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INFRASTRUCTURE EXECUTIVE COUNCIL®

Emerging Trends in IT Infrastructure Technologies—Findings from the Vision for Infrastructure (Excerpt)

December 2010 Update

Key Findings:

For the next two years, cloud computing and the "consumerization" of end-user computing will influence the direction of most infrastructure roadmaps. Cloud computing—likely to take the form of private cloud implementations, with selective use of public cloud services—represents the planned technology direction for most infrastructure organizations, one that can facilitate and accelerate the development of integrated IT and business services.

By contrast, consumerization is largely seen in terms of the potentially negative consequences it presents to infrastructure organizations. The response to consumerization will be seen in technology investments that look to mitigate the risk of "rogue IT," while attempting to respond to changing expectations from business partners. Yet as consumerized expectations play a greater role in shaping the end-user roadmap, the challenge for infrastructure executives will be in building greater business partner responsibility for technology governance.

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INTRODUCTION

ABOUT THIS RESEARCH

The return to "economic normalcy," if not full recovery, has been marked by caution and change in infrastructure investments:

- Continued uncertainty in the business climate has raised the ROI bar for major capital outlays like data centers, especially amid a widening set of sourcing alternatives.
- The commoditization of process automation and shifting of competitive advantage to information management are increasing the business premium of advanced end-user capabilities, many of which are widely available in the consumer sector.

In mid-2010, the Infrastructure Executive Council launched the third iteration of its Emerging Technology Survey, a collaborative effort across 97 organizations to understand infrastructure organizations' perceptions of enterprise value, deployment risk, and likely adoption time frames for 70 technologies. The collective wisdom of the participants generates a roadmap of anticipated investment patterns likely to influence infrastructure roadmaps across the next three years.

Key Findings by Technology Domain[1]:

1. **Server/Hosting:** Most infrastructure organizations will be focused in the near term on building "private cloud" capabilities, with limited forays into "public cloud" services likely after 2012.
2. **Data Center Facilities:** Despite considerable technology advances in energy and capacity efficiency, capital spending considerations and the evolution of "public cloud" services will likely delay emerging technology adoption until 2013 or later.
3. **Storage:** Adoption patterns in the near term are likely to be limited to a small number of technologies, like distributed virtual tape or thin provisioning, which deliver substantially improved performance or functionality at lower capital cost.
4. **Network:** While infrastructure organizations will continue to invest in network technologies in the near term, fewer are anticipated to deliver the same level of value as investments in other domains.
5. **End-User Computing:** The trend toward consumerization is increasing uncertainty in many end-user computing roadmaps, while virtualization of the end-user environment has slowed relative to past business cases.
6. **Security:** Despite flat budgets, near term investments are likely for several technologies, while longer-term adoption patterns may hinge on the question of organizational and process readiness.

[1] For information related to collaboration and mobility technologies, please see our *Social Computing and Communications Adoption Curve,* along with our position paper, *Emerging Trends in Social Computing and Communications.*

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SPECIAL THANKS TO OUR SURVEY PARTICIPANTS

The Infrastructure Executive Council would like to express its appreciation to the organizations listed below, as well as others for their participation in our Emerging Technology Survey.

AEGON
Agilent Technologies
ATK
Australia Post
BlueScope Steel
Campbell's
Caterpillar
Chevron
CUNA Mutual Group
EMC² where information lives
ExxonMobil
Ford Motor Company
General Mills
HBO
JPMorganChase
KBC
Manulife Financial
Merck
Navistar
Nike
PPL
Rockwell Automation
Schneider Electric
Standard Chartered
Target
Tiffany & Co.

