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magazine

LOST IN EA TRANSLATION

**How Do You Tell the Business
Your Story?**



**Governing Enterprise Meta-Models and
Value-Chain Instrumentation**

Is EA for Everybody?

**Why Not Visualize Enterprise Architecture
Principles Like They Do in Building
Architecture?**



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FROM THE EDITOR

Be a Storyteller

BY GEORGE S. PARAS

While they say that “a picture is worth a thousand words,” too often the viewer just doesn’t seem to “get it.” The picture doesn’t yield the clarity the author had hoped for. In EA, that’s usually because the picture is overloaded, obscuring the story.

Most enterprise architects are model builders by nature. We are awash in engineering diagrams, drawings, and reports loaded with detailed information. Such models are additively appealing, at least to those who think like us, so we build more. They show everything that anyone would possibly want to know. Who wouldn’t love all of that information in one place? They are complete, elegant, and perfect, to us. But therein lies the problem. Those models are usually not self-evident to everyone, particularly to executives and business leaders. The important takeaways can be lost in a flood of often highly dense and obscure detail.

Strong communicators realize that everyone doesn’t need to know everything. In fact, most consumers want just enough detail to inform a decision or action they must take. When I talk with fellow architects, I advise that they should not create that one perfect, complex, detailed model and then try to explain it to everyone around them. Instead I coach them to think about their messaging and audiences first, then sequence those messages into stories. Only then should they build models conveying just enough detail to support the story, customized to each consumer. Their audiences will appreciate the clarity, and the architect’s messages will be more clearly understood.

Speaking of messages to be heard, in this issue of A&G our contributing authors share their ideas on a broad range of topics. We hope you find their stories and examples compelling and thought provoking. As always, thanks for being an A&G reader! **A&G**



GEORGE S. PARAS is editor-in-chief of A&G and managing director of EAdirections.

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Governing Enterprise Meta-Models and Value-Chain Instrumentation

By Joe Roushar

Knowledge comes in multiple flavors. Information systems are used to process data or “content” that is structured or unstructured, across different flavors of knowledge. “*Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information,*” according to the National Information Standards Organization (NISO)¹.

Metadata can describe both the structured content in databases, tables and columns, and unstructured content in images, videos, audio files, and documents. Meta-content governance brings “enterprise” level discipline to the metadata creation and management processes in each area of an organization to help achieve horizontal alignment across disparate divisions and stakeholder groups.

NISO describes three main types of metadata:

- **Descriptive metadata** describes a category (glossary) or single instance of a digital resource for discovery and identification with elements such as subject, title, abstract, author, and keywords. A taxonomical model is descriptive.
- **Structural metadata** indicates file or data type, formal link structures or how compound objects, such as pages and chapters of a book, are put together.
- **Administrative metadata** provides information to help manage a resource, such as when, by what system or how it was created, data lineage, file type and other technical information, and who can access it. Types of administrative meta-content may include:
 - *Rights management metadata* describing intellectual property rights.

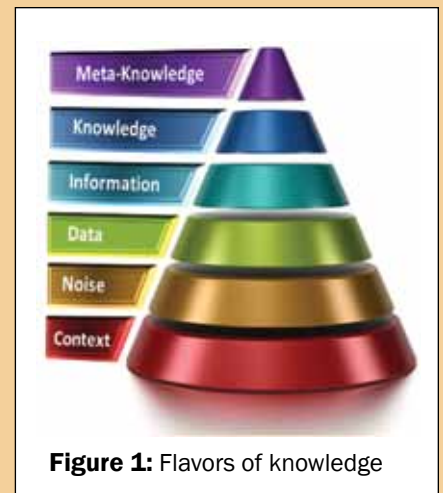


Figure 1: Flavors of knowledge

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- *Preservation metadata* describing policies and procedures governing resource archival and preservation (ibid¹).

