as an arrow—i.e., as a process not a state. For the VS acquisition, this discovery process continued throughout the acquisition phases. It began with a set of assumptions about the target. The understanding of the target grew to include the most critical requirements. In the selection phase, it was critical to understand the target's EA in those areas where there were critical potential threats to value creation. In the integration phase, the discovery process was extended into the areas where the acquirer's and the acquisition's capabilities were to be blended. Post-acquisition, the acquired standalone capabilities were mapped to the existing reference models.

The discovery process in the case of VS started with VS's consumption models. This was the only area where that the acquisition team was uncertain about the nature and level of integration threats to value creation. The discovery process continued in the integration phase by identifying the VS capabilities that were to be combined with Cisco capabilities. Here, Cisco found additional, and unexpected, differences between VS and

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[16] Zachman, J. A. "Enterprise Architecture: The Issue of the Century," *Database Programming and Design,* March 1997.

Cisco. For the remaining VS capabilities that were to be kept separate, Cisco continued to map them, as described above to existing reference models, after the integration was finalized when time pressure had been reduced.

The third component is how EA contributes to understanding how the acquisition relates to the broader context of concurrent organizational transformations. This is depicted in Figure 5 as two cyclic streams, one representing an acquisition stream and the other a general strategic transformation stream, with both streams passing through the acquisition process. Other strategic transformations include, for example, divestures, joint ventures and market reorientations. These initiatives can take place simultaneously or subsequently to an acquisition.

In the VS acquisition, this third component came into play when Cisco considered reversed integration of VS's capabilities for highly customized offerings. Not pursuing this opportunity was beneficial for Cisco's subsequent strategic initiatives because the conditions for transformations were not compromised and the strategic options for the growth-by-acquisition strategy were sustained. Moreover, Cisco's use of capability roadmaps enabled the integration of VS to be scheduled concurrently with a large infrastructure transformation project. This saved costs by reducing disruption to the VS unit because it did not have to go through two cycles of change.

Lessons Learned

We have distilled five key lessons from Cisco's use of its EA capability in its acquisition-based growth strategy and, in particular, from the VS case study. These lessons will help managers to successfully use EA capabilities in the preparation, selection, integration and post-integration management phases of the acquisition

process. The first lesson is concerned with the way in which an EA capability is used and applies to all phases. The other four apply to each of the four phases of the process.

Lesson 1: EA is a Dynamic Process

An EA capability enables an "ongoing process of discovery" for an organization on how its current state relates to its future business, operations, systems and technology. The enterprise reference model is always an incomplete representation of the company's capabilities. For acquisitions, the critical task is to ensure that the enterprise architecture of the company at any time is fit for purpose in the critical areas and is available as required. The emphasis is on "architecting" rather than "architecture." This differs from the more traditional view of EA as a complete and accurate representation of a company.

An acquisition does not require an EA to be developed for the target company so it can be compared with the acquirer's EA. At the beginning of the acquisition process, the acquirer has limited knowledge of the target's EA. Developing a complete enterprise reference model for the target firm according to the reference framework used by the acquirer would not be feasible given the need for rapid integration. Instead, an understanding of the target firm's EA is built progressively over time.

In acquiring VS, Cisco progressively discovered VS's EA. Cisco's EA team initially focused on areas where deviations from the expected would matter, enabling it to drill down to assess where technology integration would present obstacles. After deal closure, the discovery process continued in the integration phase, revealing more details about VS and adjusting expectations about its architecture. Finally, Cisco evaluated the extent to which the desirable to-be scenario had been achieved.

Understanding where to focus modeling in a target and where it is necessary to "dig deeper" is a constant learning process. Importantly, this is still the case for Cisco after 179 acquisitions. In the VS acquisition, Cisco identified some critical areas but also missed some important areas where further modeling was needed. Cisco uses each acquisition as a learning opportunity to refine its "just in time" modeling approach for capturing critical aspects of the target's EA before closing a deal. This lesson may well be even more crucial for companies where organizational transformations are less frequent and learning opportunities are therefore fewer.

Lesson 2: Reduce the Number of the Integration Problems

To be acquisition ready (Phase 1 of the acquisition process model), organizations must invest in EA resources. When Wijnhoven and his colleagues were reflecting on how to come to terms with the many struggling integration projects in acquisitions, they concluded that "the avoidance of problems is of the greatest value to practice."[17] To reduce the number of problems, rather than becoming better at resolving them during the acquisition process, the acquirer should identify those elements that could contribute to a difficult integration project and use its EA capability to manage them.