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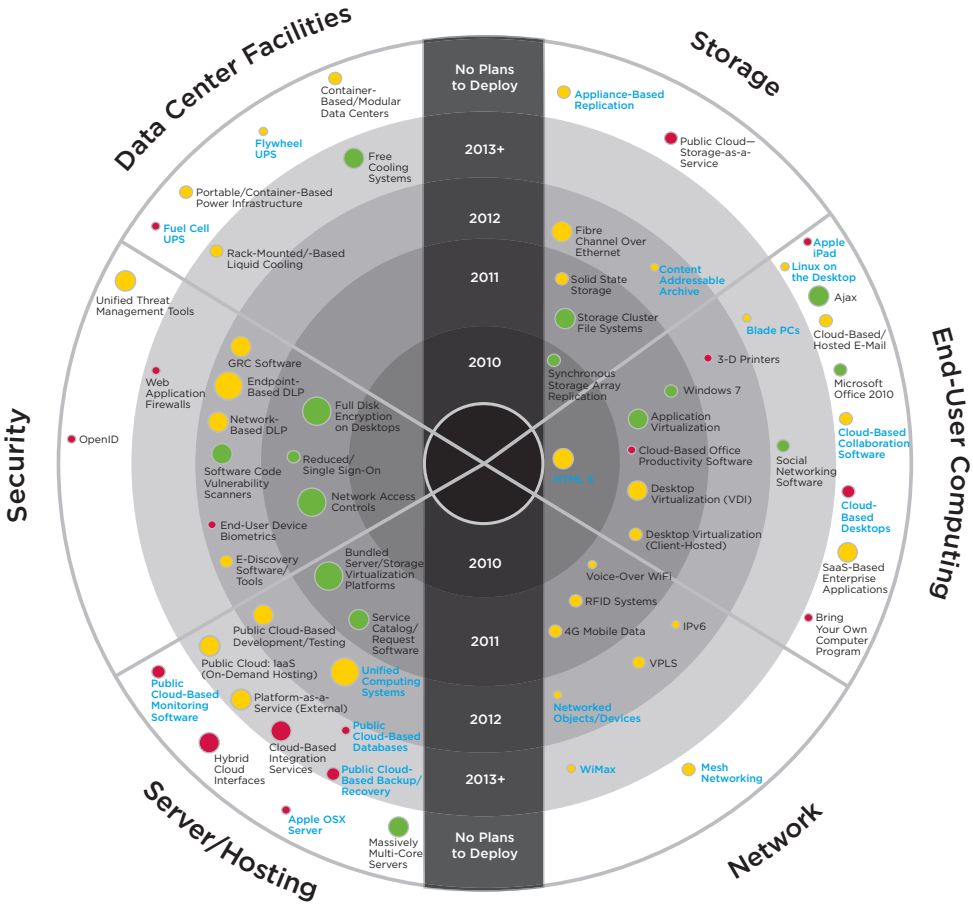
EMERGING TECHNOLOGY ROADMAP



Mainstream by H1 2010

- Netbooks
- Distributed Virtual Tape
- Thin Provisioning
- Multifactor Authentication
- Host-Based Intrusion Prevention Tools
- Database Security Tools
- Mobile Security Tools

Uncertainty Factor

Blue denotes technologies for which significant uncertainty exists around value and risk (30% or more of responses indicate "no opinion").

Enterprise Value[1]

Enterprise value represents the potential benefit that can be delivered.

High Value | Medium Value | Low Value | Minimal Value

Enterprise value is a composite assessment of the following:

- Effect on Capital Expenditure
- Effect on Performance
- Effect on Operational Expenditure
- Effect on Availability
- Functionality Benefits

Deployment Risk[1]

Deployment risk represents the likelihood of operational failure.

High Risk | Medium Risk | Low Risk

Deployment risk is a composite assessment of the following:

- Marketplace Maturity
- Management Tools
- Scalability
- Architecture Integration
- Support Skills
- Security

[1] Value/risk factors for security and data center technologies vary slightly. For more information, please refer to the VFI interactive roadmap on the IEC Web site www.iec.executiveboard.com.