These types also apply to meta-knowledge about structured and unstructured content needed for meta-content governance. Meta-knowledge, or semantic knowledge about content, provides insight into what is represented by the tables, columns, attributes, objects, dimensions, files, and documents that knowledge workers gather and use to make better business decisions. The semantic insights include:

- Data element and category definitions
- Formulas for combining data into results and performance indicators
- Source and lineage information (where it came from and who manipulated it)
- The nature of associations between related data elements
- The people responsible for managing the metadata

Decision makers often use the term “insight” to refer to information that describes or predicts customer or market behaviors and trends. The introspective insights in meta-knowledge facilitate and help deliver customer and market insights that can enhance success and competitiveness.

In the new knowledge enterprise, business users will have more ability to identify critical content and customize dashboards and reports, and even the workflows and rules that feed the repositories, warehouses, marts, and lakes from which they draw meaningful information. The outputs of some of the more intelligent systems will be in the form of actionable knowledge. The better the meta-model—the more actionable knowledge can be delivered.

Automated processes for creating metadata, in bulk through mining, or for each transaction, are needed to feed the model and the users with important semantic information. The model without the instrumentation is not enough. Value-chain instrumentation is one way the lineage and transaction metadata can be captured. Ideally, services that form part of every CRUD transaction go beyond logging the transaction (logs are hard to access and often out of reach for most users) to provide

a compact statement of the current step in the lineage. Along with automatically mined data, this becomes a permanent part of the historical record of that data element and its successors, aggregates, and KPIs. When needed, manual input can be used to augment and enrich metadata for content of any type.

Retrofitting existing systems, especially commercial software with value-chain instrumentation, is naturally more difficult, and sometimes requires mining logs to extract lineage data. But the instrumentation delivers such rich and helpful historical data, especially needed when researching downstream data quality problems, that the effort is almost always worth the cost. (For further information on value-chain instrumentation, see <http://understandingcontext.com/2015/04/knowledge-value-chain-instrumentation/>.)

WHAT PROBLEM ARE WE SOLVING?

Meta-knowledge of any sort is used to clarify ambiguities in data and expose implications of change. In an enterprise, inspecting the metadata can resolve ambiguities when users or auditors ask, “Where did this data come from and how was it calculated?” Well-implemented canonical models combined with up-to-date metadata can help technicians answer: “How will this change affect connected systems or downstream data consumers and reports?” Both are served by the transparency provided by good metadata. In some cases, good semantic metadata can interpret requests and provide more complete answers or collateral information that can make the results more actionable.

These are significant benefits of metadata for meta-content management, but how do you govern its creation and management? The same stewardship and governance strategies that improve the consistency and quality of enterprise data today can be used in the future “knowledge enterprise” with a few additional considerations.

THE META-CONTENT GOVERNANCE PROCESS

The discipline involves an end-to-end process and governance framework for creating models and controlling, enhancing, attributing, defining, and managing their knowledge definitions. The desired outcome is correct,

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complete, and current models and definitions that can be used to support increasing usage in search, request processing, and reporting. Meta-content governance involves regular periodic governance discipline in which assigned stewards assist in defining, categorizing, organizing, and transforming information assets in a business domain, then instructing, championing, and evangelizing the business and technology evolution needed for broad adoption of knowledge-based innovations.

- Canonical modeling and content transformation
 - The model describes the semantics and associations in a structured way that rules can use to support complex processes.
 - The model resides in a semantic layer that can be used to improve information access.
 - The transformation is both physical and cultural with information naming and categorizing within the model, and processes that preserve and defend the canonical definitions.
- Content convergence with metadata master management
 - Processes permit users with access to relevant unstructured content in any digital form to create metadata that places this content in the contexts in which it can be retrieved.
 - The benefits of internal crowd-sourcing the information are demonstrated as the meta-model in the semantic layer grows in breadth and depth.
 - Stewards scrutinize proposed additions and changes to categories and attributes to ensure managed expansion of the enterprise model and related sub-models.

