Currently, we are at the middle of the maturity curve for portals. Clients are facing a great deal of intranet sprawl; and there is too much content to force people to navigate their way to find information on departments and projects. It takes five clicks to get to anything. In this presentation, I want to give a quick overview of information that is useful at all the different points in this timeline.
What usually starts the wheels turning in terms of portals is when an intranet or sometimes extranet or Internet site starts taking on too much information to just be presented in a static manner. There has to be some sort of dynamic way of personalizing the information and helping the users find that information. It usually churns that way for a year or more before anything is done about it. About a year before the portal is deployed, they get to a spot where they need some sort of portal, and that is when they start with the whole process. So, there are a lot of things going on at that point — trying to somehow create a business case for it, and going through all the chaos to generate requirements and figure out different needs. Which are the highest priorities to be addressed in Version 1? Vendors are giving demos that look good, and you are wondering which you actually need.

They hit zero on the timeline, which is when the portal is actually being deployed — either right before or after it. Roles and responsibilities are being assigned, people are being trained in their new tasks in what they have to do to maintain this portal, and they are trying to drive the initial users into the portal to get the thing going.

About a year after the portal is deployed — and there is additional activity going on — you now want to add to it. In Version 1 or Version 2, maybe you held off on business intelligence or collaboration, and now you want to work that in. The one-year point is when you usually have to go back to management and ask for more money. As with any project, you now want to add some more features. Management is going to be asking you to prove the success. “You said you were going to save us this much, would be this much more efficient, or retain 5% more customers.” After one year, they are going to ask for some sort of proof of that measurement. Hopefully, you have been keeping good track!

Several years after the portal is initially deployed, the more mature companies are often trying to manage a portal of portals. Often, a large company winds up having multiple portals around and is trying to figure out how to tie or manage them together. This can be very tricky. Most organizations tend to start with employee portals, though once they have been comfortable with that and have been using it for a couple of years; they feel they have the operations down. Several years later, they start looking at expanding that to business partners or all the way out to customers.

Most companies seem to realize that they will hit portals at some point, even if they are not there now. It is not a matter of “if” but “when” they do that. Luckily, the costs have been dropping. We have found that costs have dropped by more than half in most cases, so it becomes more attractive. If we had a certain bar that portals were not hitting a year ago to make the investment valuable, it is worth examining again because that bar has been lowered. The market has been expanding, as well, so we will be talking later about the vendors and how this is emerging. Organizations are still trying to focus on a single portal instead of a single framework, and we certainly want to change that by trying to look at creating one portal framework, if possible, and then any number of portals that can be built on top of it.
There are basically three things that we are going to talk about in this Trend Teleconference today, and they relate to “before portals,” “in the middle of portals,” and “after portals” as shown in the timeline. In the before part, we are going to talk about facing the portal imperative, understanding the drivers of portals, and what pain points to be looking for. In the middle of that process, we will be talking about planning — when to first decide to do this portal thing, and to go about planning it. What are the steps to ensure success? We will talk about the post-portal stuff — once it is already there, and understanding the futures of it. How are the vendors going to emerge? What are the futures of portals and the key features they are going to have in the future?
Ashim Pal: The portal journey is not new. It is the next realization of greater capability, in terms of how users consume information, applications, and collaborate with their peers and partners. Often, you are looking at the existing infrastructure which you would have provided such as Domino-based intranet, Microsoft’s IIS, other tools, third party, or other sets of products. The way to think about this is not to view this as completely new infrastructure, but essentially consider it as the next step in a journey. The classical pinch points in terms of the existing intranets and existing Web applications is around the context, or lack of it, and the lack of interactivity. Usually, you are trying to provide context and interactivity.

This gets you into a fairly nasty discussion pretty early about what to context-enable and what to provide interactivity to. Many of the worst practices with customers are basically where they have tried to “genericise” the portal initiatives; which is a portal on every desktop from day one. First, it is incredibly expensive. Second, it is a huge dilution of effort. Third, it is almost certainly a recipe to fail, in terms of trying to satisfy everyone but in reality satisfying no one. We suggest looking at the knowledge or information context for the users you are trying to support — whether trying to provide them with tools to speed time to market, reduce error rates. Or potentially cost reduction (e.g., removing meetings, differentiation). So, if you are looking at more of a customer focus, what are the parts of the interaction and context, and which provide the customer with the most value?

Knowledge management is a decent anchor to portal-enable applications and processes; because it forces you to think about the specific job role or activity a user is engaged in. It enables you to identify the deficiencies in the infrastructure and potentially the remediations. It is an instantiation of the old classic “needs drive requirements drive product selection.” A particular user — maybe in the call center — has to get into a lot of telephone calls with a supervisor to deal with escalations. That process may have a certain cost associated with it, which may drive up call center utilization and cause instances where that call center is
overloaded. In that case, dropping in a particular collaborative component or other interaction components (e.g., e-mail, Web mail, instant messaging) will enable you to change the way that process is delivered. In terms of the planning activity, we suggest is not to do this for everyone. Instead, be very specific. Remember, Craig talked about a four-year journey, and you are trying to build small, bite-sized pieces of credibility — processes that have been automated in a specific way using portal technology to identify wins which have occurred, processes which have been enabled, and return on investments. Do not think about this in terms of big, broad, fat initiatives. Think of this more in terms of how to deliver specific practical benefits to the users in a particular work context. First, there is risk reduction for you and the organization. Second, it gives you a pretty good lever when dealing with suppliers, in terms of getting them to be specific about how the portal product, framework, or component delivers value to the organization.

