Pace-Layered Application Strategy and IT Organizational Design: How to Structure the Application Team for Success

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Gartner's Pace-Layered Application Strategy enables IT organizations to build some systems for rapid change and others for stability, depending on the business need. We explore how CIOs can organize their application teams to take advantage of the pace-layered concept.

Key Challenges

- IT organizations everywhere face an urgent need to deliver systems faster in selected areas of the business.

- Organizing the application team for pace layering offers a way to deliver speed in the areas that require it, while maintaining stability in the areas where that matters most.

- Although there is no "one way" to organize an application team (or any team), the hub-and-spoke model is the best fit for most pace-layered application teams.

- The people delivering systems of innovation — the systems most built for speed and change — may reside inside or outside the IT department. If they reside outside, the emerging chief digital officer (CDO) is increasingly taking on the role of delivering systems of innovation.

Recommendations

- Even small application teams should be thinking about how they can organize to deliver according to rates of change, rather than treating every project with the same (often plodding) methods and processes applied across the board. CIOs need to determine where speed matters most and what the business is willing to trade off to get it.

- CIOs should decide now how much it matters to them to deliver systems of innovation inside the IT organization, as opposed to somewhere else in the business. The emerging role of the CDO often resides outside the IT organization, taking the delivery of systems-of-innovation-like products with them. This is OK, and even desirable, in industries experiencing deep digital

disruption. But CIOs should try to be proactive, not reactive, about where systems of innovation reside.

- CIOs should note that a minimum level of maturity in demand governance, relationship management and architecture is required to manage all three pace layers — systems of record, systems of differentiation and systems of innovation — in-house.

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Introduction

The golden rule in organizational design is to organize around what you are trying to optimize. In the case of Gartner's Pace-Layered Application Strategy, the application team is trying to optimize to deliver systems with differing rates of change, so that the IT organization can deliver some systems slowly and robustly and other systems rapidly and flexibly. This research focuses on how Gartner believes the pace-layered application team should be organized.

Organizing for Pace Layers Means Delivering at Different Speeds

Hands down, one of the biggest issues facing IT departments today is the problem of speed. IT has to get faster at delivering on business needs. But speed of delivery is not universally necessary or desirable in all systems. CIOs need to know the difference between those systems that require rapid delivery and change and those that don't, and they need to organize around each. Enter the Gartner Pace-Layered Application Strategy, which categorizes applications according to the rate at which they need to change.

In "How to Use Pace Layering to Develop a Modern Application Strategy," we defined pace layers:

- **Systems of record —** Established packaged applications or legacy homegrown systems that support core transaction processing and manage the organization's critical master data. The rate of change is low, because the processes are well-established and common to most organizations, and often are subject to regulatory requirements. Systems of record have the longest life cycle, at 10 or more years.

- **Systems of differentiation —** Applications that enable unique company processes or industry-specific capabilities. They have a medium life cycle (one to three years), but need to be reconfigured frequently to accommodate changing business practices or customer requirements.

- **Systems of innovation —** New applications that are built on an ad hoc basis to address new business requirements or opportunities. These are typically short life cycle projects (zero to 12 months) using departmental or outside resources and consumer-grade technologies.

Structuring the application team for the Pace-Layered Application Strategy means organizing to deliver some things quickly and other things slowly, with all the attendant differences in governance, demand processes, culture and development approaches that implies. See Figure 1 for the major differences among the layers.

