TO ENSURE THAT IT MEETS THE NEEDS OF THE BUSINESS, AN INDEPENDENT TEAM SHOULD EVALUATE ENTERPRISE ARCHITECTURE PERIODICALLY.

Evaluating Your Enterprise Architecture
A logical, business focused enterprise architecture (EA) can deliver exceptional business benefits and investment returns. Ensuring such results is the goal of enterprise architecture evaluation, which should be done periodically by an independent team. Independent evaluation will facilitate confident decisions by EA management and sponsors; provide valuable input to the architecture team; and help the architecture succeed by adding visibility and weight to the team’s authority. Effective evaluations can be performed using one of the many publicly available methodologies or via homegrown methods.
1. THE IMPORTANCE OF ARCHITECTURE EVALUATION

By defining and enforcing a logical, business-focused enterprise architecture (EA) across the entire organization, enterprises can achieve interoperability and consistency of business processes, applications, data and technology. Benefits include:

- Better economies of scale,
- Simplification and consistency at every level,
- Reduced application development, implementation and maintenance cost and time,
- More efficient use of software licenses,
- Reduced skill set requirements,
- Greater vendor leverage, and more.

In fact, the company-wide optimization made possible by an EA can lead to annual savings in the hundreds of millions of dollars, while truly leveraging information technology to improve the business. (For more information, see Syntel’s paper titled *A Global Vision for Enterprise Architecture*.)

The enterprise architecture group is a significant expense, but not as expensive as migrating to a new architecture, which typically takes years and may involve replacing hardware, networks, system software, data and applications. An even larger expense is involved in changing business processes, organization structures, business strategies, etc. For Fortune 500 companies, this can cost hundreds of millions of dollars, and for the Fortune 10, more than one billion dollars. Added to the expense are the risks, business impacts, new skill sets, change management considerations and more. But more significant than even these expenses and risks is the cost of not doing an EA. The funds and resources expended should generate a substantial return—if your EA is implemented correctly.

People other than the architects need to ensure that this is indeed happening. As the business itself evolves, an independent team should evaluate EA work periodically and provide strong direction. Independent evaluation will facilitate confident decisions by management and sponsors by highlighting significant issues, opportunities and risks inherent in the EA project. It will provide independent input to the architecture team, helping to improve the architecture’s evolution. It will also help shore up the architecture group’s mission, provide additional support and visibility and add weight to its authority.

What if you have no corporate architecture group or EA project in progress? Fact is, you always have an EA, even though it may be a hodge-podge. Periodic evaluation will help you understand the strengths and opportunities made possible by your architecture, as well as the any inherent weaknesses and business threats.

2. CHOOSING YOUR EVALUATION TEAM

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We recommend inviting architects from companies in your industry and forming an appropriate team. CIOs of participating organizations can have a reciprocal agreement in place to provide back approximately the same hours in return. This is perhaps the best way to obtain relevant, independent knowledge and experience while minimizing conflicts of interest.

The next best way is to engage individual architects on a time-and-materials consulting basis. All you have to watch are the hours. Our third preference is to engage a small, specialized EA consulting company. In addition to watching the hours, beware of new scopes of work being created through eloquent depiction of a too-bleak picture (e.g., new skill requirements, ongoing skill provision, gatekeeper reviews, etc.)

The last preference is to engage a large IT services company, which also does architecture consulting. Beware of the company taking over not only your architecture project, but its implementation and maintenance as well.

Who should review the evaluators’ report? The evaluators should first present their findings to the internal architecture group, which should comment on a point-by-point basis. This document should then be presented to a representative group of stakeholders—some or all of the CXOs. The stakeholders will then be prepared to make the required decisions, providing direction to the architecture and support and funding for the project.

When evaluating your enterprise architecture and/or associated effort, it is best not to leave the methodology to the architects. Instead, choose a formula or methodology from two general categories: creating your own evaluation method or adopting an existing evaluation methodology.

3. HOME GROWN EVALUATION METHODOLOGIES

- Spontaneous general management review. This is the most common and least productive way to evaluate an EA. The CIO may invite a couple of business EVPs or CxOs, who come unprepared, to listen to presentations by the internal enterprise architecture group (or the chief architect). They are unintentionally or intentionally led by the architects, who may fail to see significant risks, opportunities and threats. This is imperceptible to the CxOs, however, because they lack the skills or the time to contribute meaningfully to the discussion, while simultaneously trying to understand the pieces.