Figure 4 — Delivering Knowledge Management (KM) via the Framework

Delivering Knowledge Management (KM) via the Framework

- Organizations must define KM in the context of specific:
  - Business processes
  - Business pain points
  - Knowledge worker needs

- KM practitioners must link efforts to specific:
  - Business strategies and imperatives
  - Existing architectures

- KM efforts must have a global strategy with local implementations

- The portal is the primary KM function aggregator and delivery mechanism

Abbreviations — CI: Competitive Intelligence; CRM: Customer Relationship Management; KM: Knowledge Management. R&D: Research & Development

Although supporting/delivering any business process involves employee knowledge about the specific process steps, participants in the process, process rules/best practices, etc., more knowledge-centric processes demand additional experience/knowledge gleaned from sources external to the process itself. Sales automation, R&D, competitive intelligence, and marketing are four such processes, and thus, it is no surprise they tend to be linchpins for many initial, value-laden KM (and, increasingly, enterprise portal) efforts. R&D efforts, for example, require knowledge not only about existing products/services and how they were developed, but also changing customer desires, competitive offerings, underlying technical enablers, changing complementary offerings, and overall organizational strategies. R&D workers need efficient access to various internal and external content repositories as well as a means to collaborate with peers to effectively perform their duties.
Figure 4 is a taxonomy of the key components an organization would typically need, in terms of identifying
good candidates for portalization and potentially the tools they would use to instantiate those portal
applications. At the left-hand side of Figure 4, we are referring to organizations defining KM in the context of
specific business processes, pain points, information work, or knowledge worker needs. The requirements
piece informs any product or technology selection. In terms of selling, you are trying to link this to specific
business initiatives. Often, clients are trying to justify a portal in and of itself as a technology buy. That will
succeed with few exceptions. Instead, you are trying to tie the value of the portal or portal applications to
specific, higher-level business drivers — whether corporate drivers from senior management, or potentially
line-of-business drivers. Throughout, there is a linkage between higher-level business objectives and intent
and goals of the projects.

This is not about one product providing all the capability you will ever require. In few cases will that be the
situation. Instead, you are looking to provide some global guidance around governance and higher-level
product selection, while enabling some capability to lines of business or geographies to deliver applications
locally. It is a tight/loose model. You are tight about certain things and allow a certain element of looseness
based on a particular application, infrastructures, and business requirements in the particular worlds.

Finally, in terms of how to think about this — though a lot of people are quite enchanted by the notion of
providing personalization and high context to an application — in many cases, you can deliver a lot of value
just by providing aggregation services and some sort of delivery mechanism. Essentially, you are not
tightening up any processes underneath particular application windows but just integrating them into one
place. That has a value in and of itself. It is not the end point, but it does provide some useful context.
Figure 5 — Portal Framework Services

**Portal Framework Services**

**Purpose:** To provide a fulcrum for reuse of a commonly used set of contextual aggregation and display technologies:

<table>
<thead>
<tr>
<th>KM/Collaboration</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Search/taxonomy</td>
<td>▶ Application access/delivery</td>
</tr>
<tr>
<td>▶ Repository</td>
<td>▶ Security/SSO</td>
</tr>
<tr>
<td>▶ Personalization</td>
<td>(Un)structured content access/delivery</td>
</tr>
<tr>
<td>▶ Sync/async collaboration</td>
<td>▶ Process</td>
</tr>
</tbody>
</table>

Portals are proving recession-proof due to their ability to combine KM and application integration facilities

Abbreviation — SSC: Single Sign-On

**Portal Functionality**

- Information Catalog Management. Portals must provide a mechanism to organize content into categories meaningful to users (e.g., a category tree similar to Yahoo).
- Content Management. As portals grow in scope, the content sources proliferate. Content management becomes critical, particularly when content must flow into the portal in real time. Basic check-in/check-out becomes an important shared portal service (SPS).
- Repository Management. Portal frameworks must incorporate a repository to store information as well as support access to information stored in file systems and other repositories (e.g., report servers, document stores).
- Metadata Management. Beyond the content itself, metadata has become a critical linchpin to assist organizations in applying a schema, or taxonomy, over large collections of information.
- Personalization Engine. Portals deliver a unique user interface (UI) by establishing customized navigational structures, content, and application interfaces.
- User Profile/Membership Management. Going hand-in-hand with personalization, profile management will enable users to set wallpaper backgrounds, localization parameters, and other UI characteristics. These personalization characteristics will be available to other applications and services plugging into the portal.
- Activity Tracking. Monitoring on-site behavior enables recommendation engines to suggest other information and application interactions based on explicit and implicit associations made while users traverse a site.
- Access Control. Authentication and access controls are essential portal underpinnings. Users should expect single-sign-on capability as they interact with the spectrum of applications, content, and services.
- Key Framework Vendors: Viador, Plantex, Cotexchage, Brio.

I am going to quickly walk you through what we mean by portal framework services. It is a term that is really used and abused. In terms of understanding how to build your requirements, it is really crucial to know what these services mean and how they are assembled. At a high level, it is instantiated for specific layers. You
have an infrastructure layer such as the database and the IP network, Web system services — which are the basic services to deliver a first-generation user experience with a classical intranet. The third layer is the portal framework services such as collaboration and profiling. On the top are rather specialized components called portlets, which are vertically oriented or maybe function-specific as they relate to CRM, ERP, or some sort of business application. Those components layer on top of each other to provide a contiguous piece of Web infrastructure, enabling you to build reusable Web applications. In the context of the portal, you would have thought about Web infrastructure, Web server, content management, and content assembly. There numerous other pieces to think about.

The first is the knowledge management or collaboration component. Here we have search, technology, and repository management in terms of how to reuse content, personalization components in terms of how to make the content specific to end users and their work tasks, and synchronous and asynchronous collaboration. One of the battlefields during the past 12 months in the portal world has been how to add some of those features to a raw set of Web application services.

A further area which is absolutely worth investigating is integration. Many client portal initiatives basically run out of steam because they end up having to hand code particular applications into the portal by writing custom Web parts of gadgets, or some other components to enable their portals to extend into other application data environments. We believe that in many portal initiatives it is actually the integration piece which is the rate-limiting step, because it is a lot of hard work to go to the next level — from integration to the glass to integralational processes underneath the data and user interface. Application, access, and delivery are feeding into security and single sign-on. These areas are still completely non-trivial, and we recommend clients go for more of a roles-based approach rather than an individual personalized model.

Unstructured and structured content delivery is a huge component, because you are trying to reuse the content according to specific contexts. That is difficult, because most content outside the relational databases is unstructured. Here, you are looking at providing star sheets and tagging to make that content more accessible. The ultimate value lies is trying to integrate the underlying processes beneath data and applications, and that is the greatest contextual value of the portal.

Not all of those things are essential now, but they are absolutely crucial in planning. In terms of evaluation, you may want to be quick and dirty to start with, but ultimately those things become important to take you to that two years after portal model. For companies taking the approach we are suggesting — looking at this more from a business productivity or process perspective — we are finding that the portal is proving recession-proof, because it basically provides a business application context, the ability to link in knowledge management components to user work, and provide application integration to enable consumption of the applications in new ways.
Craig Roth: Ashim was just talking about the integration aspects of portals. Since Web services has been a topic on people’s minds, I thought I would bring those two together here. I have put together a simple example of where a portal would be used, the kinds of things to use a portal for, and how Web services would fit into that.