EA capability contributes toward pre-acquisition preparation by ensuring that the IT infrastructure is scalable, documentation is in place as a starting point, and that the link between business capabilities and technology enablement is well understood. Being acquisition ready reduces the degree of difficulty of the acquisition process and enables acquisition projects to proceed more quickly and with more certainty.

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[17] Wijnhoven, F., Stegwee, R., Spil, T. and Fa, R.T.A. "Post-merger IT integration strategies: An IT alignment perspective," *The Journal of Strategic Information Systems* 15(1), 2006, pp. 5-28.

At Cisco, the advantage of its EA capability in the pre-acquisition phase was illustrated by the reduction in software consumption models. After a stream of acquisitions, the company was providing 32 different poorly articulated consumption models, which were supported—or not supported—by largely undocumented and overlapping technology capabilities. By standardizing on and documenting scalable business, operations, systems and technology capabilities for software purchases, Cisco reduced the number of software consumption models to four. Thus, when Cisco was acquiring VS, the acquisition team could analyze VS's practices and subsequently integrate them within the four well-defined and scalable consumption models, rather than bolting on another consumption model. By using its EA capabilities in this way, Cisco reduced the complexity and difficulty of the VS acquisition.

Lesson 3: Use Pairs of Business and Technology Architects

The challenge of the selection phase (Phase 2 of the acquisition process model) is to envision how the combined organization should work, and to identify potential roadblocks to realizing this vision. Selecting the right acquisition target is difficult because it entails bridging a strategic business mindset with a detailed understanding of how strategies can be enacted. If the acquirer embraces EA as a business modeling approach, its EA capability can help to overcome this difficulty. Business capability models, capability heatmaps and capability roadmaps can be used to capture the critical value creation potential of the acquisition target and to drill down into the operations, systems and technology integration required to leverage that potential. In addition, using EA capability in the selection phase enables fast and direct translation from business to-be scenarios to integration plans.

Combining business and technology architects into pairs with ongoing responsibility for specific capability areas forms a crucial bridge between the business and technology domains. With the assistance of business architects, business managers are able to think in terms of capability configurations and use EA tools to envision strategies. Business architects provide the link to operational enablement and, through their technology architect counterparts, to systems and technology enablement. Over time, knowledge about how a business capability is technologically enabled is accumulated in the architect pairs.

In Cisco, business architects worked with the acquisition team to use capability maps to envision and communicate the to-be scenario of the acquisition. Consistent with the dynamic discovery of the target's EA, capability heatmaps and roadmaps were used to focus architecting activities on the areas of the enterprise that were critical for value creation. In the VS acquisition, software consumption was one such area, where a business and technology architect pair investigated the possibility of integrating the VS software consumption model and determined if there would be any roadblocks associated with this integration. Subsequently, business capability maps were used to define the to-be scenario, which was translated into technology enablement.

Finally, when evaluating the outcome of the VS acquisition, Cisco decided how the EA pair responsible for consumption models should, in the future, deal with consumption models of acquisition targets with highly customized offerings. In this way, EA pairs accumulated knowledge about how to bridge the business and technology domains.

Lesson 4: Making acquisition integration part of the ongoing business transformation

In large organizations, a multi-threaded and continuous transformation involves a variety of challenges and opportunities. Different strategic initiatives, including divestures, downsizings, joint ventures, restructurings and market reorientations, affect the same operations, systems and technology capabilities. They also use the same organizational resources to implement change. Companies that use their EA capabilities to orchestrate ongoing transformations, can use those capabilities in the integration phase (Phase 3 in the acquisition process model) to ensure the integration is synchronized with other transformation initiatives. This enables a more efficient integration phase, because less rework has to be done and the disruptive effects of organizational transformation can be minimized.

To successfully synchronize acquisition integration with the ongoing transformation of a company it is essential to have a holistic understanding of the different technology and organizational transformations that the company is facing in the near future, and the extent to which they overlap. This critical overview of the ongoing technology transformations and what parts of the organization they affect can be captured by architects in capability roadmaps that cover the intended transformation for a specific capability within, say, an 18-month horizon.