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STRUCTURAL SHIFTS IN INFRASTRUCTURE'S DEMAND/SUPPLY EQUATION

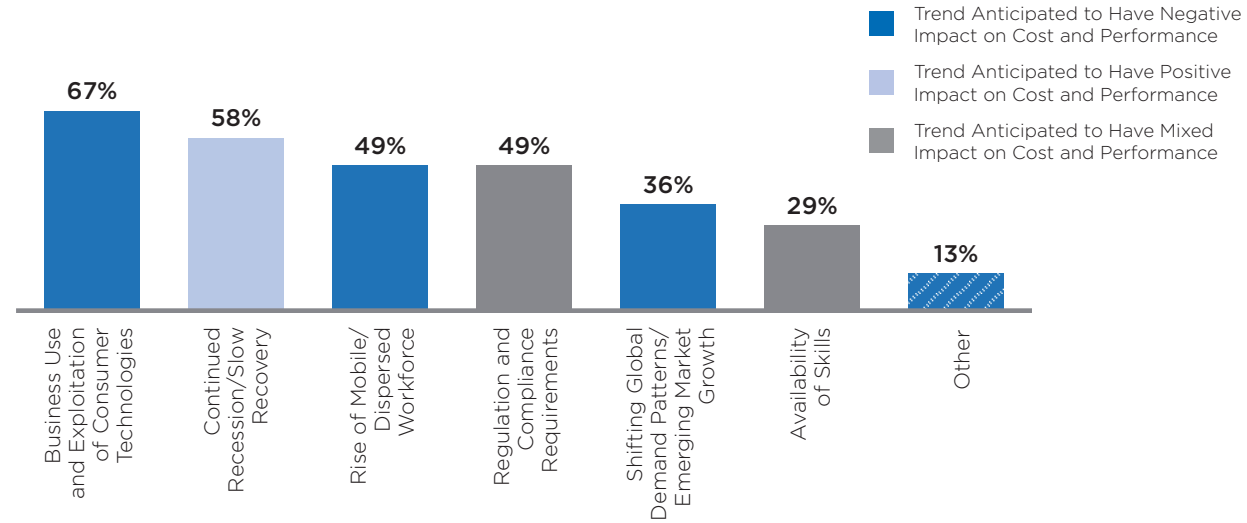
The debate over how structural factors may have influenced the 2008–2009 demand shock and recession in North America and Europe is not yet resolved. But there is no argument with the fact that major structural shifts in the global business environment have been underway for several years and carry significant consequence for corporate IT functions [1]:

- **Globalization:** 2010 marks the first year in which emerging markets' share of global GDP will surpass that of Europe or the United States. The epicenter of global growth is shifting, and the pace of growth outside core markets will challenge IT service models to manage the tensions between global efficiency and local differentiation and empowerment.
- **Diminishing Opportunities for Cost Cutting:** From 2005–2008,[1] the average annual decline in the cost-to-sales ratio for companies that can sustain year-over-year declines shrank by 20 basis points, when compared to the previous 10 years. For many IT functions—especially those post-consolidation—the only path to a step-change in cost-efficiency will be through a reconsideration of IT's boundaries and activities, relative to business partners and external providers.
- **Information Over Process:** The industrialization of back-office processes and commoditization of the systems used to manage these processes means that process automation by itself is less and less a source of competitive advantage. The permeation of advanced communication and collaboration technologies across customer and corporate markets creates new opportunities for competitive advantage in data analytics, customer experience, and knowledge worker enablement.

THE DEMAND SIDE: IS CONSUMERIZATION A NEW SOURCE OF COMPETITIVE ADVANTAGE?

Amid these structural shifts, the most immediate concern in 2011 infrastructure strategies, as reflected in our survey of infrastructure executives, is the **business use and exploitation of consumer technologies**—more prominent than the continued impact of emerging market growth, macroeconomic conditions, or changes in the regulatory environment. Why?

Figure 1: Top Business Trends Impacting 2011 Infrastructure Cost and Performance
Survey of Infrastructure Executives



n = 45.