Figure 6 shows where you have something set up for a salesperson to use. He is about to go into a particular account and wants a summary of the information on that account so he is up to speed before heading out the door. The salesperson enters the company name into the portal and looks it up to see if it is an existing customer. If it is, a transaction report is pulled out of Siebel or some CRM system, and then some industry-specific content is added together. This means it may go out to Yahoo and get information on what is going on in the industry. A nice template and stylesheet is applied, so it all doesn’t look like a couple of systems. Then it displays the Web page.

If they are not an existing customer, then maybe it goes out to Hoover, an Internet-based company where you can type in a company name, and it gives you all sorts of information — such as a financial profile — and then it will combine it with the content.

That is a simple example for a salesperson to have for each client before leaving the office. Why would Web services be useful in this example? Some APIs are going on over the Internet. If you had an internal system with financial profiles, you would have some application programming interface to call it and get the response back. In this case, you have to pass in your sponsor identification and the company you are looking for to an Internet site to get results. So, it is like a programming call but over the Internet. That is what Web services does. Also, we do not want a formatted page. We do not want something that is all totally formatted with
colors, fonts, and everything else, because we are going to apply a style sheet to it. We just want data back in XML that we are going to format later.

Why is this a good portal example? First, integration is going on here, but it is not system-to-system integration such as you would buy an EAI tool for. This is end user-focused integration, where we are taking completed sets of data and combining them to form something and aggregating the output into a common page. Also, there is a blend here between something transactional and content. The transaction report is a set of data coming out of a transaction from a Siebel system. You are combining it with something that is purely textual — this industry-specific content — which is a bunch of articles. Portals excel at combining transactional, informational, and collaborative elements together. So, this was just a simple example to show why portals and Web services are useful and how they work together. We think that most applications are probably going to make use out of a lot of internal and external systems (e.g., Hoover) to put a useful system together.

Figure 7 — Face the Portal Imperative

Face the Portal Imperative

▲ As complexity and velocity of business increase, managing knowledge becomes imperative
  ▶ Define KM as a goal, and portals as an implementation of KM principles
  ▶ Repository services and metadata must be part of the design
▲ Concentrate on portal frameworks, not portals
  ▶ Portals aggregate the content, collaboration, and application integration services needed to meet the needs of contextual browser-based delivery
▲ Look for portals to deliver Web services to end users

Business Impact: Aligning portal requirements to business goals will ensure that organizational needs for personalization and collaboration are met

The bottom line to this section is the impetus of why a portal comes to the forefront, or what pain is being felt before someone decides to go off on a portal effort. We found that managing knowledge is really the key behind what is pushing portals in most organizations. Knowledge management is a goal, but as an implementation point, a portal provides an actual instantiation of knowledge management principles.

You want to concentrate on portal frameworks not portals. The set of services described is where we really want to focus our efforts. We talked about how Web services are a good way to deliver this kind of functionality to end users and how they fit in with portals. I think it is very important at this early stage to align whatever requirements you have from the portals with business goals to make sure that whatever you are doing is something that actually meets the needs for personalization, content management, and collaboration.
David Folger: We are going to talk about what to do when you actually plan a portal project. We will talk first about facets of portal ownership. What are the best practices for roles and responsibilities within a portal organization? Then we are going to talk about estimating some of the costs and discuss some rollout change control implementation issues.
Here, we are looking at some of the facets of portal ownership, or what some of the roles are in portals. Typically, a portal will have some concept or be involved with HR. Often, one of the first starting points in building a portal will be an HR portal. The HR department will have a strong involvement in portals. It will be helping the IT organization figure out what sorts of employee self-help implementations are needed. Benefit selection is often done with a portal. The corporate communications group also normally gets involved. Occasionally, we see a senior corporate communications officer being one of the lead portal sponsors. It will be involved in messages from the senior management to the organization, corporate announcements possibly in joint effort with the HR departments, or some policies and procedures. Often, one or more divisions of the company may be involved in forming a portal, because perhaps the portal is focused on a particular division of the company. Therefore, you need to take into account any business processes that are particular to that division, workflow surrounding them, and messages from the people in that environment. Typically, there will be a steering committee consisting of some of the business people from each of these organizations, along with the senior IT management that guides the portal effort.

The bars across Figure 9 show some of the technologies involved. Community technologies, collaboration, and discussion groups are important across these, particularly in the HR and communications area for community issues. Knowledge management is important. Search and crawling Web sites within the organization and in document repositories are critical aspects of almost every portal. Even when it is a specific HR portal, you are probably still going to see a search implementation, though perhaps it does not really apply to the HR stuff. Almost all portals have a search mechanism.

A taxonomy concept is important to portals. The taxonomy means the hierarchy of terms. For example, you can look at the different subjects on Yahoo. If you are interested in travel, you could go to “travel to Europe” until you book a hotel or something. Typically, organizations need to create a taxonomy for their own

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<table>
<thead>
<tr>
<th>Facets of Portal Ownership</th>
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<tbody>
<tr>
<td><strong>Community</strong></td>
</tr>
<tr>
<td>Search/Crawlers</td>
</tr>
<tr>
<td>Taxonomy</td>
</tr>
<tr>
<td><strong>Discussion Groups</strong></td>
</tr>
<tr>
<td><strong>Collaborative Functions</strong></td>
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<td><strong>Content Management</strong></td>
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<td><strong>KM Functions</strong></td>
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<tr>
<td><strong>Technical Functions</strong></td>
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<tr>
<td><strong>Vertical Ownership</strong></td>
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**Portal responsibilities have many facets; horizontal and vertical roles must be assigned to ensure success**

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organizations. This can be a complex process, and there are a lot of tradeoffs of whether to do it by topic, product (or a combination of both), or subject area. It can be a complex, ongoing process. An organization needs a function - We have dubbed the term “infomaster” - to encompass the function that deals with keeping all this information organized within the portal. Also, it is common to need consulting help from the outside in building these taxonomies when first starting your organization. Content management becomes a key aspect of portals and is critical in developing a portal project. It is common that you finally realize just how screwed up your content management really is in your organization when you start working on a portal. Many technical functions have to be thought through such as security, managing the walls, and personalization information. You have to look at operations and system management of the portal. There are all sorts of technical roles.

Building a portal has a many complex interactions within the rest of the IT infrastructure, and people or groups of people need to be assigned to these various roles to manage how this portal fits into the infrastructure, and manage the creation and organization of taxonomies and knowledge management functions.