Cisco was able to synchronize the integration of VS with a major infrastructure project. This had a number of benefits. First, the need to carry out integration work after the end of the infrastructure project was avoided. Second, the major infrastructure project was marginally adjusted to take account of the scheduled integration of VS. Third, the video offerings business unit needed to go through only one disruptive

organizational change. These benefits outweighed the cost of delaying the systems and technology integration of VS.

Lesson 5: Digital Traces Point the Way Ahead

A well-known mantra is "what gets measured gets managed." Thus, the dynamic outcomes of an acquisition project must be measured to prevent the project from drifting from the desirable business state (Phase 4 of the acquisition process model). The negative long-term effects on operational performance and strategic innovation caused by the sequential accumulation of minor integration inefficiencies are frequently overlooked in an acquisition. Critically, in the post-acquisition phase the integrity of affected resources must be rapidly restored so that the acquirer is ready for the next challenge, irrespective of whether that is an acquisition or another type of strategic organizational transformation.

Using EA capability in the preparation, selection and integration phases of an acquisition has the additional benefit of producing detailed documentation on acquisitions and integration. Such "digital traces" include the pre-acquisition and post-acquisition reference models, which can be used to evaluate how the acquisition has impacted the IT infrastructure. Post-acquisition evaluation can also revisit the to-be scenario that was created and the capability roadmaps to investigate the extent and causes of "drift" during the acquisition process.

For Cisco, the need to rapidly get back to a stable business environment following an acquisition is high because its industry is under constant transformation. It is therefore an advantage if the EA digital traces are available by the end of an acquisition. After the VS acquisition, the acquisition team used documentation provided by the EA team to evaluate the performance of the acquisition. In particular, the evaluation contrasted

forecast and actual integration outcomes as part of an ongoing learning process of what needed attention in the due diligence of future acquisitions. This led to a revision in due diligence practice, with increased emphasis on investigating how an offering was technically delivered to the target's customers, and to EA being assigned the additional task of investigating scheduling barriers in larger acquisitions. These changes mean that, in subsequent acquisitions, Cisco can identify possible obstacles in the selection of an acquisition target. This enables Cisco to be ready for the next acquisition, and to avoid resource inefficiencies that would impede future acquisitions.

Concluding Comments

Acquiring business units is a common and challenging component of many corporate growth strategies. Drawing on an advanced EA capability in the acquisition process can improve the value created from acquisitions. In many organizations, the purpose of EA is to enable the translation of strategic initiatives, based on a corporate vision, into executable components that can be measured and operated. In such organizations, it is highly likely that EA would have a meaningful impact on its ability to remain agile, responsive and adaptive to a changing business environment. The key is to focus efforts on major business transformations and to develop models that enable rapid and agile acquisition processes for translating strategy into execution "just in time."

Appendix 1: Research Methodology

Empirical data for this article was obtained partly from first-hand experiences with Cisco's EA practice, where one of the authors is employed as Head of Enterprise Architecture Operations & Governance. Personal experiences were complemented with 22 in-depth interviews with Cisco managers and employees involved in the firm's acquisitions to understand the role of the company's EA capability in the acquisition

process. Interview subjects ranged from the CEO to line managers and technology integrators. Public material (press releases, generic integration model, etc.) and internal documentation (target assessments, integration plans, performance evaluations, etc.) of Cisco's acquisitions contributed data points for triangulating the findings and confirming acquisition details.

We would like to thank Cisco Systems for its generous contribution to this research. Individuals at Cisco contributed rich information about the factual actions and events in the firm's acquisitions. However, the analysis and interpretation of these actions and events remain the sole responsibility of the authors.

Appendix 2: Cisco's Use of its Enterprise Architecture Capability in the VS Acquisition

