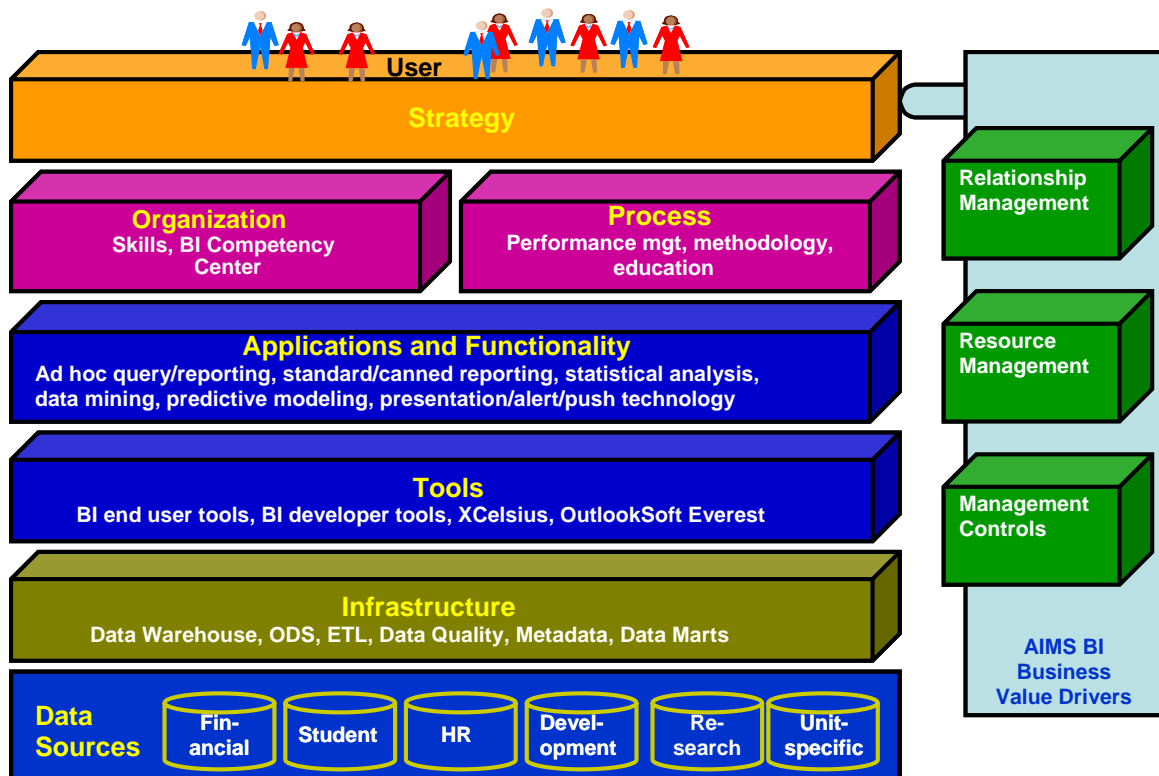


MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

Draft

Introduction

Gartner Research has developed a framework¹ to enable an enterprise to align various Business Intelligence (BI) initiatives in the most efficient and effective manner. MAIS and AIMS adapted this framework to U-M and are using it to direct BI planning on campus.



Each of these layers affects the others and has a meaningful return only if viewed in combination with the other layers. For example, it is of little use to have an infrastructure if there is no BI functionality that uses it. And it is of no use to apply BI in a way that doesn't fit the organizational culture. In an overall integrated framework, each layer has its own specific and indispensable contribution to the overall return on investment. Gartner advises a building block approach to this framework—building on what already exists, rather than starting completely over for BI. MAIS has already made progress in each one of these layers and needs to continue to develop all layers of the BI framework. This Information Delivery and Management portion of the MAIS Strategic Plan is organized according to this framework.