Figure 10 — Estimating Portal Costs

![Estimating Portal Costs Table]

**Estimating Portal Costs**

<table>
<thead>
<tr>
<th>Hardware &amp; Software</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Hardware</td>
<td>Content Development and KM</td>
</tr>
<tr>
<td>Development Software</td>
<td>$</td>
</tr>
<tr>
<td>Networking Costs</td>
<td>Program Management</td>
</tr>
<tr>
<td>Software License</td>
<td>Portal Administration</td>
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<tr>
<td>Software Maintenance</td>
<td>Internal Development</td>
</tr>
<tr>
<td>Content Subscriptions</td>
<td>General Administration</td>
</tr>
<tr>
<td>Additional Software Costs</td>
<td>Software Contractors</td>
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<tr>
<td></td>
<td>Training</td>
</tr>
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<td></td>
<td>Business Consultants</td>
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</table>

Software licensing is only ~15% of overall portal project costs; concentrate on the cost buckets that act as cost multipliers

What is all this going to cost you? Portals are not cheap. As with most IT projects, you have really only contributed maybe 15% of the cost of a portal when you buy the software. If you look at some of the basic hardware and software implementation issues, the software license can be fairly important for the portal. Even more important is some of the ancillary slots where items are needed to couple this portal into your environment. It may push you into building additional search capabilities, single sign-on, and adding more collaboration tools. You may get involved with content management and find that you need to buy some additional content management tools. All that extra software can be significantly larger than just the cost of
the portal software itself. Sometimes you have content subscriptions to external content such as news feeds. All this software needs to be maintained. Typically the server hardware is not tremendously large as a percentage of all this cost, but it is still a factor to consider.

Even higher than all these hardware and software costs are the personnel issues. Often, getting a handle on the content involved that the portal is going to organize for you ends up being one of the biggest costs. This can not only involve the addition of a content management system, but also a great deal of changes to processes and a lot of time to find content, organize it, clean it up, and make it available. You also have a considerable cost in software contractors and business consultants to organize the portal project, and help design the portal. Once it is designed, there is an ongoing cost to administering the portal and ongoing development. A portal is like many IT projects in that it is never done. In that sense, typically a portal starts off relatively small — managing a few business processes or just HR — and then it continues to expand over time. As organizations, groups, departments, and projects within the company see the usefulness of a portal, many want a jump on it and have their own portal or section on the portal, or their own pages and content in the portal. IT continually keeps adding to a portal as time goes on.

Figure 11 — Portal Rollout and Change Control

Portal Rollout and Change Control

▲ Proper architecture permits steady flow of enhancements
▲ Target 6 months from selection to rollout
▲ Pilot one group, then roll out horizontally
▲ Automate processes to ease change control burden

Take a phased approach to portal features; identify simple features with a fast return for the first phase

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Mike Gotta: David touched on a lot of interesting aspects of rolling out portals and making them not just enterprise ready from a technology perspective, but also enterprise ready from an organizational and process perspective. One of the best practices that we recommend for organizations undertaking a portal or portal framework is that they adopt program management-type structures. It does not mean you must have a full-blown PMO type of office, staff, and budgeting, but you want to look at it as a best practice. The business
The value of a portal framework is the ability to start achieving knowledge management and integration aspects and consolidation in cost savings. That requires an iterative approach. It is going to be phased in, over time, as we outline on the diagram here on the right. A portal framework is not something that simply goes in completely on one project. You are more than likely going to have multiple projects within the organization that are going to be looking at different types of business requirements — perhaps building up applications that support particular business processes, as well as teaming and community aspects.

There are numerous issues when defining which channels are going to be on the portal. Who are going to be the content owners, editors, and authors, and how do we get consistent look and feel? What type of care and feeding do we have, in terms of operational management of the portal? When people start putting some of their business processes into a virtual workspace, then how do we hook collaboration up to that portal framework? A PMO structure is a way to leverage and get consistent practices and implementation methods across your various project teams. It enables leaders to go from project to project. It gives you a place to centralize a budget in planning, so that you can do this over a multiyear scenario, and not get worried about plan/build/run — which turns into plan/build/runaway on a one-cycle project. But it also has implications to what you want in terms of architecture. If you think of portals as a higher-level abstraction — a unification of context that brings together application, content, and collaboration-learning components — it has implications to what your central enterprise architecture group wants to achieve. It must get involved.

There are usability issues. If you are providing syndication types of services throughout the organization, style and user-interface consistency become important. That is going to happen, over time. Sometimes you want a “low-hanging fruit” approach and get something to solution quickly; but that does not mean you stop there. You want to keep fine tuning and making sure that the interaction model is appropriate.

Reference implementations in portal services have to be built out. If I am an application developer, what am I doing differently for this portal framework than for a regular Web application? Can you point me to some best practices or examples or anything from design examples to coding examples, so that I can have a library of portlets to refer to or reuse? What is the new development model? Is this a link type of model where we point to something, or is does it actually require server integration. If I am Plumtree, I am writing to a Gadget ATI. If it is a WebSphere, I am more Java-centric. If this is a centralized model, do I need to look at what type of caching or content delivery issues? From a business life-cycle management, if a portal is going to be a trusted source of information, what are the organizational processes that have to be put in place, so that content is updated on a regular basis?

If there are things that you are delivering for employee self-service such as 401(k), change in life events, or performance objectives, make sure it is reliable, because it is going to become a core part of that worker’s relationship with the enterprise.

Which KPIs do you want? If you are justifying this portal, over time, in terms of fighting for its share of the budget, you must have metrics to show business, organizational, and knowledge management changes to make a business case to the sponsor, so it can champion its share of the budget for down economic times. The takeaway here is to take a phased approach to portal features. Identify simple functions with a fast return in the first phase. Remember, this is a journey. You are going to cycle through this multiple times.
To bottom line this section, you want to target to keep building on successes. Low-hanging fruit does not always mean the easiest. Sometimes you balance that against low-hanging fruit in terms of business value. One team does not own the portal. This is a matrix type of organization, and you need people from operations, infrastructure, applications, and architecture to pull it all together. You want to address the people and process issues, and this is about behavioral change and making sure that you are not just cementing old ways of doing things. However, if the portal becomes a virtual workspace, then what does that mean for how the process is conducted?