Activity	Activity Description	EA Role in VS Acquisition
Phase 1: Pre-Acquisition Preparation		
1a: Infrastructure Preparation	Ongoing control activities to ensure that no transformational or development activities compromised the IT infrastructure flexibility	At the time of the VS acquisition, the IT infrastructure was technically prepared (simplified and scalable) to support extended use and integration with the additional IT services acquired together with VS.
1b: Documentation	Ongoing documentation of the organization, including, appropriate resource and organizational models	Before the VS acquisition, the EA function kept an updated reference model of the IT architecture. Because of this existing documentation, at the start of the VS acquisition, the transformation team could "hit the ground running," avoiding the need to first document the Cisco as-is scenario.
1c: Knowledge Integration	Working closely in joint teams with business and technology partners, the EA function promotes an ongoing awareness of the possibilities and constraints of the other partner	Understanding how the VS business and its operational capabilities interact with Cisco's systems and technology capabilities in areas such as software consumption models helped the EA team to identify areas of concern prior to the integration and helped Cisco to plan extra efforts in those areas.
Phase 2: Acquisition Selection		
2a: Business Case Estimation	Valuation of combinatory potential	EA artifacts helped to determine the business and operational capabilities in place that would support the new business models being acquired. These artifacts were also used to determine which elements of the acquisition would be integrated wholly and which would remain standalone. In the case of VS, Cisco decided to preserve the business capabilities while absorbing the operations, systems and technology capabilities.
2b: Roadblock Analysis	Analysis of roadblocks that could hinder synergy realization	The way VS sold its products directly to end customers was different from the partner channel approach Cisco used in its video solutions unit, and thus presented a possible

		roadblock to the integration However, the EA team verified that it was possible to retain separate business capabilities, while still redeploying Cisco's existing operations, systems and technology capabilities.
2c: Transformation Need Assessment	Cost estimation for the transformation needed to leverage potential synergistic effects	By understanding the transformation needed to integrate the desired elements of VS, the EA team was able to define programs with cost estimates across all four views needed to complete the integration and account for conflicting developments in the affected capabilities.
2d: Reverse Integration Potential	Investigation of the possibilities to redeploy in Cisco capabilities from the acquisition	The EA team was tasked with examining the consumption models of VS, and identify if there were opportunities for reverse redeployment of this capability.
2e: Suite analysis	Product/service/solution offering overlap and analysis	The EA team was asked to evaluate the potential product integration issues and opportunities from the point of view of a customer. No such issues were identified.
Phase 3: Acquisition Integration		
3a: To-Be State Definition	Identification of "integration debt" for specific solutions, development of operational scenarios and target state for the business, operations, systems and technology views	Cisco's EA team played a role in mapping the current technology capabilities of both VS and Cisco and presented a target state for the integration.
3b: Organizational Design	Alignment of acquired entity's resource models and organizational models	The acquisition team used the reference models to determine the conceptual integration of the VS workforce into the Cisco workforce model.
3c: IT-enablement	Site and infrastructure technology enablement	The technology models contained in the reference model were used to determine the needed transformation to support the systems and operations capabilities needed to support the VS business capabilities.
3d: Roadmap Development	Capability integration roadmap, migration model development	The EA team leveraged the to-be scenario capability roadmaps and transformation needs assessment to model required changes in each capability that required transformation, and incorporated the changes required into capability roadmaps for the coming 18 months.
Phase 4: Post-Integration Management		
4a: Integration Evaluation	Providing metrics for integration performance evaluation	Based on its ability to overview the acquisition transformation, the EA team was tasked with determining the extent to which the three key integration measurements had been achieved in the stipulated timeframe.
4b: Integration Correction	Corrections to ensure that platform integrity was restored	The EA team was tasked with documenting deviations from the integration plan in the reference model and to plan for corrective action to restore "integration debt" arising from the acquisition process.

Appendix 3: EA Artifacts Used in Acquisitions

Four EA artifacts assume particularly prominent positions in the acquisition process: the enterprise reference model, capability heat maps, capability roadmaps and the EA health metrics dashboard.

Enterprise Reference Model

The enterprise reference model (see Box) is the key EA artifact used in Phase 1 (pre-acquisition acquisition preparation). It ensures the integrity of the architecture and

captures the evolving as-is state. Being acquisition ready enables Cisco to hit the ground running in any business transformation, avoiding the need to first prepare critical resources or to document the as-is situation.

The Enterprise Reference Model

The enterprise reference model is a critical component that makes Cisco's current EA effort distinctly different from previous efforts. The reference model captures the current state of how Cisco does business and shows how the components in the business, operations, systems and technology views are currently working together to enable Cisco to do business. The enterprise architects use the models captured in the reference model in their interviews with business and technology leaders interested in transforming the current state of the business. These transformations can be triggered by a need to restructure, by acquisition integration, by moving out of certain business models or by a divestiture.