¹ The Business Intelligence Competency Center: An Essential Business Strategy, R-15-2248, Strategic Analysis Report, 29 May 2002. Hostman, Bill, "Organizing for BI," Business Intelligence 2004 conference, Chicago, IL; used by permission of Gartner, Inc.

MAIS Strategic Plan

Information Delivery and Management (Business Intelligence)

Strategy

The purpose of BI is to leverage data to make better decisions. The strategy of the University (or a school/college) should drive what is developed and delivered in all of the lower layers of the framework. The need to form new partnerships, outsource something currently done internally, identify processes that need to be improved, and address mandates such as Sarbanes Oxley are all examples of strategies that can drive the need for BI. Clearly this is happening in pockets within the University (e.g., the Medical School and their M-Dash/M-Stat system). More effort is needed to align BI investments to the appropriate strategies to ensure a return on investment.

MAIS does not have a primary role in the strategy layer of the framework, as this layer must be established by those managing the “business” of the University. AIMS did some preliminary work on identifying metrics in the areas of relationship management, resource management, and management controls from December 2004 through February 2005. However, AIMS decided that instead of compiling the top 25 goals for review by the deans as was originally planned, an inventory of what’s available in the units that might contribute to BI should be developed to stimulate thinking around BI. The rationale was that these measures could help AIMS focus on specifics, instead of beginning so broadly. This echoes Gartner’s counsel to begin to define metrics from the bottom up. An example from the business world is by examining customer complaints. (However, Gartner also advises defining metrics from the top down, beginning with the institution’s mission statement.) A survey was subsequently compiled and distributed to U-M units to gather data. Results are still being analyzed by AIMS and MAIS.

MAIS needs to do the following in terms of strategy:

- Increase effort in the area of customer intimacy. AIMS completed a Gartner BI readiness survey in January 2005. Although the sample from the survey was a very small one with only 18 responses, it affirmed why AIMS was established and why its work is important: leveraging the data in the units is the goal U-M has not yet achieved. The results, grouped into categories by respondent (“school/college,” “central office,” “MAIS”), indicated that U-M needs to “wake up the users” in Gartner parlance. The higher scores from the central offices (e.g., Registrar’s Office, HRAA, Business and Finance) show that MAIS is aligned to central units and their associated data domains (HR, student, financial, etc.), rather than business processes. Integration across data areas and systems is what is needed in the schools and colleges. M-Pathways project members had worked closely with the schools and colleges to develop the major operational systems, but once these systems were in place, there was not much interaction with MAIS on a day-to-day operational basis.
- Increase effort in the area of innovation. MAIS needs to provide technologies to support BI needs, such as push technology, dashboards, and web reporting.
- Work with AIMS and University units to increase education and awareness on the need for strategy to drive BI applications.

MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

- Continue to analyze the AIMS survey results for possible systems, projects, or even reports developed in one unit that can be shared with others in a BI showcase venue.

Organization (BI Competency Center, Skills)

Organizational characteristics drive which BI functions are needed and how to deploy BI. At this level, several critical factors need to be addressed: Does the organization have the right analytical, business, and IT skills to deliver BI? Are the appropriate decision-making processes in place to leverage BI and at what level (e.g., planning and control, balanced scorecard)? Does the information culture support broad sharing of information? Is there a central group that can advise and coordinate BI activities? Are the different types of users identified (e.g., power, casual, executive, managerial)? According to Gartner, the biggest barriers to BI are organizational culture and skills/know-how. Their consultants believe that some of the most important innovations in the coming decades will not be new technologies, but new ways of organizing work made possible by these technologies.