Figure 1. Attributes of Pace Layers

Attributes	Systems of Record	Systems of Differentiation	Systems of Innovation
Pace of Change	Slow, infrequent and incremental. Changes every six to 12 months.	Moderate and more frequent. Configurability is key. Changes every three to six months.	Rapid, very frequent and ad hoc. "Throwaway" customization. Changes weekly, sometimes daily.
Lifetime	Ten-plus years.	One to three years.	Zero to 12 months.
Planning Horizon	Seven-plus years.	One to two years.	Up to six months.
Governance Model	Formal and global.	Responsive and business-led.	Flexible and ad hoc.
Stakeholders/ Ownership	High business executive engagement; alignment between business and IT strategy. Low end-user engagement, and formal handover from the business to IT.	High business executive engagement, but driven by lines of business. Moderate end-user engagement, with the business engaging on hot spots, and IT filling the gaps.	Moderate business executive engagement, with some sponsored and under-the-radar; tactical. High end-user engagement, often through business users or even circumventing IT.
Funding	Capital expenditure (capex), with corresponding operating expenditure (opex). Corporate or divisional funding. Annual budget.	Mix of capex and opex. Corporate IT budget or departmental expense budget. Discretionary.	Mainly opex. Departmental expense budget. Innovation fund.
Architecture	Large, modular design dominated by formal, upfront blueprinting phase.	Service-oriented architecture (SOA) and cloud-based, with a mix of service consumers and producers. Increasing use of composite applications through assembly of new and existing packaged and custom applications.	Lightweight and emergent, predominantly service consumers. Mobile and cloud-dominate.
Application Life Cycle Management (ALM) Approach	Waterfall approaches (time-boxed) at 70%. Interactive and incremental development (IID) at 30%.	Waterfall approaches (time-boxed) at 40%. Interactive and IID at 50%. Agile and lean methodologies at 10%.	Waterfall approaches (time-boxed) at 10%. IID at 30%. Agile and lean methodologies at 60%.

Source: Gartner (October 2012)

Most application teams have avoided the problem of delivering at variable speeds by simply defaulting to the slowest approach — the systems of record approach — for all systems. As noted earlier, this strategy doesn't work long term because, for an increasing number of digital business opportunities, the business needs more speed than a systems of record approach delivers. Digital marketing campaigns, crowdsourcing contests and many mobile apps are examples of systems of innovation that suffer if a systems of record approach is applied.

Analysis

Portions of this document are based on historical information; however, the overarching best practices are still relevant in the development stages of leadership.

A Hub-and-Spoke Model Is Best for an Application Team Organized Around a Pace-Layered Application Strategy

The central question here is, "How should the application team organize to deliver systems of record, systems of differentiation and systems of innovation, given the deep differences in culture, development methods, skills and orientation among the layers?"

As we have noted in "Application Organization Design: An Overview," there's seldom "one way" to organize an application team. There are simply a set of trade-offs that, when understood and evaluated, can be planned for and/or guarded against. There are, however, a few drivers that will force an organization to set itself up in one or another model (silo, system integrator or factory). Organizing around the pace-layer concept is one of them, because pace layers have fundamentally different governance processes between layers (see "Pace-Layered Application Strategy for Governance and Change Management"), and pace layers are focused on business processes, not any particular business organizational model.

CIOs need a way of organizing that preserves coherence among layers, while allowing for enough distance to let systems of innovation, systems of differentiation and systems of record cultures flourish independently. Gartner believes that the best option to achieve this delicate balance is the hub-and-spoke organizational model.

Generically, in a hub-and-spoke model, there is a central team of resources focused on common applications that are — or should be — shared among all business groups. Using pace layers, we'd extend that to applications that have common governance, planning and management functions. An application team organized around the Pace-Layered Application Strategy delivers systems of record from this central team or hub. This is akin to the "run" systems, in Gartner's run, grow, transform model (where systems of differentiation roughly equates to "grow" and systems of innovation to "transform").

Systems of Record Is the Hub From Which the Systems of Innovation and Systems of Differentiation Spokes Draw

The hub of this structure supports systems of record. This group supports applications that automate business processes with a relatively predictable pace of change. This doesn't mean that no capital gets allocated to these applications or that they're not critical to the business (payroll, for example, is automated by a system of record, and it's certainly a critical business process). It does mean that changes are typically targeted at cost optimization or efficiency, which lends itself to a predictable, long-term financial plan.