Look at portal costs to make sure you can properly scope this and budget it, over time. You want to take a series of tradeoffs. In the next section, we will talk about treating some of these portal investments like a portfolio, because it will reflect a lot of technologies coming together, in terms of directory, security, and other pieces of infrastructure. You want to roll out the basic portal framework to all users and implement additional functionality and phases. Get the plumbing out there and then use some of the low-hanging fruit to keep championing on prior successes and building a business case with analytics and metrics, so that you can win your share of smaller budgets, over time.

The business impact is that portals can reduce the cost and implementation time for many strategic business initiatives such as CRM, supply chain, employee knowledge management, and employee relationship management strategies. Employee portals are key to some of the strategies companies are undertaking, in terms of human capital management.
Here, we kick off a new section. As we begin to wrap up the presentation, we want to cover delivery infrastructure. Portals are more than just applications. You are actually beginning to look at portals as a high-level manifestation of process integration, unification of context, aggregation of multiple information, content, collaboration, and application resources. So, that means something different is going to happen. You have to look at this differently than you would rolling out an application. Our portal METAspectrum will go through our assessment and handicapping on the market, and then determine where portals stop and infrastructure begins. One of the most critical decisions that an organization is going to make is proper linkages and alignment to those looking at core infrastructure services that scale across the enterprise. This is especially a challenge, because some portal vendors will be also trying to push their own infrastructures. So, does the infrastructure come with the portal, or does the infrastructure need to be integrated around the portal? That is where the demarcation line is marked as a critical agreement that has to happen across infrastructure applications and enterprise architects.

On the right-hand side of Figure 13, we are showing that — in terms of your portfolio — META Group defines these buckets as core, which means monies that basically run the business and keep the lights on. With non-discretionary, you have some ability to wiggle around how you want to stretch the dollar out — maybe delay, postpone, or scale back — but some level of investment is required. Above that line is where risks start to creep in from market uncertainty, business uncertainty, or other competitive pressures. You might want to still allocate resources to do something a bit innovative. It might be a little risky. You might want to look at a portal for your suppliers. That may be more risk, but the payoff could be tremendous in terms of competitive differentials. Or, you might be in a market where you have to batten down the hatches, really pay attention to risk, and fund only those things which are necessary décor and non-discretionary. So, the key point is that the portal steering committee (or whomever is looking at the overall budgetary implications) needs to look at this as an investment — not just in the portal, but also in related technologies.
The takeaway here is that organizations without a portal framework will be at a competitive disadvantage. We believe that portal frameworks are so strategic because they provide that unification of context, process roles, rules, and user preferences. That is not possible now with lower-level technologies around Web services and EAI. It is one of the key deliverables to improve process performance and user productivity.

**Figure 14 — Delivery Infrastructure**

Craig Roth: In this section, I want to talk about where we see portals fitting into the long term. We see them eventually settling in to be a piece of the infrastructure stack. Architects have gotten a lot better over the past five to ten years at finding things that are reusable between different applications, pulling them out of their proprietary applications, and making them usable by a number of different applications. A whole set of different technologies is reused to deliver information to knowledge workers. This includes content management, access control, and single sign-on. It can include device transformation for different devices, aggregation mechanisms, an assembly engine for putting Web pages together, and personalization. These are all technologies that appear over and over again in packaged applications and custom applications. After a while, you start wondering why you need so many sets of these in the enterprise. Why don’t we just pull these out—once it has its data ready to present or application interfaces—and push them all through this extra layer that can then assemble it all, personalize it, transcode it to devices, and all those sorts of things on the way out to the end user?

Figure 14 is an alternate view of the infrastructure stack. You are used to seeing a stack that shows all sorts of infrastructure layers on the bottom, and then applications on top. This is an alternate view that shows...
applications can actually be looked at as being surrounded by infrastructure on all sides. Sure, you have that core infrastructure on the bottom — networking stuff, and databases. On the left side, you also have application infrastructure services — reusable services among collaboration, analytical, or operational applications. These include analytics that are reused by multiple applications or operational services (e.g., pricing modules) across multiple applications. On the right side are various management infrastructures that all apps plug into. On the top, you have this delivery infrastructure that I have been talking about. This is the whole set of infrastructure that you get the most value from when all the applications funnel themselves through it. So, we really see portals surviving as fulcrums to focus all these different delivery technologies on. Even if a set of these technologies is already in an organization, a portal helps integrate them and provide some focus.

The bottom line is to move toward a services-oriented architecture in looking at different pieces of the architecture as being reusable services. Organizations want to maximize and leverage what they have, and that is really pushing infrastructure to surround all sides of applications.

I would like to talk a little bit about where we see this marketplace evolving. It has certainly been a marketplace that has had a lot of dynamic movement in it. Platform, enterprise application, standalone, and more independent players are surviving, as well. A METAAspectrum published in October showed where we think the different portal products currently are, and we identified three leaders: Plumtree, IBM, and SAP. Numerous challengers were close to being leaders.

There has even been some movement since then. Epicentric announced it intends to be acquired by Vignette, so those dots will probably merge somewhere between where they are now — hopefully, closer to the Epicentric dot. Numerous other players are out there, as well. Hopefully, Microsoft will move up when it
comes out with the next version of SharePoint portal, which is due in the middle of the year. Currently, it is anchoring the bottom of this chart for us.

We still see a leader from each one of the three segments I mentioned: independent (Plumtree), platform (IBM), and application players (SAP). So, there is still more of a shakeout to come. We plan a new version of the METAspectrum around June or the middle of the year, which will show a number of these players fading off. Some may still offer portal products, but they are not heavily pushing it in the marketplace to an independent client base. Some of these vendors have anchors in other things (e.g., Hummingbird). Although they may continue to offer portals, they it may not be something that someone who is not already a client and not interested in their other products would go ahead and purchase. Or possibly if it is OEM’d underneath something else and someone might be purchasing it that way.

We think the market will still shake out. This is not a static chart that is meant to say, "Hey, if you are looking at portals, you want to pick one of these winners. Pick the guy in the upper, right-hand corner, and that’s it.” The METAspectrum has ratings based on many different categories and features that these products provide. How good is their collaboration? How good is their Java functionality versus .Net? Are they more proven? Do they have more employee portals versus customer-facing portals and things of that nature? So, if you are interested in looking at portals, we encourage you to talk with us. We listen to your requirements — maybe collaboration does not fit into your portal at all, but analytics is important, or something like that. The model enables us to create a custom chart that says not to just pick a winner in the marketplace, but also pick the best product for you. We will also apply some financial logic that says you do not want to pick someone who is disappearing or going out of business. You want to pick a product specifically for you, and not just blindly choose whoever is at the top of the chart.