Gartner further suggests creating a BI Competency Center to enable optimal resource sharing and skills development. The BI Strategic Plan from AIMS/MAIS in May 2005 (see accompanying document entitled “A Business Intelligence Strategy Proposal for the University of Michigan”) recommends the establishment of such a group, referred to as a BI Leadership Center at U-M, with the purpose of communicating, coordinating, and collaborating, not controlling (Gartner also suggests moving from “command and control” to “coordinate and cultivate”); providing a common data infrastructure for BI on campus; and embarking on projects that are transferable to other units. Since this plan was published, however, AIMS has determined that establishing a BI Leadership Center on campus is premature (see accompanying document entitled “Key Points from the Discussion about BI Leadership Center on 10/3/05”). The focus at this time should be on projects that demonstrate the value of BI in order to drive demand for BI on campus. In the meantime, MAIS has established a project team with a project manager and a small group of dedicated staff to work with AIMS to initiate BI on campus. A BI Lead team currently consists of 9 members, including the chair of AIMS from the Law School. Subgroups have been working in the areas of Communication/Coordination, Tools, Infrastructure, Applications, and Data. Some of these groups have spawned further subgroups for work in specific areas such as Archive/Purge and Services Oriented Architecture (SOA).

This organization level of the framework is the critical link that allows an organization to leverage BI. Some good work has begun in this area, but more is required to position the University to optimally leverage its administrative data. An IT Commons approach might be an appropriate model to support distribution of BI application development on campus.

In specific,

MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

- MAIS needs to strengthen its relationships with schools and colleges and increase collaboration on campus.
- MAIS must continue to collaborate with AIMS throughout the course of all BI planning and activities.
- MAIS and other units must develop a mechanism for determining priorities of new projects and managing existing applications.

The organization layer of the framework is currently the one with the greatest number of critical questions for MAIS:

- How much of MAIS' effort should go into BI versus other efforts? 10-15%?
- Is there some kind of reorganization of staff and/or responsibilities in MAIS that can position us to better deliver and support BI on campus? Do we want a group totally focused on BI separate from our current organizational structure? Do we need to build data warehouse data sets more quickly, change our ETL approaches more quickly, build more Business Objects universes, build a web reporting environment? Does any of this require reorganization?
- What type of reorganization is needed to support the SOA development model?
- How can MAIS staff become more nimble in order to better respond to rapidly changing BI needs on campus?
- What kinds of BI skills need to be developed by MAIS staff (e.g., analysis)? Should we be in the analysis/data mining role at all?
- What role should MAIS play in an eventual BI Leadership Center on campus?
- What can MAIS do to contribute to the distribution of BI application development on campus from an organizational perspective? Do we build services? Host local data on our servers?

Process (Performance Management, Methodology, Education)

Gartner suggests developing a plan to broaden the adoption of BI, helping as many user segments and parts of the business as possible with self-service BI, and shifting the corporate culture toward fact-based decision making.

A big portion of this layer consists of communication and coordination. Underscoring the idea of beginning with projects to drive BI demand, rather than immediately setting up a BI Leadership Center, is Gartner's advice to market extensively after piloting projects. The more you *try* to change the culture, the less successful you'll be. The biggest mistake is "build it and they will come." Since feedback drives people, we need to demonstrate things that will excite users, to "create a buzz" around BI. The MAIS BI Communication/Coordination group, in concert with interested users on campus, has created a U-M BI web site as a first step in a campaign to raise awareness of BI on campus. BusinessObjects User Group meetings on campus in January introduced BI and how BusinessObjects will play a role in it. A *University Record* article on BI is slated for publication in late January 2006. The BI Leads are working with AIMS on planning a

MAIS Strategic Plan

Information Delivery and Management (Business Intelligence)

series of campus-wide BI events in 2006. Much more work needs to be done in the area of communication and coordination.

Performance Management, however, is a campus management issue. What measurements do campus leaders need to monitor to understand how we are doing? Performance management links the actual performance indicators to the business strategy. It is in this area where the investment in business intelligence pays off. The Medical School is a great example of where BI solutions support a business strategy. Managing their performance against that strategy is what their applications do. As stated earlier, a bottom up and top down approach is needed to make progress. This is where things need to meet in order to leverage the investment.