This group may be structured in any of the major organization types (silo, integrator and factory), and may be totally in-house, external or a combination of the two. The hub is organized around cost

optimization of the application delivery processes. The hub does not imply a reporting line from the spokes into the hub, but rather a common platform from which the spokes can draw (see Figure 2).

Figure 2. The Hub-and-Spoke Model for the Pace-Layered Application Strategy
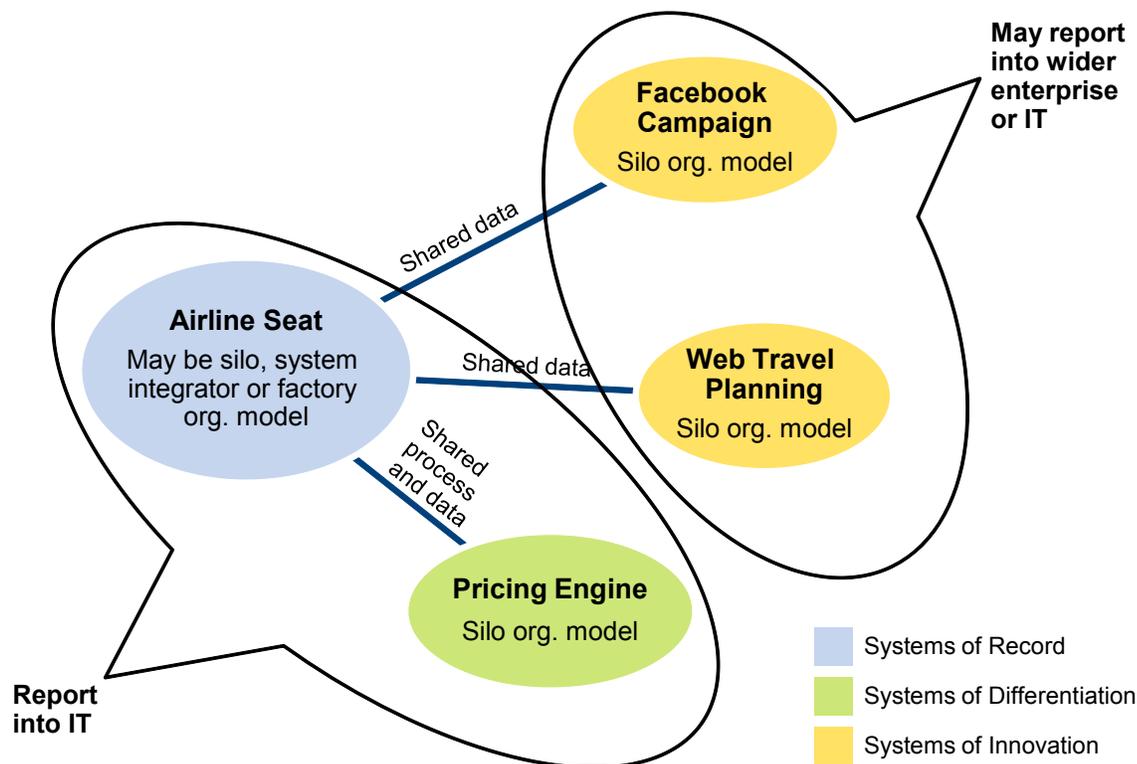
Source: Gartner (October 2012)

The hub is responsible also for providing the connecting tissue between the layers. Given the deep differences in governance between the layers, we recommend that each pace layer report separately, and that no layer report into another layer. There are issues with this, which we outline below. Essentially, whether a systems of innovation group reports to the CIO or somewhere else in the business, the critical thing is that the client-facing differentiable apps be located in one team, and that that group not be shared across applications.

In "The End of the Waterfall as We Know It," Gartner cautions about using different processes within the same team, especially because of the major cultural differences between agile and waterfall (or iterative) methods. The applications also typically require specialization of business skill sets that may not be shareable across the various business groups.

