



White Paper No. Fifteen The Enterprise Knowledge Portal Revisited

By

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Enter the Enterprise Knowledge Portal

About one year ago (on March 20) I introduced the *concept* "Enterprise Knowledge Portal" (in "Enterprise Information Portals and Enterprise Knowledge Portals," [1]) to the IT world by defining it and distinguishing it from the Enterprise Information Portal (EIP). The *term* had been used earlier (on March 5) by Hummingbird Communications, in a press release [2] announcing their impending acquisition of the PC DOCS group, and in an article in DataPro Industry News by Karen Shegda and Allan Tiedrich [3] entitled "Knowledge Management = Access + Collaboration + Retrieval + Analysis." But they declined to define or characterize the EKP except to say that it would integrate structured and unstructured content, and provide a single point of access to all relevant enterprise information. On March 25, IDC published its "Sourcebook for Knowledge Superconductivity" [4]. In this report Gerry Murray, then IDC's Director of Knowledge Management Technologies (currently, IntegrationWare's Vice President of Business Strategy and Development) distinguishes four types of corporate portals, including EKPs and offers some definitions (which I have discussed previously in ("Defining Enterprise Information Portals," [5])).

The introduction of the EKP concept was followed by remarkably little activity on EKPs. Google searches on "Enterprise Information Portal" (1015 hits), "Enterprise Information Portals" (943 hits), "Enterprise Knowledge Portal" (56 hits) and "Enterprise Knowledge Portals," (66 hits) tell the story of EKP vs. EIP during 1999 and the first two months of 2000. Other than urls reflecting writings by Gerry Murray or myself, and third party links to what we've done, there are few evidences of EKP activity on the web, and only six vendors that bill themselves as having EKP products. Hummingbird promised an EKP in March 1999, but by

this March had released an EIP instead. During its first year, the EKP space gave every evidence of being swallowed up by its EIP parent.

Enter DM Review and Jeff Grammer

In view of the apparent slow growth of interest in EKPs, the appearance of Jeff Garmmer's article ("The Enterprise Knowledge Portal," in the March 2000 issue of DM Review [6] was a pleasant and welcome surprise. Grammer is co-founder and Chief Technical Officer of IntegrationWare, one of the few self-identified EKP vendors. He brings to his writing on EKPs an appreciation that they are closely connected to formal Knowledge Management (KM) efforts in the enterprise, and that they both enable KM and are dependent on it for success in implementing them. While I appreciate and agree with many aspects of Grammer's analysis of the EKP and certainly agree strongly with him on the KM connection, I believe his analysis is both less than comprehensive and ignores many of the critical distinguishing characteristics of the EKP. I will develop my own point of view on EKP's through an extensive commentary on Grammer's analysis.

"The EIP Deals Only With Information"

In EIPs users must "still infer any process and knowledge from the information." (P. 20)

I agree that this is a major distinction between EIPs and EKPs. EIPs provide facilities for producing, integrating, and managing data, and information, but not knowledge. If they supported producing, integrating, and managing knowledge they would be EKPs.

Tacit Knowledge

"Most corporate knowledge sits inside the heads of employees digesting the vast amounts of information. While information is captured, knowledge is not; and pieces of it leave at the end of every employee's tenure." (P.20)

I don't agree with the view that corporate knowledge sits inside the heads of employees. **Individual-level knowledge** is stored in the heads of employees. Such knowledge (the product of individual learning whether or not it occurs in the corporate context) is only a particular type of information from an organizational or corporate viewpoint. To become **organizational knowledge** it must be validated organizationally and in the validation process become visible to the organization. EIPs support capturing tacit individual-level knowledge through their support of collaborative interactions, but they don't support **producing it** through a portal-enabled knowledge production process. That is a role reserved for EKPs.

Core EKP Definition

The core of Grammer's view of the Enterprise Knowledge Portal is (P. 21-22):

"The enterprise knowledge portal (EKP) is an evolution of the portal that is influenced by the goals of KM. It combines EIP aspects while also capturing tacit knowledge, integrating access to expertise and embedding application functionality. The EKP not only provides the means for information access, but lets users interact to link information with their collective insight, value and experiences. EKPs enable people to make optimal decisions as EKPs combine acquired knowledge and information, and serve as a "self-documenting" center of experiential learning."