In terms of process, MAIS needs to:

- Modify MAIS' project methodology to address the following requirements. In addition, a governance model needs to be developed to enforce this methodology.
 - Enable the development of BI solutions more rapidly and less expensively over time. According to Gartner, a BI methodology must support evolution. Unlike a traditional IT project methodology, it must include *deployment* as well as development, as BI is a business process, not an IT project.
 - Include AIMS' review of large projects in order to identify BI opportunities.
 - Align BI technologies within a framework to reduce redundancy, make wise choices in BI tool selection, and propagate successful BI projects across campus.
 - Incorporate a BI component into all major development projects. Recognize and plan that BI projects may identify gaps or inaccurate data and will spawn traditional systems development projects.
 - Include a mechanism for determining priorities of potential projects campus-wide.
 - Include standards related to service-level agreements.
 - Provide a mechanism that encourages campus-wide reuse of services developed by MAIS and by units.
 - Allow MAIS and campus to readdress standards as the university learns more about working in a SOA environment.
 - Include a development methodology that addresses the entire Services Oriented Architecture (SOA) Lifecycle. This development methodology will:
 - Incorporate SOA design philosophy, such as encapsulation/separation of the presentation, business logic, data access aspects of an application.
 - Include standards related to the creation of a services library/directory, standards for publishing in this services directory (interfaces), and standards for finding and reusing services in this directory.
 - Guidelines for building applications by integrating and sequencing services.
 - Standards for testing and deploying services in a production environment.
 - Standards for securing applications in a SOA architecture.
- Work with AIMS to continue to raise awareness of BI on campus.
- Work with AIMS and the Provost to revise the policy on units paying for Business Objects licenses and maintenance.

MAIS Strategic Plan

Information Delivery and Management (Business Intelligence)

- Work with the business owners to revise training requirements for users who solely use predefined reports in the Data Warehouse.
- Increase education about Data Policy and Guidelines to broaden awareness of emphasis on sharing data and responsibility for correcting it at the source.
- Create or assist in the creation of a curriculum to be delivered with BI projects.
- Continue to keep MAIS staff abreast of BI developments on campus.
- Ensure CPU staff becomes well versed in BusinessObjects and the contents and structure of the data warehouse data sets.
- Assess BI skill sets within MAIS.
- Train MAIS staff on analysis and other BI skills.
- Continue to confer with other universities on BI best practices.
- Continue to add new material and a blogging facility to the BI web site.
- Increase the frequency of data labs and user group meetings to leverage current query/reporting capabilities and educate on BI.
- Train MAIS staff on SOA design/development concepts and standards.
- Train MAIS staff on new development tools that will support a SOA environment.
- Train key MAIS staff to develop and enforce SOA design/development standards.

Critical questions on process for MAIS are:

- The purpose for developing BI applications is to make better decisions. How can the University help ensure applications lead to better decisions (and therefore better use of resources)? What is the MAIS role in this?
- What can MAIS do to contribute to the distribution of BI application development on campus from a process perspective?

Applications and Functionality

As noted above, the focus at this time should be on projects that demonstrate the value of BI in order to create demand for BI on campus. Gartner advises enterprises to think big, but start small—with a pilot and market approach. Early adoption projects should be selected wisely. BI is not all about technology. Quick wins on familiar ground can breed the success needed to increase demand and move into less familiar technologies for which proofs of concept can reduce risk. Another recommendation from Gartner is to ensure that a strong, enthusiastic, engaged executive sponsor is on board very early on in the process.

The MAIS BI Applications subgroup identified approximately 20 possible BI projects (see accompanying document entitled “Business Intelligence Application Projects”), including a high-level assessment of criteria for gauging their potential success: Do we have a tool that meets the needs of the project and its users? Are there specific trends or predictions that the resultant data would identify? Is the data available? Is an executive sponsor committed to the project? Does the University have the staff (MAIS and users), data knowledge, technical skills, and analytical skills to implement the project? Some of

MAIS Strategic Plan

Information Delivery and Management (Business Intelligence)

the projects on the list are already in progress. AIMS is currently prioritizing those not yet initiated, and has already selected its top five candidates, for which MAIS is currently doing further investigation and creating project scope documents. Care must be exercised to not try to do one project that meets the needs of everyone, as that will result in certain failure. It is agreed that we need clear sponsorship for all projects that we undertake.