- Questionnaire-based evaluation. It is easy to frame a series of questions covering an architecture group’s organization, authorities, stakeholder involvement, architecture project plan, architecture objectives, and current and planned architecture attributes (such as its openness, technology dependence/invariance, functional isolation, interface stability, etc.) Such a questionnaire can be repeatedly applied to any architecture and architecture effort, inferences can be drawn and scores awarded.

- Checklist-based evaluation. Checklists are the fastest and cheapest way to evaluate anything, including enterprise architectures. Each evaluator should be assigned a specific role and allowed due preparation. As an example, the CIO, CSO, CFO and business VPs could evaluate the architecture or the effort from the perspective of their roles only. It is easy to prepare specialized checklists for each role, improving them through external input and from evaluation to evaluation.
The CIO's checklist, for instance, could include a comparison of statistics before and after the EA is implemented, such as an inventory of IT assets, user service levels, annual IT costs, and application change unit cost and time. It could also include project management metrics and compare a typical application project before and after architecture implementation. Checklist items for the EVP of sales could include cost of one unit of product sold, customer service levels and competitive differentiators before and after. The CFO's checklist could include SG&A and gross margin comparisons.

**ROI-based evaluation.** Though a typical ROI analysis provides a financial-only picture, it has its value. It is fallacious, however, to compare the cost of EA development to the corporate benefit of its implementation. Such an ROI would look "too good to be true." A truer picture emerges by adding the cost of developing the architecture to its multi-year implementation and business-change costs, and comparing this to the benefits during the implementation years and the annual benefit over the horizon of the implemented architecture. (To help with ROI-based evaluation, Carnegie Mellon University's Software Engineering Institute (SEI) makes available a Cost-Benefit Analysis Method (CBAM). This is a simple architecture-centric method for analyzing the costs, benefits and schedule implications of architectural decisions. In order to provide for better design decisions, it also assesses the uncertainty surrounding the judgements of costs and benefits.)

In order to make financial analysis more realistic in a major multi-year investment decision scenario, it is best to prepare a custom model for the organization, with factors for inflation, interest rates, exchange rates, cost and benefit escalations, uncertainties, etc., in one comprehensive spreadsheet.

**Function-attribute-measures-based evaluation.** This method assumes that key business functions have quality attributes such as accuracy and maintainability, and cost attributes such as cost per transaction and time per transaction. It also assumes that the ongoing job of IT is to continually improve these functional attributes. To evaluate the EA, stakeholders specify the quality and cost attributes of functions that interest them; or they take the architects' suggestions. They quantify how to measure performance and estimate the value of these numbers in the past and when the architecture is fully implemented, and after each year of its implementation period. Thenceforth, all evaluation occurs with reference to these numbers, as well as all decisions on technologies, direction setting and tradeoffs across divergent stakeholder interests. Tom Gilb is one of the pioneers of such methods.

**Simulations, prototypes and experiments.** Developing simulations and "what if" scenarios, building prototypes to validate assumptions and conducting experiments on existing architectures may be applicable in specific situations, often serving narrow purposes. This is not to downplay the importance of these methods: at times they are the only ways to address specific issues.

**Proprietary evaluation methods.** Boutique architecture consulting firms and large IT service providers typically use proprietary methodologies and frameworks. In many cases, these are minor adaptations of public methods described in the following section, or simplistic methods put together with minimal effort. Some have unique merits, but our recommendation is to stick to proven methods, complementing
them only when the methods are incomplete. If you must use a proprietary method, be sure that it does not commit you to the consulting firm forever, and that you will have continued rights to use and modify it—if you have the staff and skills for this purpose.

4. PUBLICLY AVAILABLE METHODOLOGIES

- **NASCIO Maturity Model-based evaluation.** The National Association of State CIOs (NASCIO) provides three primary tools for Enterprise Architecture development and evaluation. Although designed for local and state governments, they are general enough to be used by non-government organizations, possibly with some adaptation (especially, simplification). NASCIO’s tools are:
  - **EA Development Toolkit**, a guidance document for developing an EA program
  - **EA Readiness Assessment Tool**, which allows an organization to measure its own readiness for an EA program; if an EA program already exists, the tool can be used to determine its maturity (see below)
  - **EA Maturity Model (EAMM) Draft for Comment**

The EAMM is particularly useful for architecture group or function evaluation. It defines EA processes in the following categories: administration, planning, framework, blueprint, communication, compliance, integration and involvement. In each category it defines six levels of process maturity, from "no program" through "continuously improving vital program." This methodology allows for the possibility that you may have achieved different maturity levels in different process categories.