I agree with the first and last sentence of this statement. EKPs are influenced by the goals of KM, because a distinguishing characteristic of EKPs, in my view, is that one of their important goals is to provide support for specific KM functions such as: leadership, building external KM relevant relationships, KM-specific knowledge production, KM-specific knowledge integration, crisis handling, changing knowledge processing rules, allocating resources for KM and knowledge processing, and negotiating agreements with representatives of other business processes.

The last sentence expresses the idea that optimal decisions are specifically connected to the use of knowledge, i.e. valid information. And the implication is that decisions made on the basis of unvalidated or invalidated information will be less than optimal. To me this is the heart of the justification of the EKP and of why one needs to go beyond the EIP. The EIP does not support knowledge production and integration, but only information acquisition, production, and integration, so it does not explicitly support optimal decisions.

Moving to the middle sentences, here I find problems. The second sentence implies that "capturing tacit knowledge, integrating access to expertise and embedding application functionality" are features that distinguish EIPs and EKPs. But, if one means by an EIP, the definition of it first offered in the Merrill Lynch (ML) report, this implication is not justified. The ML report certainly recognizes that collaborative applications having these characteristics are part of the EIP universe, and there is nothing in the idea of knowledge itself to suggest that these characteristics distinguish EKPs from EIPs.

Furthermore, it is not the case that EKPs alone let "users interact to link information with their collective insight, value and experiences." Collaborative EIPs do this, as well.

Apart from these specific problems, I don't think this core definition makes the critical distinctions between EIPs and EKP's sharply enough. Obviously, EKPs are distinguished from EIPs by their focus on knowledge and knowledge

management. But to sharpen the distinction we need to know more about what that means, and that is where Jeff Grammer's view on EKPs is less than comprehensive. The best way to explain my alternative view is to present my own core EKP definition and then specify it.

An EKP is an enhanced Enterprise Information Portal (EIP). It is an EIP that:

- is goal directed toward knowledge production, knowledge integration, and knowledge management, and also
 - focuses upon, provides, produces and manages information about the validity of the information it supplies,
 - provides information about your business and meta-information about the degree to which you can rely on that information,
 - distinguishes knowledge from mere information,
 - provides a facility for producing knowledge from information
 - orients one toward producing and integrating knowledge rather than information

AN EKP is an EIP

An EKP shares the characteristics of other EIPs. It is a particularly comprehensive version of an EIP however, incorporating a personalized browser-based interface, structured data management, unstructured content management, and collaborative, as well as knowledge production, knowledge integration, and knowledge management functionality. It also requires an integrative architecture incorporating knowledge claim objects encapsulating knowledge claim data, metadata describing the validity characteristics of these knowledge claim objects, and methods producing behavior of the objects.

Knowledge Processing Means Knowledge Production and Knowledge Integration

I view knowledge processing as encompassing knowledge production and knowledge integration processes composed of the following sub-processes:

- Knowledge production;
 - individual and group learning;
 - information acquisition (getting information from outside the enterprise);
 - knowledge claim formulation;
 - knowledge claim validation;
- Knowledge integration;
 - Broadcasting;
 - Searching/retrieving;
 - Teaching;
 - Knowledge and information sharing.

A more detailed description of these sub-processes is in "The Metaprise, The AKMS, and The Enterprise Knowledge Portal," [7], and in Mark McElroy's "The Second Generation of KM," [8].