In terms of applications and functionality,

- MAIS needs to implement multiple BI projects with apparent demand and clear benefits that are likely to accrue in order to increase awareness and drive demand on campus.
- The BI Initiatives Application Team needs to coordinate BI subprojects until BI is established at U-M and organizational structures are in place in MAIS.
- MAIS needs to incorporate a BI component into all major development projects.

A critical question on applications and functionality for MAIS is:

- What can MAIS do to contribute to the distribution of BI application development on campus from an application perspective?

Tools

According to Gartner, no single tool is capable of meeting the broad spectrum of needs in BI, so enterprises need multiple tools to produce and deliver BI applications. However, the number of tools that can deliver the same type of application (e.g., metrics, predictive analytics, statistical analysis, ad hoc reporting) should be minimized. At U-M, we have some tools in place that can meet certain needs. Business Objects, a front-runner in the BI tool market, remains our supported tool suite for ad hoc queries and running pre-defined reports. However, more tools are needed to meet other needs, and in some areas the University may own multiple tools that meet the same need.

A BI Tools group, comprised of users from across campus and MAIS staff, met for two months in late 2005 to determine whether a tool suite approach or best of breed tool approach for future BI tool acquisitions would be best. During the course of its tenure, the group segmented the user population on campus in terms of role (see accompanying document entitled “U-M BI User Segmentation by Organizational Role”) and suggested which types of BI tools would be useful to each role (e.g., production reports, ad hoc querying, dashboards, statistical analysis, OLAP, scorecards, data mining). After much research and discussion, the group recommended that a tool suite approach be taken by the University—in specific, a suite of tools from Business Objects, our current data warehouse tool vendor (see accompanying document entitled “Preliminary Advisory Report: AIMS BI Tools Subgroup”). We should not only move our current Business Objects products to the web, but also work toward expanding offerings from Business Objects, most notably in the area of dashboarding in the immediate future. Recognizing that the Business Objects product suite will not suit every BI need on campus, the group

MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

confirmed that a user-friendly environment for users to execute predefined reports over the web is still very much needed at U-M and that some BI tools that may be needed over time are not available from Business Objects. In December, MAIS signed a new contract with Business Objects for moving to the Web and beginning to incorporate dashboarding into its toolkit.

In terms of tools, MAIS needs to:

- Move Business Objects to WebIntelligence and upgrade to XIr2 expeditiously.
- Ensure an environment where units can contribute solutions (e.g., reports, dashboards) to the Business Objects or Web Reporting environment.
- Investigate evolving BI-oriented capabilities of Oracle, such as OLAP, data mining, BAM, and BPEL, and continue to keep abreast of BI-oriented developments with these products.
- Continue to keep abreast of the BI-oriented capabilities of the Business Objects product suite.
- Continue to work with users on the BI Tools group to implement solutions and investigate further additions to the BI toolset, as needed.

A critical question on tools for MAIS is:

- What can MAIS do to contribute to the distribution of BI application development on campus from a tool perspective?

Infrastructure

The BI Infrastructure must be flexible enough to support the rapid deployment of BI applications across the University. A SOA (Services Oriented Architecture) architecture that is based on Web Services can provide this flexibility. SOA is an emerging systems development standard in which systems are constructed as a series of well-defined functions that are written and presented in accordance with formal industry standards. These functions (services) can be put together to construct more complex functions or business processes. The reusable nature of SOA allows, over time, for applications to be built more quickly, efficiently, and consistently. Additionally, SOA design focuses on business processes rather than on technology,

In late 2005 a BI Infrastructure group in MAIS developed a recommendation for an infrastructure to support BI and existing systems as well as next steps for further research and implementation of the infrastructure (see accompanying diagram entitled “BI Infrastructure Subgroup Proposed Reporting Architecture”).