[1] See our full analysis in *The Future of Corporate IT: Five Radical Shifts in IT Value, Ownership, and Role.*

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CONSUMERIZATION DEFINED

The Infrastructure Executive Council defines consumerization as a capabilities overlap in corporate and consumer markets for end-user technologies, which is changing employees' expectations and behaviors when using corporate technologies.

At its root, concern over "consumerization" reflects uncertainty around IT's value/cost equation. Increasingly tech-savvy[1] business managers will exploit available technologies—from mobile devices like Apple's iPad to SaaS tools marketed directly to business professionals—to capture competitive advantage, particularly in new markets where business leaders feel the corporate IT function lacks the right tools or desired levels of agility.[2] In most cases, though, business and IT leaders struggle to articulate exactly where consumerization delivers this advantage, beyond the level of anecdote or generalizations about "Gen Y" demographics. Moreover, IT's concern is that business partners may pursue the *opportunity* afforded by consumerization without developing the mechanisms for *responsibility*—for incorporating central support costs in opportunity analysis, for managing the role of consumerized solutions in business architecture, and for supporting enterprise-wide security compliance.

The strategic implication of the consumerization trend—and one potentially advantageous for IT in developing "step-change" cost-cutting—is that infrastructure groups will need to enlist business partners in a dialogue to redefine governance roles for consumerized technology, driven by a view into where differentiation within business lines will drive greater enterprise value than standardization and central control.

Figure 2: Greater Business Partner Responsibility Defined

What Greater Business Responsibility Entails

- **Business-Led Opportunity Identification—**Business leaders are responsible for identifying technology enablement opportunity and defining needs.
- **Business Responsibility for Processes, Programs, and Change—**Business process design, project management, and change management become business roles.
- **Selective Business-Owned Technology Sourcing—**Business leaders can obtain IT capabilities directly from the cloud when the value of differentiation outweighs standardization.

What Greater Business Responsibility Does Not Entail

- **Rogue Local IT Staff—**No local,"rogue" IT groups of dedicated IT headcount
- **"Servers Under the Desk"—**No business unit–owned, on-premise application or technology portfolios
- **Unintegrated Data—**No relaxation of central information and integration standards when the value of integration outweighs differentiation
- **Security Risk—**No relaxation of central security policy where business unit actions create organization-wide risk

[1] By "tech-savvy," we refer to broadening technology knowledge and confidence, without depth. In other words, more business leaders and employees may understand how to exploit technology, but this does not necessarily imply a deep technical expertise.

[2] Notably, the percentage of business leaders who rate the IT function as "effective" at applying IT capabilities to business needs fell 5% between 2007 and 2009.

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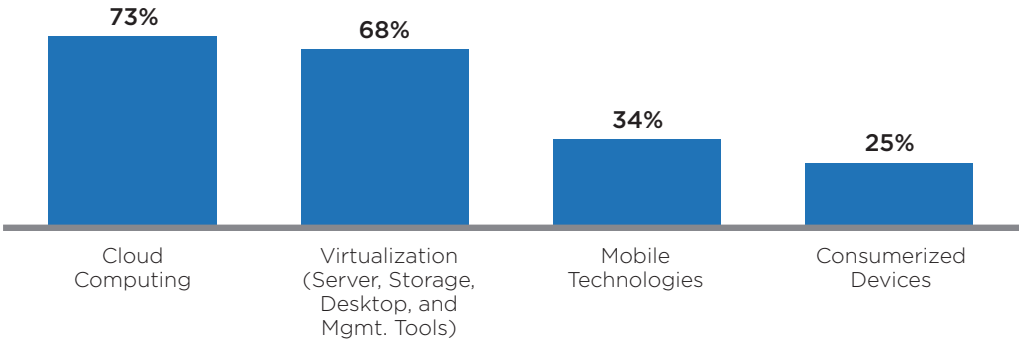
THE SUPPLY SIDE: CAPITAL PRESSURES AND SERVICE MODELS DRIVING IT TOWARD THE CLOUD AS A "GLOBAL SUPPLY CHAIN"