The Knowledge Management Process

Knowledge Management is human activity that is part of the interaction constituting the Knowledge Management Process (KMP) of an agent or collective. (See "The Metaprise" [7]) This definition reduces KM to the definition of KMP. The KMP is an ongoing, persistent, purposeful interaction among human-based agents through which the participating agents aim at managing (handling, directing, governing, controlling, coordinating, planning, organizing) other agents, components, and activities participating in the basic knowledge processes (knowledge production and knowledge integration) into a planned, directed, unified whole, producing, maintaining, enhancing, acquiring, and transmitting the enterprise's knowledge base. ***In other words, KM is about managing knowledge processes, it is not about executing knowledge processes.***

There are three categories of KM activities in the KMP:

- Interpersonal Behavior-focused KM activities (Leadership -- hiring, training, motivating, monitoring, evaluating, etc. Building relationships with individuals and organizations external to the enterprise);
- Knowledge and Information processing KM activities (KM knowledge production, KM knowledge integration,); and
- Decision Making KM activities (Changing knowledge process rules at lower KM and knowledge process levels, crisis handling, allocating knowledge and KM resources, negotiating agreements with representatives of other business processes)

See "The Metaprise" [7] for a more detailed treatment of these activities.

Provides, Produces, and Manages Information About The Validity of Information It Supplies

Knowledge is validated information. EKPs distinguish knowledge from mere information by providing information about the results of tests of the validity of any piece of information. That means that EKPs ***must track and store such meta-information while EIPs in general need not.*** This requirement is one that distinguishes EKPs from other EIPs and ***it is a requirement that greatly expands the diversity and volume of metadata found in EKPs as compared with EIPs.***

Provides Business Information Along with Meta-information About the Degree To Which You Can Rely On It

Validity information about a knowledge claim is meta-information about that claim. This validity base includes meta-information comparing the knowledge claim against competing knowledge claims. This meta-information tells you the degree to which you can rely on the target knowledge claim compared to its competitors. It tells you the relative strength of the knowledge claim compared to its competitors. Thus, ***EKPs record the history of the competitive struggle among ideas (knowledge claims) within the enterprise.*** EIPs need record no such history.

Distinguishes Knowledge From Information

By providing validity information (meta-information) about knowledge claims, EKPs provide information on the relative strength of knowledge claims. The stronger the claim, the closer it approaches organizational knowledge and the stronger the support it provides for decisions. The weaker the claim, the more closely it approaches false organizational information and the weaker the support it provides for decisions.

Provides a Facility for Producing Knowledge From Information

By providing services for knowledge claim formulation and validation and tracking and storing the results of validation activities in knowledge claim objects, EKPs provide a facility that supports producing knowledge from knowledge claims (or, if you like, supports producing better or worse validated knowledge claims from unvalidated ones). Since knowledge claims are information and knowledge is validated knowledge claims, it follows that EKPs provide a facility for producing knowledge from information.

Orients One toward Producing and Integrating Knowledge Rather than Only Information

Because the EKP supports the full set of knowledge life cycle activities including, and most critically, individual and group learning and knowledge validation, it orients one toward knowledge production. Because new knowledge results from use of the EKP, enterprise information integration processes will be oriented toward integrating knowledge and validity information as well as business information.

The Keys to Distinguishing The EKP are Knowledge Production, Knowledge Integration, Knowledge Management, and Validity

Among these, Grammer's core definition emphasizes only Knowledge Management and particularly neglects the role of knowledge claim validation in the EKP. In addition, it provides little emphasis on knowledge production as a whole, the object of "demand-side" KM. ("The Second Generation of KM," [8])

EKP Value

"The EKP is the first pragmatic KM application. Giving users one-stop interaction with appropriate intellectual capital, applications and expertise, the EKP speeds innovation and reduces the amount of rework in an organization." (P. 22)

I agree with the idea that the EKP accelerates innovation, but I don't think the main point is that it does so through the above "one stop interaction." EIPs also provide, or can provide, such interaction. Instead, the reason is that the EKP provides systematic support for knowledge production and knowledge integration sub-processes, while the EIP does not. Through this support the EKP can reduce cycle time in each of the sub-processes including individual and group learning and knowledge claim validation, and therefore reduce cycle time (accelerate innovation) throughout the knowledge life cycle. In contrast, EIPs cannot support individual and group learning and knowledge claim validation, and therefore their potential for accelerating innovation is limited.