**Figure 16 — Determining Where Portals Stop and Infrastructure Begins**

▲ Portals and infrastructure will overlap in many areas
▲ For each overlap, organizations must determine ownership

*Portals should work with, and leverage, existing infrastructure, not replace it*
Here, we go into a little bit more about this infrastructure alignment. There are a lot of different products involved in infrastructure that overlap with things that portals do, mostly the eight things that are surrounding on portals here on Figure 16. In every single one of these cases, you can either have a portal that does this for you, or you can have best-of-breed independent infrastructure that the portal then has to connect with. Content management is an example. A lot of portals have some content management functionality, so you can create documents, drop them into folders, and do some basic stuff. They usually provide at best about 70% out of what you get in a full content management tool. Usually, you do not get a nice drag-and-drop way of creating complex workflows or repository services. It is not good at managing multiple repositories and things like that, but if you currently do not have anything at all and your needs are pretty basic, maybe the portal is fine.

If you have more sophisticated needs, it is assumed that you have a separate content management tool. In that case, it is important in this impact analysis not to just say that you have something else for content management such as Documentum or Interwoven. What is important is to say how the portal is going to integrate with that. Does the portal have some sort of portlet that automatically knows how to connect to it? The portal is the place where people are going to log on. It is going to have to query the content management system to say what new documents are out there that this person would be interested in, and get that list back. So, there has to be some coordination.

That applies to every single one of the eight topics here. Phase four of the list on the planning process is when you want to do this infrastructure impact analysis, look at these eight areas, and determine if it is something that the organization currently has a solution for. If so, you want to write that down and evaluate the vendors to see how they integrate with it. Or, is it something that you have future plans for? Maybe it is a gap you will want the portal to fill, so place more emphasis on that feature when doing your evaluations. That is what you want to do during an infrastructure impact assessment.

The bottom line here is that portals should work with and leverage any existing infrastructure you have. This is not the kind of thing where if the portal does it, you automatically replace or have a duplicate set of it. You want to leverage it if you have it, and then maybe have the portal fill the gap if you do not.
Figure 17 — Portal Futures: 2003 and Beyond

David Folger: Looking at some of the futures beyond 2003, we think that portals will more and more be looked at as prearranged integrations of a series of components and some tools to agilely change environments such as personalization, so they can adjust with agility to your organization’s requirements. They will look less and less like an application that you buy. That goes along with the last bullet on Figure 17. As portals become more a part of the infrastructure, we will see them becoming viewed more as components — along with application servers, workflow engines, and other components that come from large infrastructure companies. Long term, we expect leaders in this space will be BEA and IBM, which have broad infrastructure stacks.

We also see a move toward the portal framework developers focusing more on business processes. In one sense, you can almost think of the business process as being the next step in personalization. Initially, portals were oriented around a user and the user’s preferences to decide what he or she saw on the portal screen — you could put the sports scores in the upper, right-hand corner. Then we moved to an era in which portals really were personalized around the user’s role. So, if you are a sales manager, you get one set of portal gadgets, object and portlets. Or, if you are an R&D engineer, you may get another set. The next step will be to personalize a portal around the business process you are part of and where you are in that business process. Business process knowledge and business process information will become more of a key part of portals during the next couple of years.

There will be continued industry consolidation. We expect to see most of the small portal pure play portal players gradually fade away. We will probably see Plumtree survive for a considerable period, but we question the others’ long-term viability. Most likely they will end up getting acquired by other companies. As in most software industries, there will be a handful of healthy players in three or four years and a reduction in number. We have already seen that with Top Tier and Epicentric getting acquired.
Craig Roth: We think there is still some demand for independent players in portals, just because there are so many clients that I have talked to that have multiple things in their environment. Let’s say I am an IBM and a BEA shop. You may not want to go with either one of those for the portal, and you want something else. Or, you have SAP and PeopleSoft and add two other things. For those kinds of customers, it always helps to have someone who is independent — they are not one of the vendors that sell something else. Corechange or Plumtree often look good in those situations. I think we will see at least some survivors from that bunch — Plumtree being the most likely — just based on the independents.

David Folger: Right. In any case, by 2004/05, we think 90% of the Global 2000 will have some form of portal. Portals are almost inevitable; in some sense, you can say that portals are a new user interface paradigm and special form of integration for most large applications that involve multiple people, collaboration, and information sharing. We expect that to continue during the next few years and reach the point where 90% of such companies have some kind of portal. It does not mean that everything is available through a portal in that short a time frame, but at least they have portal projects and portals somewhere in their organizations.

Figure 18 — Understand Portal Futures

Understanding Portal Futures

- Infrastructure will surround all sides of applications
  - Portals will form the foundation of the delivery infrastructure
- Leaders have emerged in the market, but a shakeout is still occurring, and a few vendors may still advance
- Portals and existing infrastructure will overlap more over time; these overlaps can be handled well with proper planning

Business Impact: Customers, partners, and employees will demand contextualized access to all applications and information necessary to conduct business

Looking at the bottom line on this particular section, infrastructure will surround all sides of applications. In other words, applications will work with other system components to do all kinds of things, including low-level memory management and higher-level messaging with other applications, along with using the portal as the interface and delivery layer for the application to integrate with the user. Portals will provide integration between applications.

Leaders are going to emerge in this market. As Craig pointed out, the shakeout is still continuing. There will be possibly one or maybe a couple at the most of the small independent players surviving, and then we will
see Microsoft ultimately doing something significant in this market. They are already getting into it but they are kind of lagging. We will see IBM and the other large players continue to battle it out until we start to see a consolidation around a few of those players. So we do not expect there to be nearly as many players in this market as there are now in three or four years.

Ashim Pal: David, would you spend a little time on Citrix, a client we get a lot of questions about? How would you see it playing in this overall space?

David Folger: Citrix initially provided the multiuser NT capability with WinFrame a few years ago, which was sold to Microsoft. It is now resold by Microsoft as its Windows Terminal Server option on Windows NT and Windows 2000. Citrix now sells a product called MetaFrame which essentially enhances Windows Terminal Server and makes it available to a lot more users, applications, and other devices — other than just PCs, including Macintosh and Unix terminals — through its ICA protocol. We believe Citrix will not be a significant factor in the general portal market. Instead, we see Citrix positioning its products more as application integration layers on top of a MetaFrame, enabling users to get at delivered applications in a much more organized and convenient way. Citrix is focusing more of its efforts on selling its portal as an add-on application management feature into the existing base of MetaFrame users. I really do not see Citrix fighting it out with IBM, Microsoft, or BEA as the lead portal framework vendor.