The most striking change across the three surveys conducted by the Council between 2008 and 2010 is the shift in infrastructure organizations' attitudes toward cloud computing.[1] Survey data and interviews from 2008 suggested only a tiny minority was treating cloud computing with anything more than skepticism, even when looking out over a three-year time horizon. 2009 saw a "turn of the wheel" in that software-as-a-service and infrastructure-as-a-service were being considered in many infrastructure roadmaps, albeit largely in terms of their implications for infrastructure cost and funding models. Responses to this year's survey indicate that cloud computing is now taking a central role in infrastructure roadmaps, in terms of its anticipated benefits for performance as well as cost—an impact perceived to be greater than the introduction of consumerized devices (governed appropriately) or other front-end developments.

For a clear majority of organizations, the roadmap to cloud computing reflects an anticipated mix of internal and external capabilities. At a minimum, the internal or "private" cloud represents the ability to orchestrate virtualization and automation technologies for more rapid provisioning, improved workload handling, and opex savings. The extent to which external or "public" cloud services complement the private cloud depends on the continued maturing of vendors' service offerings, but pressure to avoid major capital outlays will provide the primary motive for continued evaluation and use.

Figure 3: Top Technology Trends Most Likely to Influence Infrastructure Cost and Performance in 2011
Percentage of Infrastructure Executives Citing, up to Three Choices Allowed



n = 44.

"The security and integration questions with cloud computing are known, so it'll be in the market's interest to resolve these in the short term. Rather than focus on these, we need to be asking ourselves this: when is the last year that any of us, large or small, are going to be building our own data centers?"

Senior Infrastructure Director
F100 Financial Services Company

[1] For the Council's definition of cloud computing, and our criteria for distinguishing between "public" and "private" cloud models, see our *Emerging Technology Brief: Cloud Computing.*

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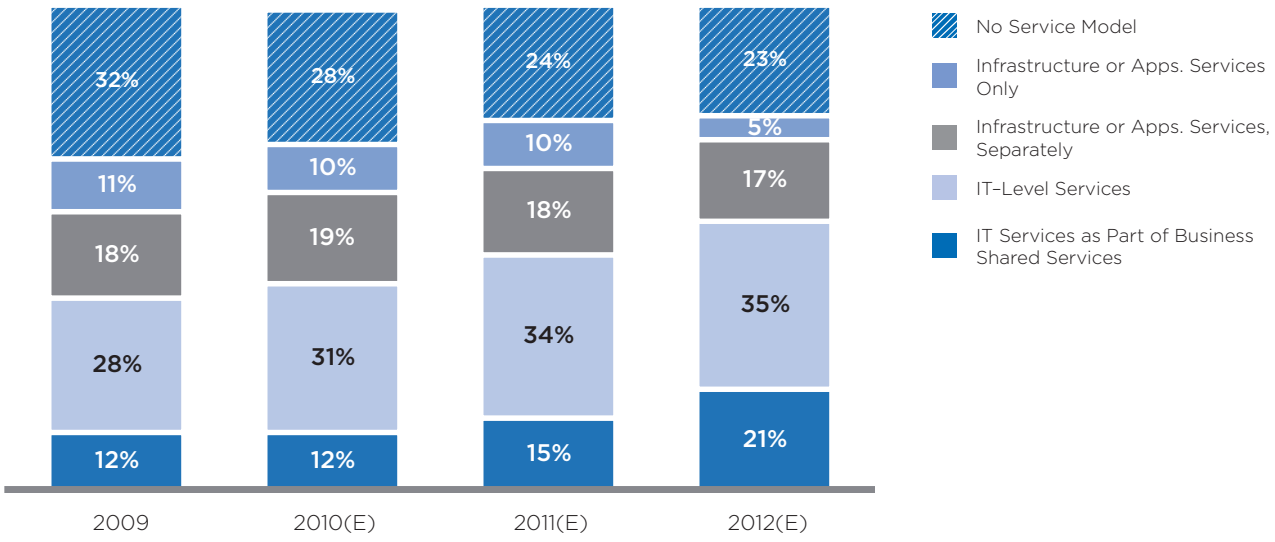
A less but still important visible economic motive for cloud computing is the evolution of advanced models for service delivery that more closely match IT resource planning to patterns of business demand. At leading companies, a limited set of integrated IT service offerings or integrated business service offerings is providing the foundation for demand estimation and resource allocation. Services in effect become product lines, supported by a supply chain of IT resources.[1] Demand for global agility and pressures for step-change cost-efficiencies are fueling this trend, such that a majority of organizations anticipate moving toward an integrated services framework by the end of 2012—with one-fifth of organizations moving toward the embedding of IT services in a business shared services model.