While the long-term goal of standardization is very good, it is not always practical to roll out a new architecture to everyone at once. Divisions or silos can benefit from such innovations, and meta-content management solutions almost always need to begin in an

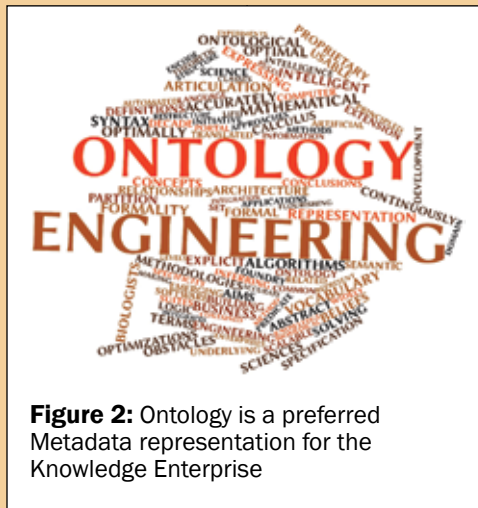


Figure 2: Ontology is a preferred Metadata representation for the Knowledge Enterprise

isolated enterprise sub-domain. Once understood and proven, the deep benefits come in leveraging these innovations enterprise-wide to achieve vertical and horizontal alignment.

Governance roll-out may differ from solutions roll-out. It may be most advisable to implement top-down governance frameworks, disciplines, and tools at the broad enterprise level from the beginning, even if governance solution implementations begin in isolated pockets. Establishing enterprise

tools capable of combining separate sub-domain meta-models can also provide valuable perspectives on the completeness and quality of separate implementations.

Tools such as SKOS (Simple Knowledge Organization System) can be used as a connective tissue or aggregator between different models even if implemented using different tools and standards. Many knowledge organization systems, such as thesauri, taxonomies, classification schemes, and subject heading systems, share a similar structure and are used in similar applications. SKOS enables governance professionals to capture much of the similarity, make it explicit, and enable knowledge and technology sharing across different services or applications.

Building out knowledge governance and semantic integration models across the enterprise makes it more feasible to push some governance responsibilities to individuals. This is an appealing choice for individuals who have unique expertise and unique automation needs. To mitigate some of the significant risks of such shared responsibilities, governing bodies will need to implement comprehensive technical security and auditing technologies, and institute appropriate checks and balances, periodic touch-points, and tools to manage governance responsibilities and accountabilities throughout the hierarchy.

STEWARDS CURATE METADATA QUALITY

As we push more responsibility for alignment to more

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subject matter experts, the middle managers become increasingly important in maintaining and curating metadata quality through small course corrections whenever misalignment occurs. Stewards watch for changes that could impair:

- **Consistency of definitions:** The metadata glossary contains data element definitions to reconcile the difference in terminology such as “clients” and “customers,” “revenue” and “sales,” and formulas such as “gross margin” and “contribution margin,” or “members” and “subscribers.”
- **Clarity of relationships:** The meta-model shows associations between data entities to help resolve ambiguity and inconsistencies. Hierarchical associations are important for managing inheritance of attributes, and synonymy associations connect different words used to mean the same thing in different systems.

- **Clarity of data lineage:** Static lineage metadata, including its proper source of record, format, location, owner, and steward, describes lineage expectations in general terms. More granular operational metadata may capture auditable information about users, applications, and processes that create, delete, or change data, the exact timestamp of the change, and the authorization that was used to perform these actions. This can be gathered using value-chain instrumentation that tracks the origins of a particular data set (see TechTarget²).

Tools for lineage management should support proper governance processes and audit trails by:

- Capturing end-to-end metadata describing upstream processes and data lineage.