There are four key issues in separating the layers of the model:

- First, most organizations won't be able to toss out their current application portfolio, and many applications span the layers, especially between systems of record and systems of differentiation. This makes deciding which applications fit into which organization a difficult

proposition. In fact, existing applications may need to be refactored, so that some pieces can become systems of record and others systems of differentiation.

- Second, quite often, there will be a major integration need between the layers — thus, the importance of the connecting tissue and of well-designed thresholds. Developers need to know where the limit is in terms of architectural adherence, for example.

- Third, size matters. If the overall application group is small, organizing in a hub-and-spoke model is impossible.

- Finally, applications will move in the stack based on movement of the business processes they support. This requires a more capable set of architectural standards and documentation that's consistent up and down the layers. This means that, as changes are noted, application delivery and support will need to be handed off between the hub and spokes.

Systems of Innovation and Systems of Differentiation Require More Closeness With the Business Groups They Serve

The governance of systems of innovation and systems of differentiation differs markedly from that of systems of record, which is focused more on flexibility and speed, and less on predictability and control (see Figure 3).

Figure 3. Governance Differences Between the Layers

	Systems of Record	Systems of Differentiation	Systems of Innovation
Application Portfolio Management	Assess cost, risk and business fit.	Assess whether still differentiating.	Assess whether ready for productization.
Project and Portfolio Management	Prioritize on business needs and ROI.	Prioritize on business strategic need.	Prioritize on opportunity.
Staffing, Skills and Sourcing	Focus on reliable, cost-effective delivery.	Focus on business knowledge and speed.	Focus on design of experiments.
Financial Analysis and Budgets	Focus on reliable, cost-effective delivery.	Iterate on budget as project progresses.	Venture-capital-style funding rounds.
Management of Architecture	Ensure data and process integrity.	Leverage systems of record and new processes.	Experiment with new technologies and structures.
Software Processes	Mostly waterfall (time-boxed).	Mostly incremental and iterative.	Mostly agile.
Operations and Support	Tightly controlled change management.	Streamlined process per system.	Team control with "kill switch."
Vendor Management	Large, stable megavendors.	Best of breed, BPMS and composite apps.	Whatever works.
Business Engagement	Formal processes.	Day-to-day involvement.	Doing much of the work.

Source: Gartner (October 2012)

Generally, systems of differentiation should report inside the IT organization, because many systems of differentiation are actually part of a larger system of record. A high degree of integrity between the layers is needed for the whole to work.

This is not always the case for systems of innovation, where, in some cases, the systems of innovation spokes can and should reside outside the IT organization. This is especially true when the IT organization does not have deep business know-how or sophisticated demand management.

Systems of innovation delivery will likely reside officially or unofficially outside the IT organization if the IT organization responds "no" to two or more of the following questions:

- Can IT deliver at a systems of innovation pace? For example, is the application team set up to consistently and repeatedly deliver a system in less than six weeks?

- Is the IT organization close enough to the business to be present when a new idea emerges? For example, do IT developers regularly attend the meetings where new concepts and ideas are being discussed?

- Is the depth of technological disruption that affects the enterprise's business model so great that the business model itself is under threat? Put another way, are its revenue streams or mission under imminent threat because of digitization, such as with a newspaper or travel agency (see Note 1)?

- If IT responds "no" to two or more of the above, the chances are that the bulk of system of innovation delivery will be embedded in business units, not in a central IT organization.

Establish Clear Thresholds Between the Hub and the Spokes

No matter where systems of innovation report, distance must be maintained between the controls and risk management practices associated with keeping the back office running and the opportunistic, revenue- or mission-focused culture associated with the front office. This means establishing thresholds between the hub and the spokes to know which things need to be common and which things do not. The most important thresholds to establish are data integrity and process integrity.