The value of the EKP goes beyond accelerating innovation. Some other benefits are:

1. Competitive Advantage;
2. Increased ROI;
3. Increased Employee Productivity;
4. Increased Effectiveness;
5. Decreased Cost of Information;
6. Increased Collaboration;
7. Universal Access to Enterprise Resources; and
8. A Unified, Dynamically Integrated and Maintained, knowledge-optimized and Common View of Enterprise Applications, Data, Information and Knowledge

The first seven of these benefits are also claimed for EIPs. ("Benefits of Enterprise Information Portals and Corporate Goals," [9]) But benefits 1, 2, and 4 assume the use of valid information in decision making, so they are clearly benefits that, along with accelerated innovation, distinguish EKPs from EIPs.

Converging Computing Capabilities, EKPs, and An EKP Framework

Grammer thinks that the EKP "pulls together" a number of converging computing capabilities including expert systems and AI, business intelligence, collaborative computing, Enterprise Application Integration (EAI), and computer-based training. His emphasis on EAI as an important aspect of portal systems is particularly significant, because thus far it has been mentioned less frequently

than some other portal capabilities. And I generally agree that EKPs pull together the other four capabilities also. But this list is incomplete, and in addition his treatment of some of these capabilities misses some critical points.

On incompleteness, it is hard to see why Content Management, Data Management, and Data Warehousing (including Data Marting) are not also included in this list. The ML report named them (along with BI) as key areas converging toward the EIP. And there is no reason why they are not equally relevant to the EKP. Further, the capabilities represented by Object-oriented based technology and architecture and XML may be special keys to an EKP framework, but they are also two additional converging capability areas and may as well be identified as such. That gives us ten areas of converging capability.

Moving to the issue of critical points missed, the first point to recognize is that EIPs, as well as EKPs, can also pull together all ten of the converging computing capabilities listed. EIPs can use agents, expert system-based inference, business intelligence, collaborative computing, EAI, and training. They can also integrate data warehousing, content management, data management, O-O based architecture, and XML. The integration of all these capabilities does not make or distinguish an EKP, as I have shown in a recent full-length industry report. ("Approaching Enterprise Information Portals," [10]) So, what is distinctive, about the convergence of these capabilities in EKPs?

Expert Systems and AI

The two points made by Grammer are that expert systems assist the knowledge worker in deriving value from the EKP, and that expert systems and AI are a starting point for delivering agent-based capabilities that use the knowledge of the EKP. What is meant by "deriving value from the EKP" in this context is not specified, and the idea that expert systems and AI help us deliver the product (i.e. knowledge) of the EKP does nothing to distinguish their role in the EKP from their role in the EIP, where they are a starting point for delivering agent-based capabilities that use the information of the EIP. So what is the **distinctive** role of expert systems and/or AI in the EKP? It is to provide the basis for automated knowledge production and integration within the enterprise through intelligent servers and agents capable of learning in response to their interactions and changes in their environment.

These servers and agents constitute an adaptive system in which knowledge claims formulated at various levels of the EKP systems architecture can interact in a collaborative learning process influenced by group and organizational level validation rules. The learning process is one in which local knowledge claims aggregated by client-based avatar agents, and application server-based agents are submitted to a distributed Artificial Knowledge Server (AKS) for adjudication and evaluation resulting in negative or positive reinforcement of knowledge claims.

Business Intelligence

BI querying and OLAP capabilities are not distinguishing features of EKPs, because they don't incorporate capabilities for validating generalizations or models suggested by the results of such BI analysis. Formal knowledge production capabilities such as statistical analysis, non-linear modeling, model free estimation techniques, simulation, etc. distinguish EKPs provided they incorporate some model assessment capabilities. It is these capabilities that partially support the knowledge validation process that is at the core of the EKP/EIP distinction.

Jeff Grammer states that BI (EIS/DSS) analyses "are given context by the EKP to compare data analysis with other unstructured information to provide both a quantitative and a qualitative picture." I certainly agree. But this doesn't represent a BI capability that distinguishes EKPs from EIPs. Instead, it is an EKP capability that contributes value-added to BI.