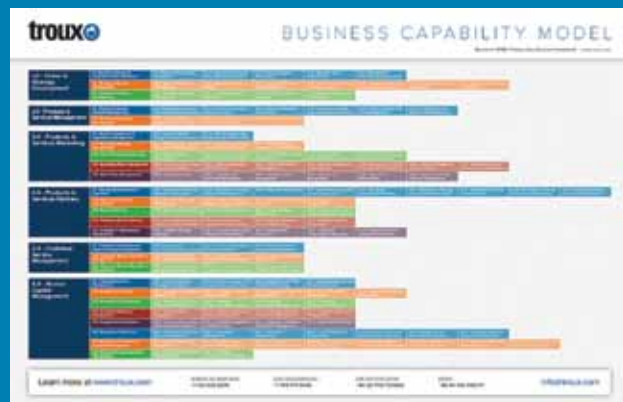
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- Discovering and notifying stewards of metadata inconsistencies from multiple sources.
- Enabling traceability from concept taxonomies and terms to logical and physical data schemas.
- Automating metadata management lifecycle to support data stewards and stakeholders.
- Empowering business users to understand where the data comes from that ends up as information in downstream reports and BI/analytics.
- Exposing the impact of changing a data element on other data elements, reports, and queries.
- Documenting needed information, how it is used, and highlighting redundancies in purchased data sources (Adaptive³).

Implementing metadata governance tools and processes requires budget and commitment, but the benefits

are deep and lasting, and they help build a culture that increases agility through greater alignment across the knowledge enterprise. **A&G**

Endnotes

1. <http://www.niso.org/publications/press/UnderstandingMetadata.pdf>
2. <http://searchitchannel.techtarget.com/feature/The-benefits-of-metadata-and-implementing-a-metadata-management-strategy>
3. <http://www.adaptive.com/products/metadata-manager/>

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A&G CALENDAR

CAMP IT-IT Portfolio/Program Management

June 18, 2015

Las Vegas, Nevada

<https://campconferences.com/events/2015/portfoliolv.htm>

CIO Government Summit

August 21, 2015

Baltimore, Maryland

www.ciogovernmentsummit.com/

Gartner Symposium & ITxpo N.A.

October 4, 2015

Orlando, Florida

<http://www.gartner.com/events/na/orlando-symposium>

TBM Conference 2015

October 26, 2015

Chicago, Illinois

<http://www.cvent.com/events/technology-business-management-tbm-conference-2015/event-summary-1b35cefbf9eb47a5936f4e6e88b8d383.aspx>

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By Douglas M. Brown, PhD, CEA, PMP

Gartner's surveys consistently report a level of maturity in enterprise architecture (EA) practices averaging about 2.3 on a 5-point scale (with the minimum already at 1.0). Many of these companies are on their third iteration of EA. In other words, a large proportion of technology-savvy businesses are leading their industries without using (indeed, while rejecting) practices that EA practitioners declare will offer strategic advantages. Are these companies missing big opportunities that would make them even wealthier? Or is EA caught up in its own hype?

Meanwhile, few of the IT consultancies I have known as an employee or client employ many of the EA and PPFM practices that they recommend for their clients. That is not necessarily a criticism: their businesses differ from those of their clients. However, it does suggest that there may be situations (too small, too simple, too diversified) in which an EA investment is simply not justified. In other words, is EA not for everyone?

Restricting ourselves for simplicity to an IT enterprise, the benefits of EA include:

- Reducing redundancy of assets and efforts

- Increasing the standardization and reuse of solutions and assets
- Rationalizing the full set of current and future investments so that they are complementary rather than contradictory
- Speeding incident resolution by showing the physical or logical connections in a complex system

All of those benefits come from cost reductions or avoidances, which can be only a limited proportion of the total current program cost. Retail stores tolerate a certain amount of shoplifting because it would cause too many problems to prevent it entirely; likewise, most organizations tolerate some degree of process inefficiency that to me seems to be in the range of 10 percent. EA would have to eliminate that much waste for executives to see it as a business multiplier worth their time and money. Otherwise, EA is just one of many worthwhile activities aimed at internal operating efficiencies. Some architects may see this lowered profile as undignified, but it is a better place to start building credibility.