There are a couple of aspects to note about these thresholds. First, the application team needs to be able to rely on a mature architecture to clarify the thresholds. In this case, "mature" refers to an architecture that reflects a coherent and accepted view about the elements that need to be common and shared across the business (the hub) and the elements that need to be differentiated (the spokes).

A good rule of thumb to keep in mind is that standardization is not in and of itself a universal benefit, and neither is differentiation. Aim to standardize commodity processes, which are the areas of the business where differentiation doesn't give the business anything in return. This is done through a systems of record approach, using the hub as a common, standard platform. In this case, the threshold for data and process integrity is very high.

Likewise, allow for differentiated processes and systems in areas where differentiation creates value, such as in systems of differentiation and systems of innovation. In systems of differentiation,

process and data integrity is generally still required to ensure coherence of the whole system. But the team working on the systems of differentiation part of the whole is organizationally separate, using different methods, timelines and governance to achieve their business goal.

The threshold at which systems of innovation connect to the other layers is generally in the data, not the process. A system of innovation, for example, for a digital marketing campaign can use different processes, nonenterprise vendors, agile methods or new funding models, but the end system of innovation should almost always be able to draw from master customer data. In other words, to preserve the rate of change of systems of innovation, you might tolerate duplicate solutions from one business unit to the next, but not duplicate data.

Knowing where the business needs standardization and where it needs differentiation is the first step to understanding how much integrity you need among systems of innovation, systems of differentiation and systems of record.

Organize Systems of Differentiation to Deliver Products, Not Projects

For most organizations, the container that's measured, managed and delivered is a project. Projects deliver new functions, incrementally modify functions or both. In many organizations, there is a growing level of dissatisfaction with project-driven funding within businesses, as mentioned earlier.

In "Maverick Research: The Shift From Projects to Products Will Drive Major Application Organization Changes," we proposed a different metaphor, where applications become products that support all or part of a business process. In project-based organizations, work is assigned on a time slice basis, called a task. Individuals can be assigned to multiple applications, as dictated by their availability. The project is the central organizing principle, not the application. In product-based organizations, teams of individuals are created to support a product or product group over a long period of time. Certainly, people come and go, but there are two key things to remember: The assignments to the team are typically long (more than 18 months), and they're typically full-time. A team member may work on multiple tasks or features, but they're within the team, not for multiple projects and multiple managers. This lends itself to a deeper and more consistent understanding of the business process within the application team.

Because the focus in a pace-layered organization is on applications or products that support business processes, and because systems of differentiation and systems of innovation require more agile governance practices, they lend themselves to this product view, where planning and delivery focus on putting the next most critical business capability into the product in the next release of the product (or as quickly as possible).

Essentially, demand governance here is at the business process level. Each year, a budget for that process is established. Typically, there is also a set of major business capabilities associated with this budget that can be mapped into releases. If at any time during the year a new capability arises that's critical to differentiation or innovation, that capability can be slotted into the appropriate release without needing to wait for a set of projects to complete. This more granular management of demand isn't required for systems of record. It's critical for systems of differentiation and systems of

innovation. And, because these changes occur fairly rapidly, most systems of differentiation or systems of innovation will be delivered using agile or tightly iterative methods.

Build Good Demand Governance Into Your Pace Layers for Organizational Coherence

In "The Four Pillars of an Application Organization," which talks about the four elements of a well-run application organization, the first critical pillar is demand and relationship management. Any organizational structure *must* account for this pillar first if they want to be successful. The application organization structure should match the way the business works. If there is flexible demand across the business and a single pool of budget, then a system integrator structure works best. If each business has its own budget, a silo fits. Pace-layered organizations are typically focused around process silos (that is, each business process has an application or set of applications that automate and optimize it, end to end)— many businesses aren't.