In terms of infrastructure, MAIS needs to do the following:

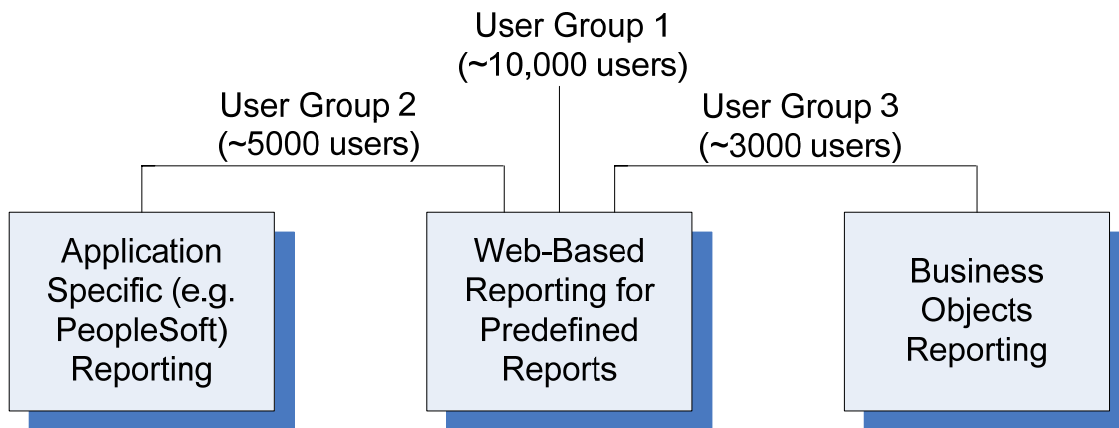
- Design, develop, and deploy a new user-friendly web-based environment to allow running an agreed-upon subset of predefined reports with variable input parameters. In early 2006 AIMS and MAIS discussed the idea of several reporting environments being a necessity in today’s world. Given that the Web Reporting Project of 2004

MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

failed in its attempt to provide one-stop shopping for web-based reports from both the PeopleSoft and Business Objects environments, AIMS discussed whether two different environments for reporting would pose a significant barrier to usage by any given user. Three “gateways” to reports were described:

- the existing application environment for operational reports,
- the existing BusinessObjects environment for data warehouse reports and higher level analytics,
- and a third new user-friendly web-based environment to allow running an agreed-upon subset of predefined reports with variable input parameters. This environment would be developed by MAIS using SOA design techniques.

Three Gateways for Reporting



This third new environment (the middle box above) would be the one from which most users (perhaps around 10,000) would execute reports, and it may be the only environment to which they would need to navigate. Users who currently run application-specific reports would probably continue to require reports in the PeopleSoft, DAC, eResearch and other application environments in addition to the third new one. Current Business Objects users would still need the Business Objects environment for ad hoc reporting in addition to running the selected subset of predefined ones in the third new environment. In the above scenario, then, a user may use only one reporting environment (the third new one) or a maximum of two: the application-specific one (e.g., PeopleSoft) and the third new one, or Business Objects and the third new one. AIMS members did not consider it too complicated or overwhelming for a user to be required to navigate to a maximum of two different environments for reporting. As users mature in their use of the internet, they seem to be more comfortable with different navigation experiences rather than a common user interface for everything. However, a common approach to some aspects of BI, such as delivering alerts and monitoring events, will increase effectiveness for all users.

- Investigate and implement archive/purge policies and processes to provide for more rapid refreshing of data warehouse data sets.