Figure 19 — An Enterprise Portal Guide: From Two Years BP to Two Years AP

An Enterprise Portal Guide: From Two Years BP to Two Years AP

▲ Transformation Steps

▲ Portals can provide real benefits if they are focused on business value
  ▶ Use a portal to implement KM principles
  ▶ Underpin with content (repository services and metadata management)
  ▶ Extend to make the portal data actionable and leverageable

▲ Portal planning does not stop at implementation
  ▶ Assign roles that help end users keep the portal fresh
  ▶ Plan to continually roll out new functionality in phases and staff accordingly

▲ Portals will emerge as a layer of delivery infrastructure
  ▶ Pick a vendor that meets specific needs but is likely to survive the shakeout
  ▶ Manage the portal and infrastructure overlaps

We are going to wrap up the presentation and talk about some transformational steps. Portals provide real benefits, but they need to be focused on business value. Knowledge management came and went as a hot topic, but it is coming back strong and being reincarnated as a function of portals. Portals provide an environment in which you can create a repository of documents, save them across different business processes and projects to leverage the knowledge created in doing those projects, and enabling them to be...
reused in the future. Portals are an underpinning for content management. Portals cause companies to focus on cleaning up the somewhat disorganized mess of content that many organizations have and making it much more available. People put in portals to get some sort of handle on the difficult problem of finding the content they need. It extends to unstructured content, and ultimately, we expect to see business intelligence query reporting and OLAP reflected through portals.

Portal planning does not stop with the implementation. A portal project is never done. Initial prototype or a pilot portal project will be just that — a pilot — as more groups within the organization find the need for a portal, and the portal starts extending to more information types, to more departments, at more groups; and ultimately outside the company to partners and suppliers. Portals will gradually emerge as layers in a delivery infrastructure. The delivery layer of software infrastructure stacks application servers and enterprise application integration technology. In a sense, the portal becomes the user interface integration layer for the distributed services-based infrastructure of applications evolving out of the old standalone operating system architecture that we have all been familiar with for the past several years.

Q&A

Q: Is there a ramp-up phase for the organizational structure that you feel must be in place to perform the post portal activities?

David Folger: There definitely needs an organization that pulls together. Most companies have many of these functions already in place. There is probably somebody doing collaboration and another person doing content management. The real issue is building a matrix organization to pull these people together under some leadership, and apply their knowledge and information to the portal. There is almost always a data warehousing BI group, and it definitely needs to be part of this. So, we see the ramp-up phase as pulling together a steering committee to help guide the portal project from a business focus point of view, with working groups spun off from a steering committee to solve specific problems such as picking a content management product. The steering committee aids and pulls together in a matrix management sense the resources that already exist within the organization that apply to aspects of this problem.

Ashim Pal: What you also find is that ultimately it gets instantiated in the sorts of structures that David illustrated. Often, you end up having to do a bit of pre-work. A good way of doing this is the notion of a community of interest or practice, where you are not quite going to the level of a formal program management structure. In some organizations, you might just not have enough energy in the initiative to warrant enough enthusiasm to participate. In that case, you would have a more informal community just trying to build a couple of pilots or test cases, and instantiate and form some of the best practices. Ultimately, you may have to take a half step before you get to that.

Q: Thank you for your interesting presentation. I really like portals, but I would like to play devil’s advocate a little bit. You are talking about service-oriented architecture, and content management, But I can also do service-oriented architectures, Web services, and content management without a portal. If I look at your statement that the license cost of a portal is 15% of the total cost, isn’t it the case that portals are really expensive, and that we simply should wait? I look at our organization with, say, a 100,000 users, or let’s take a small business unit of 20,000 users. It really becomes expensive, and it is hard to make a business case. Do you have some thoughts about that?

Mike Gotta: With portals, you can definitely do many of the aspects such as getting the content in order without portals. Portals essentially pull all those functions together and help aggregate information to the users in a more convenient way, which makes their life easier. Portals also provide mechanisms for doing personalization around roles and the user’s preferences. By implementing all those things from scratch to provide the same environment, I would argue you have created a portal. You have just created it out of development technologies, rather than by buying a portal framework. You really have to focus on a specific project where you get some business value, and not look at in an organization of 100,000 people suddenly rolling out an all-encompassing portal for 100,000 people. That would be almost impossible to justify. It has to be taken business process by business process, project by project, or group by group in smaller chunks.

Ashim Pal: There are going to be some instances where you just cannot justify a portal at all. Either they are processes that nobody cares about, or else the efficiency you get is so trivial that nobody really cares.
Eventually, over maybe five to seven years, there will be 100,000 portals. This is going to be bite-sized pieces with some process re-engineering or process redesign, which has a specific set of ROIs associated with it.

**Mike Gotta:** I think organizations are going to make a buy-versus-build decision around their portal framework. The current state of Web services (e.g., SOAP, XML) is low level. WSRP, WSIA, and some of the other higher levels in the stack standards are not here yet. It will be interesting once those standards mature. Where do the portal framework players go? That is when Craig started talking about composite applications. Currently, if you are an IT group with a professional staff well versed in architecture in an organization that would accept a homegrown unification model — the higher-level integration curves and end of stack — you do not want to buy WebSphere or Plumtree to replace that as a sourcing decision. Then, by all means, you could build your own portal framework. Many companies do not want to invest in what they can buy. They want to bootstrap, buy that portal framework, and sit on top of the lower-level infrastructure that Craig outlined, and then focus on the componentization — either through gadgets, (e.g., Plumtree), (TSR 158), or whatever standard you want — and then start to focus on the delivery of the components into the portal framework, knowing that some of those standards will be a lot easier to build to, over time.

**Craig Roth:** I certainly do not mean to say that portals equal Web services or service-oriented architecture. Those concepts exist independently. Those service-oriented architectures can be implemented in many ways. Portals are something that fits into it, and are not equal to it. It is the same thing with Web services. Portals can take advantage of Web services concepts, specifically as they relate to end users. It does not mean that portals are Web services. If you say we are going to go with Web services, “Okay, we bought a portal, that’s it.” No, this is just one technology that can take advantage of Web services.