Content Management and XML

Content Analysis is the transformation of unstructured content into data, information, or knowledge by describing it in terms of attributes of media objects, attribute structures, and rules relating attributes. **Content Management** is the process of organizing, directing, and integrating content analysis and distribution efforts aimed at producing or distributing data, information, or knowledge. **Content Management Systems** acquire, process, filter, analyze, and distribute previously "unstructured" internal and external media objects contained in diverse paper and electronic formats. They also archive and often restructure these media objects so they can more easily be retrieved and manipulated. And they store the resulting data, information, or knowledge in a corporate repository (either centralized or distributed).

Content markup and metadata capabilities based on XML tagging creates the possibility of content analysis and later access to arbitrary "chunks" of document content which may be treated as persistent XML-based objects. This capability alone doesn't distinguish EKPs from EIPs. But if the objects are knowledge claim objects encapsulating meta-information about validity and methods for manipulating such information, then an important distinction between EKPs and EIPs is specified.

Regarding Jeff Grammer's idea that "XML becomes an open method of actually passing objects in and out of EKP sources," I think it is perhaps more appropriate to point out that XML data in EKP sources provides a particularly convenient form of persisting object data and metadata, and passing such data in and out of distributed EKP components.

Data Warehousing and Data Management

Though these capabilities are essential for managing and providing access to structured data in both EIPs and EKPs, and so represent converging capabilities essential for the EKP, they do not distinguish the EKP from the EIP.

Collaboration Applications

Collaboration applications are important for both EIPs and EKPs. And for both collaboration applications provide a computing framework for information or knowledge sharing, as the case may be. But collaboration applications can provide a capability distinguishing the EKP from the EIP where they provide a framework for collaborative knowledge production; for the systematic offering of knowledge claims, counter-claims, and supporting arguments in collaborative processes of group learning, knowledge claim formulation, and knowledge validation. Jeff Grammer is correct that collaboration provides an environment in the EKP for eliciting tacit (individual-level) knowledge. But the way it does that is by involving individuals in the processes of group and organizational learning.

Computer-Based Training

Continuous CBT can be provided by both EIPs and EKPs. In order to produce the continuous learning Grammer mentions, the CBT program must support an individual's knowledge validation process, rather than merely sharing information. It is the provision of a continuous CBT program having this capability that distinguishes the EKP from the EIP.

O-O-based Technology and Architecture

According to Grammer, O-O technology and architecture in the portal system provides an ability to "wrap" all applications and resources of the enterprise into a single distributed, but non-monolithic system. This integrative capability is essential to avoid fragmentation into portal "smokestacks." It also provides an economical way to incorporate both content and rules into the autonomous components of a model representing both source content and relationships. Lastly, it provides the ability to interact with the portal front end to create new objects and patterns of objects in the object model.

While this is correct and important, it doesn't make clear the specific aspects of an O-O architecture that would distinguish the EKP from an EIP. In any EIP, O-O technology and architecture provide integration, a unified view of the portal system, encapsulation of content and rules in objects, and the ability to extend the object model. But in an EKP, the object model includes knowledge claim objects, not just business objects. And its object model also includes validation

rules, encapsulated in some of the knowledge claim objects, used by the portal and knowledge workers to evaluate other knowledge claim objects. A more comprehensive treatment of both EIP and EKP architecture can be found in "Approaching Enterprise Information Portals," [10].

EAI

"Enterprise application integration (EAI) techniques are required for the EKP to effectively integrate information from multiple types of structured and unstructured sources. Unlike traditional EAI products which deliver inter-application communication, the EKP focuses on integrating the human view of different applications." (P. 22)

A good point, but not complete, and not exclusive to EKPs. EIP's employing EAI can provide comprehensive integration of human views, processes, work flows, and data, and content. In EKPs, EAI adds the integration of knowledge stores and the automation of aspects of the knowledge production process, especially knowledge claim validation. How EAI does this, and EAI's relation to O-O technology and architecture is developed in "Approaching Enterprise Information Portals," [10].

The EKP as an Active Agent

I agree that by pulling together converging computing capabilities "the EKP can be an active agent in our pursuit of knowledge." Indeed, the whole point of the EKP is to provide more active support for knowledge production, knowledge integration and knowledge management. This means providing an infrastructure of intelligent distributed components capable of producing knowledge, i.e. of learning, and of distributing it through their continuous interaction and rule processing activity.