If EA is simply to pay for itself by generating tangible savings greater than its costs, what are those costs? Even

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after achieving stable implementation, an ongoing IT EA practice must as a minimum:

- Keep up with relevant developments in the outside world of technology (and business).
- Develop and maintain patterns for current and future solutions.
- Model, inventory, and keep track regularly churning internal assets.
- Participate in technical decision and oversight activities (project gate reviews).
- Participate in and respond to ongoing organizational planning processes and events.

These tasks are not additional duties for IT operational personnel. Many EA staffs seem to build around a core of three to four persons, increasing with the volume of innovation (project) work. An established EA practice will soon need a repository tool. All of that is just for ongoing operations; the initial implementation often requires perhaps twice as many resources. In round numbers, the ante to get into the typical EA game is about \$1 million for the first year or so. This initial investment yields almost no results in the first year, so an organization may well require hard benefits around \$3 million to consider undertaking such an investment in EA.

EA may well be able to generate 5 percent savings in IT; if that is \$3 million, the supported IT budget would be \$60 million, typically supporting an organization with annual revenues on the order of \$600 million and more likely over \$1 billion. Even if this back-of-the-envelope estimate is off by a factor of two to three, clearly smaller

organizations cannot afford an EA practice, certainly not in the way we have been doing it. Yet we know from the earlier-cited surveys that most larger businesses are not doing EA either. We started by asking whether EA is for everybody. Are we backing into the position that EA may not be for anybody?

EA can be an effective tool in solving problems of any scale, as long as we do not try to use a chainsaw to trim our nails. Architects must tailor the EA approach to what is feasible in the organization, not to some desired level of “maturity.” They must:

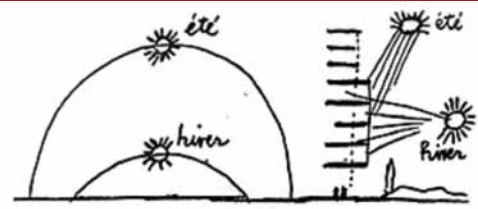
- Tolerate some (or even a lot of) unsanctioned solutions or unshared data. Think shoplifting. The cost (including the impact) of EA must be kept below the benefits.
- Pick an issue that everyone agrees is a problem and solve that. Then EA will have some credibility.
- Develop in each effort some knowledge assets that will also serve in future efforts. That will reduce not just the cost of the EA work but also the cost of the future solutions.
- Start the smallest initial EA team that can solve the first set of problems. It may not be as grand, but in a couple of years it may be one of the few EA teams that is still in place. **A&G**

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EA can be an effective tool in solving problems of any scale, as long as we do not try to use a chainsaw to trim our nails. Architects must tailor the EA approach to what is feasible in the organization.

Figure 1:
The concept
“Sun Breaker”
and its
principle.



*L'unité d'Habitation de Marseille
et le principe du brise-soleil*

WHY NOT VISUALIZE ENTERPRISE ARCHITECTURE PRINCIPLES Like They Do in Building Architecture?

By Mark Paauwe

It seems to me that we have somewhere missed the boat in the field of business administration and information science with regard to the application of enterprise architecture as a strategic management instrument for organizations. And let me try to explain why.

When you open up an art book about building architecture, you see nice pictures of the architecture of structures such as modern buildings, monumental houses, churches, towers, and bridges. Often these pictures are big artist impressions with detailed drawings of the composition of style elements, with a compelling explanation of how they interact or work as a whole (as a principle) and needed for a beneficial result, for example, in a bridge, such as a cable-stayed bridge (as a concept). These kinds of bridges enable vehicles to maintain their speed on the bridge because of a flat road surface.

The discipline of the building architecture has existed for centuries and has brought some magnificent

and extraordinary building structures. Principles and concepts are inseparable from the architecture of buildings in order to be able to design and build the “extra” that architecture brings into a structure. If we can reuse this usage of principles and concepts, we may be able to also bring that extra via enterprise architecture into our companies and organizations.