**Ashim Pal:** Yes, but let’s be clear. You could build or buy a portal that is completely monolithic, but the issue then is around reuse and maintenance. We think it is strongly desirable to focus toward the target of a services-oriented architecture, simply because it buys some flexibility about how to consume components. It also gives you an exit strategy if certain portal components or portal vendors become redundant or require revision.

**Q:** I have enjoyed your presentation. I have a question about CRM and, say, a sales rep looks at activity on a customer either from Hoover’s or an internal system. Would you address offline portal technology that sales reps might take on the road with them?

**Craig Roth:** Sure. Numerous clients ask, “If we are not connected, how do we do this portal thing?” It is not something that the industry has addressed much. The first hope of all the main portal vendors a couple of years ago was that it looked like technology for connecting up wirelessly — (e.g., cell-phone connections from laptops) might take off. If that ever happens, it will solve the problem for us, because then we will always be connected and do not have to worry about it. That has not happened, and it is not going to. They are not ready with any solutions.

The closest is BackWeb, which created Proactive Portal. BackWeb is a push vendor from way back. It created a nice version that sits on top of various portal frameworks and makes it look like you are surfing the portal — but that portal has already been downloaded ahead of time. It has all sorts of rules that determine which length it should download something for, and which ones it should not, such as if that link is going to open something more than a meg or two — don’t let them, and things like that. It is mostly a bunch of “roll your own” solutions. You can create something yourself, if your company has some database technology such as Sybase. Sybase has some replication technology and a database that will sit on a laptop. It has a portal, and you can combine all that yourself and create something out of it. BackWeb is the closest thing you get to a packaged, out-of-the-box solution for this.

**Q:** I have a question regarding developing the framework. I did not hear the specifics for it, but I think that you probably would want to have — especially if you are a large company — an information architecture guiding the development of that portal interface.

**Craig Roth:** Right. The development of the portal interface has a lot of complexity involved in that part of it, including anything from an information architect who knows what information is out there and how it matches up to different kinds of constituencies. There is certainly a design element to figuring out how it can best be displayed such as the color schemes, or what the templates should look like in the navigation. The portal fits
in between those two areas. Depending on how you have your organization set up, those two roles can be members of the overall extended portal team, or they can actually be on the portal team.

Q: Just picking up from the last question around the disconnected users, in my company we are an SAP Domino shop. Our knowledge systems are Domino-based, and our audience for that is global disconnected users. We are in the process of building an SAP portal with the vision there being Web delivery from CRM or business intelligence. We have just done a first release of an application of SAP portal globally, and it is not being received very well because the community is used to being offline and wants to go offline. When I asked SAP portals about their offline capabilities, they mentioned BackWeb. If you are already a Domino shop with all your knowledge content in Domino-based databases, do you see a business reason to start looking at BackWeb with SAP portals versus WebSphere? Collaboration is the big piece that we want to introduce in our knowledge system.

Ashim Pal: To start with, I would not be looking to introduce any further components until you have exhausted the potential with the existing technologies. Domino is a legitimate front end to SAP applications, and we have numerous examples where clients have pumped SAP information into Domino either to provide some viewing capability, or potentially even to provide some business logic locally before the information gets put back in to SAP. Without getting into the specific context, I would not want to give you the “John Wayne” answer here. My high-level recommendation would be to try and exhaust the possibility of the existing infrastructure to support these applications and use BackWeb only as an exception of technology. With the proper connectors and validation, Domino has enough horsepower in it to be able to suck out the information. It has plenty of capability to view and reformat that information, and to some extent, do data embellishment by forms, and then put it back into SAP.

Q (cont.): Yes, I think that is good. Our current problem is the finance department and finance mentality trying to push down under a sales-consulting organization. We seem to have a clash of philosophies.

Ashim Pal: Because this is getting into some of your client confidential discussions, I would strongly suggest that we have a call separately outside of this teleconference. I would like to get into this in more detail.

Q (cont.): My experience thus far with implementing SAP portals is it appears to be very piecemeal. In one of your Figures, you have it with Plumtree, IBM, and SAP in the top quadrant as far as leaders. We seem to be building it on-site from individual components versus implementing an integrated portal solution. Is this true for all portals, or is this just an SAP portal experience?

Craig Roth: There is a range from buy to build on all the portals. Some are more buy-oriented, which means you get a lot more out of the box and more ready to go. For example, BroadVision is always aimed at this. Content management is built in — e-commerce and personalization — and you are getting everything at once. There are those that are more build-oriented. BEA or IBM are examples of this, where there is more flexibility because it is open. On the other hand, you also have to do more work to get it up and running. SAP has actually been somewhat in the middle there. Clients have found that they did not have to do a lot of development work on top of it. It sounds like you have had to do a lot, so it might have to do with some of the things that you are trying to do with it. It is in the middle of that buy/build spectrum.

In summary, it could be better or it could be worse depending on which sort of product you went with. We showed the chart with all the dollar signs in any portal project. We assume there are a lot of additional costs involved including the cost of building adaptors into custom systems, taxonomy work, getting roles in the system, and tying it to pieces of infrastructure. It is not uncommon to have a lot of work going on outside of just what you paid for the portal licenses themselves.

Q: My question is about dealing with the business intelligence. How does that compare to knowledge management? I had not heard much on the BI side, but we talked about knowledge management and how the providers of the basic portal structure — the 19 vendors you have there — but I do not see anybody listed there in the BI space. How do the two compare?

David Folger: In the BI space, they are dealing with structured information out of database-like reports and OLAP models. Typically, the way that market is evolving is that some of the BI vendors are actually building their own portals. Brio was an early entry in the portal space, but never made it as a general purpose portal framework competitive with Plumtree or IBM. Cognos and Business Objects have portals specific to their BI
projects. They are not as open to integrating other content, and also made no real progress as a general purpose portal framework beyond their own product line. We think this market is going to evolve with BI vendors integrating with standard portal frameworks that come from leaders in the METAspectrum that we saw earlier.

There will be tighter integration among Business Objects, IBM, WebSphere, Cognos, BEA, and Web Logic over time. An organization will provide the BI content into its portal by integrating those standard BI packages. Unfortunately, it is not done as cleanly and as effectively as it might be, at this particular moment. At the management level, there is no integration yet, and at the personalization profiling level, you have to create a profile in both products. Over time, some of those things will get sorted out, as more standards exist for defining profiles. Also, the number of portals players that BI vendors have to deal with strengths as the industry consolidates.