How the Enterprise Reference Model Was Used in the VS Acquisition. The reference model was used by the IT architects in the systems and technology views of the BOST model. The architects analyzed VS's systems and technology components and compared them to Cisco's current systems and technology components. This analysis was used to determine which components were critical to the integration planning and execution targets. The reference model helped prioritize the components that were most critical to the future state of business for the integrated business.

Capability Heatmaps

Capability heatmaps (see Box) are important tools in Phase 2 (acquisition selection). They describe where critical capabilities for the acquisition can be found. If possible, assumptions have to be carefully investigated in the areas covered by the heatmaps. Sometimes, assumptions can only be validated after the acquisition has completed, when it is too late to reverse.

Capability Heatmaps

The Cisco EA team uses capability heatmaps to determine what capabilities currently exist in the enterprise and what capabilities are being acquired. The team use this information to determine if Cisco has the required capabilities to sustain and support the acquired company at scale once fully integrated. Furthermore, the heatmaps are used to determine if there are capabilities in the acquired entity that are suitable for reverse integration. This is often the case in the acquisition of disruptive innovations

How Capability Heatmaps Were Used in the VS Acquisition.

The architects used the capability roadmaps to understand the specific capabilities that needed to be integrated. It was at this level that the architects discovered the need for specific capabilities to support the VS acquisition and its future state of business. They discovered that specific capabilities were not present in the current Cisco reference model and capabilities from VS were needed to continue to support the day-to-day business.

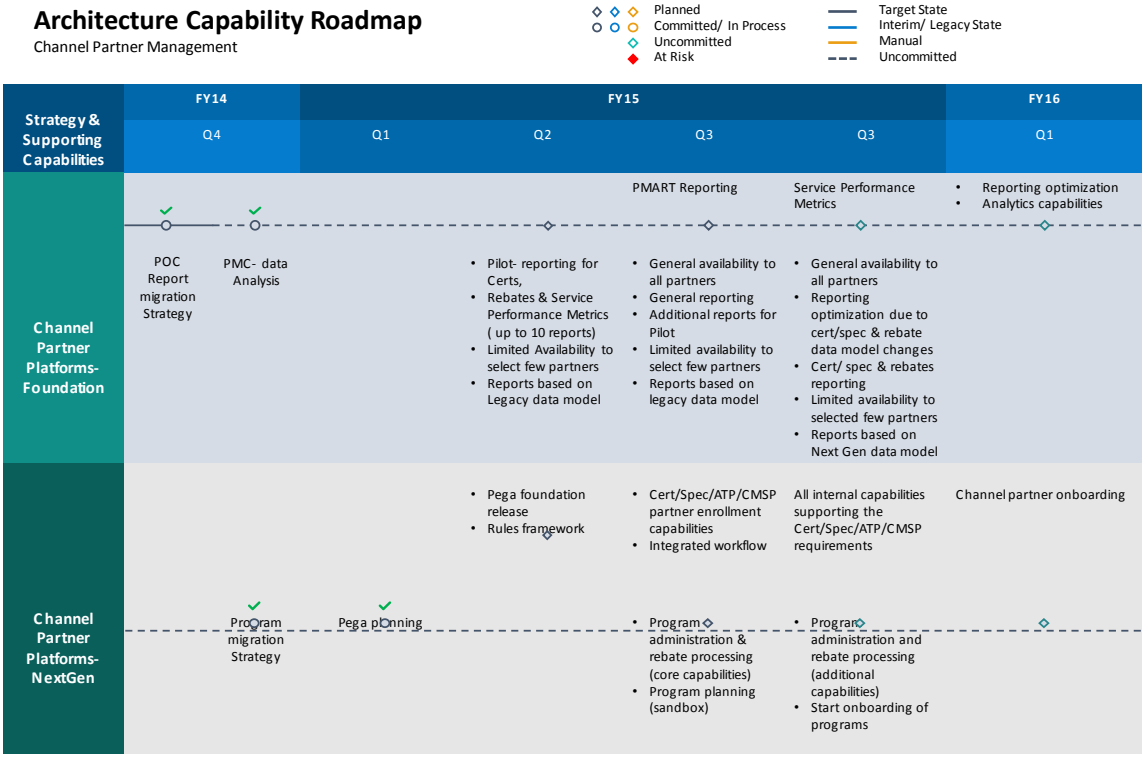
Capability Roadmaps

In Phase 3 (acquisition integration), the EA team leverages capability roadmaps to map systems and technologies and determine the relative difficulty of integration and the options that need to be considered, along with a cost estimate (see Box). The roadmaps take into account other ongoing transformations in each BOST view. The integration activities are therefore not separate and unique transformation activities, but are built into the general capability roadmaps for each part of the EA.