First let's see how concepts work and how concept principles (the enforced way concepts work) are visualized in building architecture. We do this by examining one of our great architects of all time: Le Corbusier.

In figure 1, you see a principle details sketch showing how the concept of “Sun Breaker” works. Its principle is to prevent overheating of a room during a summer's day and to catch more sun at once during a winter day by means of using a shade screen. The principle details sketch shows this in a simple way, and you will understand it without even being a building architect.

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WHY NOT VISUALIZE ENTERPRISE ARCHITECTURE PRINCIPLES LIKE THEY DO IN BUILDING ARCHITECTURE?

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Creating a design without using concepts and principles and visualizing the principle as a means to make use of knowledge on sunset and sunrise and translating that to effective time bound shading would make it difficult to build a structure and get the same effect done with the same quality and performance.

So we see this as an example where it more than only helps to visualize the concept and its principle in order to bring that “extra” of architecture into a structure. Engineers with the principle details drawing of a sun breaker can construct the desired solution much easier than without. A principle drawing must contain the necessary elements and their composition so you see how it works. If you leave out one of these elements or do not stick to the composition, the principle, or better said the concept, won’t work. In the case of the sun breaker, the elements are shade screens with a certain length positioned horizontally parallel at a certain angle and distance from each other.

Let’s take a look at another example—a carburetor—to explain in detail the working of the principle

describing the enforced way of working or working mechanism of a concept.

The carburetor’s primary function is mixing fuel with air. The structure of the carburetor concept is: The carburetor comprises a constriction in the inlet channel, and a narrow tube that connects to the location where the construction is the widest.

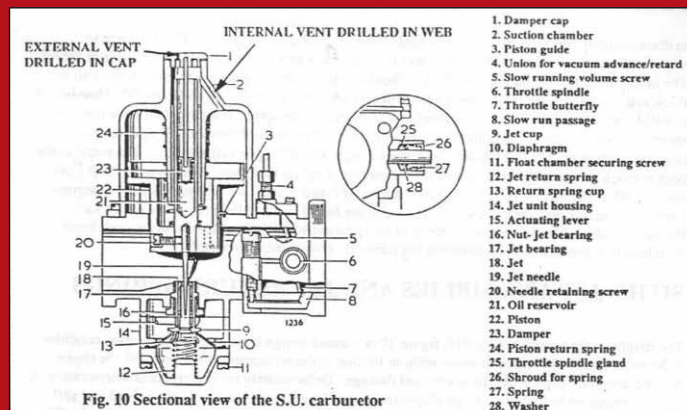
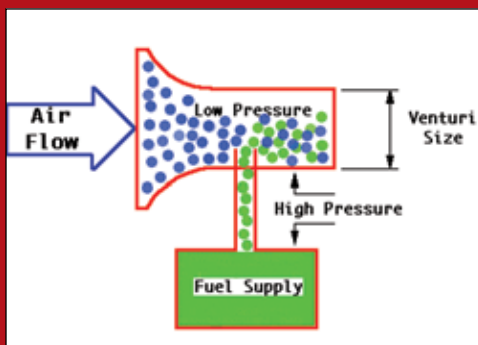
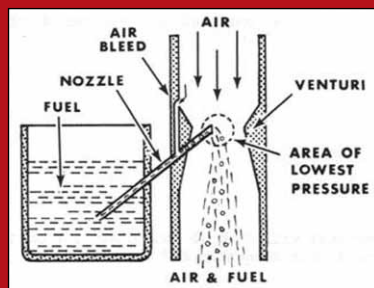
The concept principle of the carburetor is: By always pushing air through the narrowing of the inlet channel of a pipe, it ensures that the air flows faster. If we make a hole at the narrowest spot in the pipe, the fast-flowing air will suck even more air. This creates under pressure. If we put that pipe in petrol, then the petrol is being sucked into the carburetor by the air stream. This is how a gasoline engine uses a carburetor.