- **CMU SEI ATAM.** Carnegie Mellon University’s SEI has come out with the Architecture Tradeoff Analysis Method (ATAM) for EA evaluation. Starting with business drivers, it generates quality attributes and then scenarios. For an existing architecture, it generates architectural approaches and then architectural decisions. Analysis follows, which determines new tradeoffs, sensitivity points, non-risks and risks. These are then distilled into risk themes, whose impacts complete the loop back to the two starting points. The ATAM also creates a model for reasoning. This is a formal process conducted mainly by the evaluation team with input from stakeholders. It takes a few days, depending on the size of the organization and the architecture effort, and can be conducted by the SEI.

- **CMU SEI SAAM.** The Software Architecture Analysis Method (SAAM) from Carnegie Mellon University’s SEI takes the approach of coming up with business scenarios, and then running the scenarios against the current or proposed architecture. Many stakeholders are more comfortable describing scenarios where they expect certain outcomes, than they are working with numbers, models or diagrams. The evaluation team facilitates the generation of scenarios, and then they work the architecture for the scenarios.

- **CMU SEI ARID.** Also from the SEI, the Active Reviews for Intermediate Designs (ARID) method is intended to evaluate architectures whose design is still in progress. Its aim is to provide insights into the viability of early design strategies. ARID’s major steps are as follows:
1. Designer works with an ARID facilitator to identify the best reviewers
2. Designer prepares a briefing, which is reviewed by the facilitator
3. Designer presents an overview to reviewers and walks through examples, while a scribe takes notes
4. Reviewers brainstorm scenarios that the design must support, prioritized by the facilitator
5. Reviewers craft code or pseudo-code to use the design’s services for the scenarios

A scribe records issues, problems and situations where reviewers or the designer get stuck. A typical ARID may take one and one-half days. It should not address too large an aspect of the architecture design.

**EA Framework-based evaluation.** A number of frameworks have been devised for producing, implementing and maintaining enterprise architectures; some also specify ways to evaluate and review the architectures and the efforts. Important frameworks include the following:

- **Zachmann Framework** (does not specify an evaluation method)
- **C4ISR** (Command, Control, Computers, Communications, Intelligence, Surveillance and Reconnaissance) intended for U.S. defense operational systems
- **DoDAF** (Department of Defense Architecture Framework) intended for U.S. DoD systems
- **FEAF** (Federal Enterprise Architecture Framework) intended for U.S. federal agencies
- **TEAF** (Treasury Enterprise Architecture Framework) intended for U.S. Treasury
- **EAP** (Enterprise Architecture Planning) intended for large business enterprises
- **TOGAF** (The Open Group Architecture Framework) intended for all organizations
- **OMA** (Object Management Architecture) and MDA (Model Driven Architecture) from Object Management Group (OMG), intended for all organizations (does not specify an evaluation method)
- **ADD** (Attribute-Driven Design) and its constituent ATAM (Architecture Tradeoff Analysis Method) from the SEI intended for all organizations

**5. A FINAL WORD ON EVALUATIONS**

With so much at stake, EA reviews are mandatory. Any type and frequency of review is better than none at all. Just as an EA can have a major impact on the organization that will be felt for a long time, architecture reviews can also have significant impact. For optimal results, evaluations should be done by a carefully chosen team using one of the methods proposed here.

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Syntel is a global Applications Outsourcing and e-Business company that delivers real-world technology solutions to Global 2000 corporations. Founded in 1980, Syntel's portfolio of services includes complex application development, management, product engineering, and enterprise application integration services, as well as e-Business development and integration, wireless solutions, data warehousing, CRM, and ERP. We maximize outsourcing investments through an onsite/offshore Global Delivery Service, increasing the efficiency of how complex IT projects are delivered. Syntel's global approach also makes a significant and positive impact on speed-to-market, budgets, and quality. We deploy a custom delivery model that is a seamless extension of your IT organization to fit your business goals and a proprietary knowledge transfer methodology to guarantee knowledge continuity.