Capability Roadmaps

Capability roadmaps (see figure below) are used at different points in the acquisition process. Pre-acquisition, enterprise leaders work with architects to determine the current state of Cisco's business. They use the reference model and any ongoing or planned transformation efforts that may trigger an interdependency with the acquisition integration or potentially a gap that needs to be filled to support a new business model or business unit. During acquisition planning, the architects use the capability roadmaps to show how an acquisition target can be integrated into the ongoing transformation efforts across the four views in the BOST framework. Lastly, during the post-acquisition integration phase, the EA team can use capability roadmaps to determine the level of success of the integration.

Example of Cisco IT Capability Roadmap



How Capability Roadmaps Were Used in the VS Acquisition. The IT architecture team used the capability roadmap to sequence the integration of VS into the core architectures and operations of Cisco. The acquisition of VS caused the IT architecture teams to re-plan some of its projects to align with the timing of the needed capabilities for VS to become operational. Without the capability roadmap it would have been very

difficult to plan the integration of the VS IT architecture into the Cisco architecture and to integrate VS's capabilities. The roadmap gave the Cisco architects the ability to sequence the integration planning and provided a tool for the integration team and executives to communicate what activities were needed, in what order and at what time.

Enterprise Architecture Health Metrics Dashboard

The EA health metrics dashboard (see Box) is a critical tool in Phase 4 (post-integration management).The dashboard displays deviations from Cisco's ideal architecture. Corrections are worked into the capability roadmaps for the coming 18 months to ensure that whenever a new opportunity to acquire emerges, Cisco is always ready to acquire.

Enterprise Architecture Health Metrics Dashboard

Cisco's executive leadership team uses the EA health metrics dashboard (see figure below) to assess the ongoing health of the EA. The dashboards are presented in the form of 14 EA portfolios. Each is measured in terms of architecture health in four areas: risk, policy, maturity and interdependence. Each EA portfolio includes the integration activities required to complete the integration of acquisitions in addition to other ongoing transformation activities in the organization. This enables the executive team to see the full scope of transformation within the enterprise, rather than a siloed view of integration activities separate from other transformational activities. With this tool, executives can determine how the integrated components of acquisitions are being dealt with beyond the integration lifecycle, and integration success can be measured based on these metrics in addition to those discussed earlier.

Example of Cisco IT Architecture Health Dashboard

Architecture Health Dashboard

On track
At risk
Risk w/o mitigation

Health Report:	Policy	Dependencies	Arch Maturity	Risks	Investment
Strategies					
Next Generation Network	▲	▲	●	▲	▲
Infrastructure & Platform Service Delivery	▲	▲	▲	▲	▲
Global Data Center	▲	▲	●	▲	▲

Architecture Maturity	SIE Models			Business & IT Arch Alignment (Connecting CNI- O S T)	
S view Adoption	Expected total number of SIEs	Target SIEs- WIP	Target SIEs-Published	% of Systems mapped to Operational Capabilities	% of System Mapped to Technology Platform
FY-14	-NA-	-NA-	-NA-	-NA-	-NA-
FY-15	5	1	0	0	0

T-view Adoption	Actual # of current Technology Platforms	Expected # of new technology platform	% Tech platforms with TRM & Lifecycles	Expected # of new network models	New Network Models- WIP	New Network Models- Published
FY-14	44	63	78%	46	1	45
FY-15	119	12	73%	14	1	0

How the Enterprise Architecture Health Dashboard Was Used in the VS Acquisition. There were several points in the integration of VS where the executive team and integration team needed visibility on the health of the architectures to ensure that the core enterprise architecture was absorbing the VS acquisition appropriately and that issues with the integration were being addressed. The EA health dashboard provided the needed visibility and was part of the ongoing quarterly review by Cisco CIO's and

her leadership team. This allowed the team to identify issues proactively before the execution teams were faced with them.

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