Does the concept of the carburetor work if we do not have an inlet channel with a narrowing?

The answer is no. If either *inlet channel*, *air*, *pressure* etc. are lacking, the carburetor does not work or does not work as efficiently as it should.

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Figure 2: The concept of carburetor and its principle.



WHY NOT VISUALIZE ENTERPRISE ARCHITECTURE PRINCIPLES LIKE THEY DO IN BUILDING ARCHITECTURE?

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So, again, in figure 2 this second principle detail drawing helps engineers to construct a solution containing the principle much better than without or with only a textual description of the rules of the carburetor.

Here I like to make a parallel between building architecture and the discipline of enterprise architecture in organizations.

Enterprise architects (business, information, solution,

data architects, etc.) also create designs and build structures like building architects. Only their structures are IT systems, business processes, function domains, and success/product formulas. What enterprise architects often don't do is visualize architecture principles or concept principles like building architects do. Often enterprise

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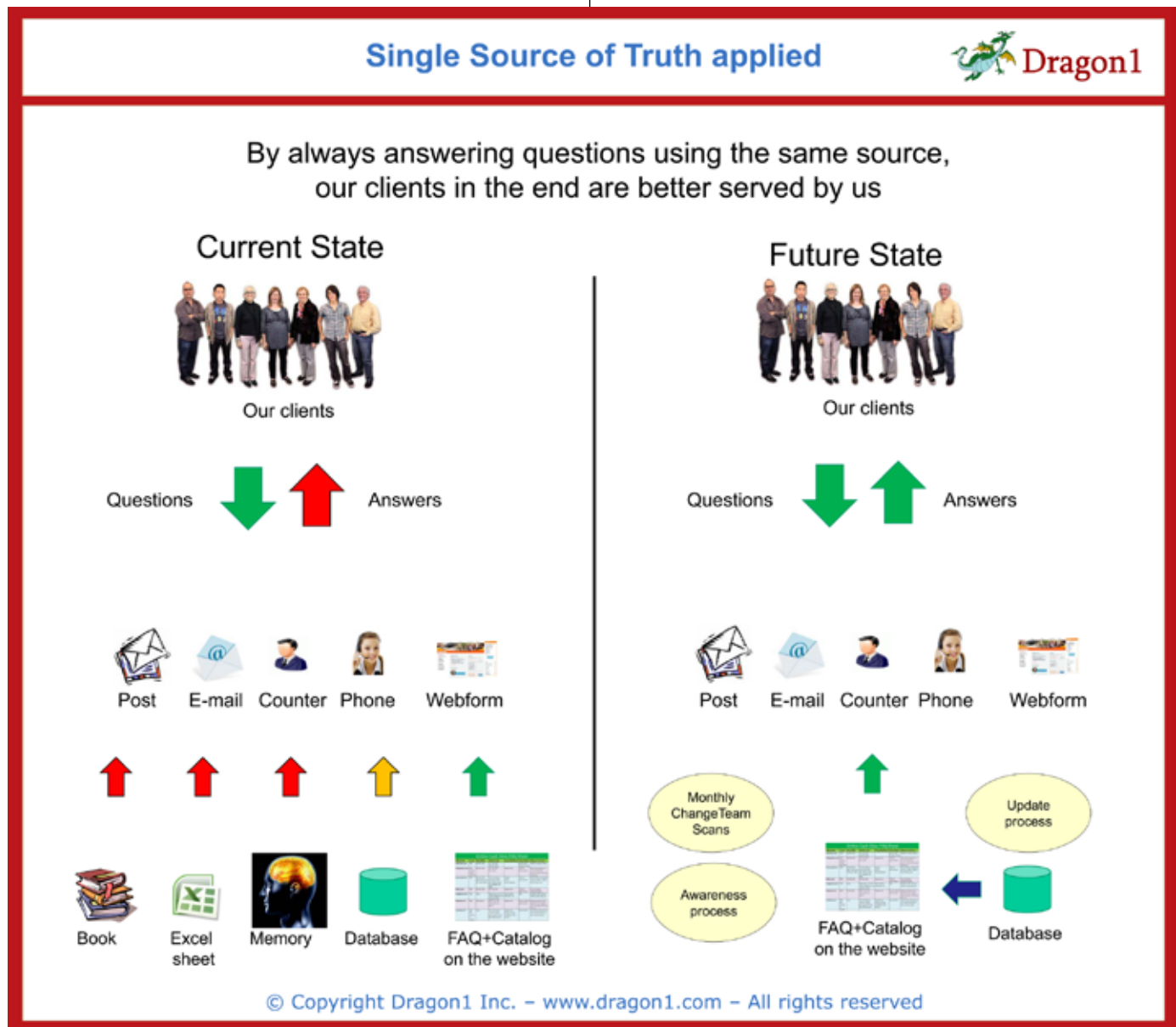