The evolution of public cloud services has mirrored this shift. Vendor market offerings are increasingly represented as a set of services that deliver against defined needs (e.g., monitoring, communications, desktop) rather than as an element of a technology stack (e.g., software, platform, infrastructure). This is important for three reasons:

- First, by more closely **reflecting demand,** public cloud services are changing the economic question from "which part of the technology stack will we move to the cloud?" to "which services could provide a better value/cost equation if moved to the cloud?"
- Second, this moves the question of **integration** from the level of specific technologies to the level of the service portfolio, where the question becomes one of "how many integration points do we want to manage across services and providers?"
- Third, this trend promises to move the question of **value** from technology capability to business capability, at the same time that business shared service models are evolving.

Figure 4: Current IT Service Models and Anticipated Change
Percentage of IT Organizations, FY2009–2012



n = 133.

Note: Bars may not add up to 100% due to rounding.

[1] While the drivers for this are economic, ITIL v3 has provided the theoretical structure for developing a service model as described here. For more background on ITIL v3, please visit our online ITIL v3 Resource Center. For examples of the supply chain or product line concept, see our case studies Air Products: Transparent Service Economics and Corning: Product Line Managers, and our archived webinar featuring Unilever, The New Vision for Global Business Services.

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This latter point is already evident in the extent of SaaS use across all business lines (see Figure 5 below) and hints at a future in which public cloud services come to resemble alternatives for business process outsourcing as much as they do for IT outsourcing.[1]

Figure 5: Cross-Industry Use of SaaS Enterprise Applications by Business Area
Percentage of Organizations

Business Area	Percentage of Organizations Anticipating Use of SaaS Enterprise Applications by 2013
Supply Chain	62%
HR	43%
Sales and Marketing	40%
Finance	30%
Production/R&D	17%

The maturing of public cloud services in parallel to implementation of the private cloud is likely to lead to more brokering responsibilities for infrastructure organizations, specifically in identifying and integrating the mix of internal and external capabilities needed to support global business service demands.

To do this effectively, infrastructure organizations will need to rely on a clear vision for business architecture—one that identifies common, specific business and IT pain points that cloud capabilities, private or public, can solve. By using real-life events, processes, and functionalities to describe a current and future state, business architecture can provide the template for the optimal "service supply chain" that then guides technology selection and implementation.[2]

"We will become technology brokers. Our job will be to know what the business needs, find the right offering in the market, and then integrate."

CIO
Global Media Company

Note: This is an excerpt of a whitepaper on Emerging Trends in IT Infrastructure Technologies from The Corporate Executive Board's Information Technology Practice. For more information, please visit www.exbd.com/IT.

[1] This also suggests that the market positioning for many public cloud services may take more of a "BPO angle" in the future to distinguish themselves from competitors.

[2] For more on business architecture, see the Enterprise Architecture Executive Council study, *Business Architecture in Practice.*

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