The EKP Checklist

Grammer's "EKP checklist" provides a list of important features for all EIPs, including EKPs, but there are no features on the list that are distinctive of EKPs alone. In addition, the list of features has an ad hoc character, suggesting it doesn't proceed from a conceptual framework for thinking about EIPs and EKPs. I will leave presentation of my own EKP checklist for another place, but I suggest here that any EKP-distinctive checklist will need to include:

- functional features supporting knowledge-based personalization, knowledge-based automated work flows, collaborative knowledge production, organizational knowledge production, organizational knowledge integration; KM knowledge processing, and KM decision making;
- architectural features such as knowledge claim objects and local/global knowledge claim validation.

The EKP, KM Strategy, and EKP Selection

In the final section of his article Grammer spells out his view that (a) the EKP should be implemented in the context of "an organizational KM strategy to address the cultural issues, business processes and measurements of any software implementation." And (b) that an EKP should be selected "based upon its framework for solution." These views provide useful guidance and place heavy emphasis on overcoming cultural barriers to knowledge sharing. I have two comments on them however.

First, in this section replace the "K" in EKP or KM with an "I," and replace "knowledge" with "information." This exercise should persuade you that the advice being offered by Grammer here is not specific to knowledge portals and knowledge management, but applies equally well to EIPs and information Management. So if the purpose here is to offer EKP-specific advice on how to proceed with implementing an EKP, that purpose is not fulfilled.

Second, on overcoming cultural barriers to knowledge sharing, Grammer advises (1) addressing the policies that foster employee hoarding, and (2) implementing incentive systems to reward knowledge workers who contribute to the developing knowledge base through the EKP. He also points out that such a system implies that the EKP will be able to track and report on knowledge worker contributions.

But perhaps it needs to go even farther than that and provide a mechanism for formulating new knowledge claims, validating previous knowledge claims, and invalidating them (also a valuable service in a knowledge production system). This "incentive system" should in some way reflect the pragmatic importance of the knowledge claims involved, as well as the importance of any specific contribution to a specific validation process.

Further, knowledge production and knowledge sharing incentive systems may face cultural resistance in organizations considering EKPs. If EKPs face such resistance, it may not always be necessary to overcome it by inducing knowledge workers to proactively share information or knowledge through the EKP system. Specifically, the collaborative knowledge processing and knowledge management capabilities of the EKP will integrate all organizational content including memoranda, e-mails, reports, and any other written documentation of a collaborative decision making or problem solving process.

Knowledge workers cannot really avoid generating content when working with others in the Enterprise. This content will naturally incorporate knowledge claims that may be modeled as knowledge claim objects. It will also incorporate counterclaims and arguments supporting competing knowledge claims. The EKP will be able to track the give and take involving such claims whether or not individuals choose to explicitly and proactively use the portal system to "publish"

their content or distribute it to others. And the portal system will be able to rate knowledge workers based on either their unobtrusive, proactive, or both types of contributions to the enterprise's information and knowledge bases.

Conclusion

While Jeff Grammer's article certainly adds some significant ideas about EKPs to the literature, it is also striking how much of his treatment is really about EIPs and not EKPs. Most of the features he identifies as EKP features in fact don't distinguish EIPs from EKPs. Even his remarks on KM strategy and portal selection apply equally well to EIP selection and Information Management. The root of the problem seems to be the lack of conceptual models of knowledge processing and knowledge management underlying his views on the EKP. Without such models it is hard to distinguish knowledge processing and knowledge management from information processing and information management. (See "Approaching Enterprise Information Portals", Chapter Seven," [10]) As a result, it is also hard to clearly distinguish EIPs from EKPs.

The purpose of Grammer's article and of this response is to specify the Enterprise Knowledge Portal. In my view, and for the reasons I've presented above, he's largely failed in his attempt. I hope that I've done better through this lengthy commentary, and that in the process I've made progress toward the goal (not attained yet) of implementing the first Enterprise Knowledge Portal.

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Biography

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