Figure 3: The concept “Single Source of Truth” and its principle.

WHY NOT VISUALIZE ENTERPRISE ARCHITECTURE PRINCIPLES LIKE THEY DO IN BUILDING ARCHITECTURE?

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architects do not even write down a principle in the form of a way of working, but as a guiding normative statement. Which, in fact, makes it hard to visualize the principle as way of working.

One advantage of visualizing principles of concepts as enforced way of working is that we can see much more quickly if an important element (a logical functional part) of the concept is missing, causing the concept not to work optimally or at all (not produce the required results). Or sometimes elements are present that sabotage the principle because they allow other paths to be taken or scenarios or states to be possible.

As an enterprise architects, we should always work with the following three starting points to visualize principles of concepts effectively:

- 1 A company's enterprise architecture equals a total concept consisting of a large number of business, information, and technology concepts.
- 2 The enforced way a concept works and produces results is the concept's principle.
- 3 In every concept its principle can be formulated and visualized so engineers are able to construct or build a better solution containing the principle of the concept.

Let us, for example, take a look at an organization that uses multiple data sources to answer customer questions. If the data source process changes independent from the various sources, different answers will be given to the customers for the same questions. This is an unwanted situation that can cause costly problems for the customers and lead to customer dissatisfaction. And that is something management and employees do not want. Employees really want to give the customers the same answers to the same customer questions thereby increasing customer satisfaction.

Now a concept that is widely known in the field of enterprise architecture is called "single source of truth." And this concept has a way of working (i.e., principle) that really helps in the given example situation. The

company above really could use a correct and complete implementation of the concept of single source of truth in the organization. If we would draw a principle details drawing of the concept and project that onto the organization, immediately it is visible what is missing or should change in order to increase the quality of the answers given to the customers by the employees.

In figure 3, the concept of single source of truth for FAQs is visualized with all its essential parts. The principle of the concept is formulated in a way of working style.

The principle is: *By always giving an answer from the same one and only source for certain questions, a business ensures that its customers get the best available or correct answer to their questions, which results in better service and higher customer satisfaction.*

So in the current state of the organization, we see that more than one and only source for certain (the same) questions is available and allowed to be used. In the future state, we see that there is one and only source for certain (the same) questions available. The other sources have been shut down and not allowed any more to create. In practice, this has often led to everyone being required to only use the website FAQ pages.

In the event of a change in the FAQ on the website, everyone using the FAQ to answer clients will immediately see and use the changed answer. Also a process must be scheduled in the organization that regularly shuts down new FAQ-sources in a very early stage. And educating and training employees why this way of working is necessary should not be forgotten.

CONCLUSION

If enterprise architects visualize concepts and formulate principles in this way—with principle details drawings—managers, employees, and system engineers in the organization will understand more clearly why they should and how they can implement the design effectively. **A&G**

MARK PAAUWE is the founder and CTO of Dragon1 Inc.