Organizations that have attempted to structure themselves differently from their business partners have typically met with failure, *unless* they put in place a very structured way to manage demand and relationship management. In other words, they need to resolve the differences in demand and relationship management explicitly in their operating model. Because a business group will likely consume applications that reside in multiple layers, demand governance and relationship management may need to be pulled out of the management structure to achieve this resolution and provide a single contact between a business group and its application counterparts. For example, an otherwise centralized operating model for application delivery would have explicit, decentralized demand managers maintaining a close link with the business units or divisions, to reflect the units' more autonomous way of operating. In many ways, this is as we have described in "Application Organization Design: The Internal System Integrator."

In addition, organizations need a basic level of maturity in their governance practices to make any organizational structure work. In "ITScore Overview for Application Organizations," Gartner has laid out eight discipline categories that must be accounted for. The disciplines don't change in a pace-layered organizational model, but the specific activities performed to meet these disciplines will. In fact, a mature application organization has a set of well-defined processes from which they can choose based on need.

As noted earlier, governance practices will differ based on which layer is being supported. A basic level of maturity (Level 3 or close to it) is critical to making pace layers work, because the governance will allow these relatively independent teams to come together. This isn't particularly specific to moving to a pace-layered organizational model. If you don't govern well, then you can't manage well in any model.

Share Organizational Aspects to Create Connections Among Layers

Many will note, as we have, that this model has been tried before. In some cases, it's worked very well. In others, not so much. The ability to manage within a Pace-Layered Application Strategy structure is based on understanding the business processes and applications that support them. Therefore, common and very structured business process and application architectures are crucial, especially in the short term, where organizations will typically have a mix of applications and

processes that don't make much sense together. This common view, across the entirety of the business, is critical to avoid the anarchy that's occurred in past attempts. For more on the connecting tissue between layers, see "Connecting Technology for a Pace-Layered Application Strategy."

Conclusion

It's increasingly urgent for IT organizations to address the issue of speed in their processes and operating model. The pace-layered application team is one step toward more speed, because it enables IT organizations to organize around the different rates of change required for different business processes. Systems of innovation teams may not necessarily reside within the IT organization. But even if they do not, mature demand governance and robust architecture are required to make the different moving parts work together as a cohesive whole. Although there isn't one way to organize the application team, the hub-and-spoke model is likely the best option for application teams pursuing pace layers, where systems of record provide the hub from which the systems of innovation and systems of differentiation spokes draw for minimum levels of consistency, while maintaining enough freedom to move quickly.

Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"How to Use Pace Layering to Develop a Modern Application Strategy"

"Application Organization Design: An Overview"

"Pace-Layered Application Strategy for Governance and Change Management"

"The End of the Waterfall as We Know It"

"Maverick Research: The Shift From Projects to Products Will Drive Major Application Organization Changes"

"The Four Pillars of an Application Organization"

"Application Organization Design: The Internal System Integrator"

"ITScore Overview for Application Organizations"

"Connecting Technology for a Pace-Layered Application Strategy"

"Systems of Differentiation: Building Applications That Provide Competitive Advantage"

"Does Your Business Need a Chief Digital Officer?"

Note 1 The Rise of the CDO

We have observed that, in highly disrupted sectors, such as print publishing and travel, where entirely new business models are required to meet the digital disruption, systems of innovation teams are more likely to reside outside the IT organization. In this scenario, the CDO role is emerging as an alternative to IT for the delivery of systems of innovation. In most cases where Gartner has seen a CDO role emerge, it reports directly to the CEO or equivalent, and is tasked with building the digital mission or revenue streams of the enterprise's future. For example, in a newspaper struggling to find its new business model, the CDO will often report directly to the editor. This is the case for the Guardian News and Media, where the CDO's team of developers sit in on each morning's editorial conference, listening in for opportunities to create a crowdsourcing app or infographic, or otherwise digitize a systems of innovation opportunity. For more on the CDO phenomenon and how it relates to front-office systems of innovation opportunities, see "Does Your Business Need a Chief Digital Officer?"

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