MAIS Strategic Plan Information Delivery and Management (Business Intelligence)

- Investigate ETL tools and processes (e.g., Changed Data Capture) to provide for more rapid refreshing of data warehouse data sets. Also develop standards for using these tools within MAIS and across campus.
- Develop standards for data management across the university, addressing data creation and replication.
- Determine which design/development tools will be used for developing the Web-Based Reporting environment.
- Determine a common MAIS approach to support push technology.
- Develop standards related to the SOA/web services design and development lifecycle.
- Develop standards for managing SOA and web services in a production environment.

Critical questions on infrastructure for MAIS are:

- Do we believe in the future of SOA? What implications does this have for BI?
- Should MAIS create a J2EE and/or .NET environment for running predefined reports over the web? We recommend .NET.
- What can MAIS do to contribute to the distribution of BI application development on campus from an infrastructure perspective?

Data Sources

Data for BI applications is derived from all primary sources of central administrative data: the OLTP, ODS, and data warehouse environments. Additionally, some data at U-M not maintained by MAIS is needed for university-wide reporting. Some examples identified by the Administrative Data Delivery Advisory Group (ADDAG) in 2003 were IT Comm data, course/class evaluation scores, student internship and in-service activities, staff professional/trades licensing, and staff professional development information. A third category of data used for BI is that unique to individual units. This data is stored at the local level.

A BI Data group was recently established in MAIS to begin addressing data needs for BI projects on campus.

In terms of data, MAIS needs to undertake the following:

- Identify and fill data gaps in the data warehouse:
 - Those required by initial BI projects
 - Those identified by the Administrative Data Delivery Advisory Group (ADDAG) in 2002-2003
 - Those identified in the AIMS group survey undertaken in 2005
 - Those identified as a result of a new application or enhancement project
 - Those required by new BI initiatives as they are identified
- Develop a mechanism to capture the data needs of the user community in an ongoing fashion for those items that aren't currently captured in MSRs.
- Build an Enterprise Data Model in an evolutionary manner, over time.

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- Assess unit data not maintained by MAIS but needed for university-wide reporting for viability of moving to the data warehouse.
- Assess unit data for commonalities in order to determine if this common data could be stored centrally in the data warehouse.
- Assess the refresh frequency of existing data to determine if more frequent refreshes are needed.
- Assess the need for and create more aggregate data in existing data warehouse data sets to ease metrics reporting.
- Assess the need for and create more snapshot data in the data warehouse.
- Assess the need for and create more application data sets in the data warehouse.
- Create more data “services” that units can use in departmental solutions.

A critical question on data for MAIS is:

- What can MAIS do to contribute to the distribution of BI application development on campus from a data perspective (“services”, migration, hosting, etc.)?

**MAIS Strategic Plan
Information Delivery and Management (Business Intelligence)**

General Recommendations

While much is already moving forward in the area of information delivery and management, there are several general recommendations that can be identified to better position MAIS to support the University in this endeavor.

Recommendation	Timeframe
Develop BI architecture that also overlaps with new application architecture to encourage reuse of common tools (BAM, BPEL, workflow, roles, rules) and technologies; identify needs for new tools, more licenses, etc.	Start immediately
Analyze organizational implications in MAIS and make short term changes (interim BILC, resource allocation, skills needed rather than organizational changes) while we evaluate long term <ul style="list-style-type: none"> • Formalize staffing commitment to various BI efforts; commit 15% of MAIS resource to various BI efforts 	Start immediately Start to increase effort immediately; attain 15% by July 2006
Upgrade Business Objects (web, dashboard)	In process
Build a web reporting environment in .NET	Start immediately
Identify key BI applications, data warehouse improvements (more data, aggregate data) and deliver	In process
Analyze implications for methodology (need to be more nimble, BI systems evolve) and internal policies and procedures (how do units participate in development and production support)	Analyze along with infrastructure and application projects
Increase education and awareness (communication and coordination) on campus (events, BI web site, AIMS, etc.)	In process
Get out on campus more (consulting, increase and facilitate partnerships with schools and colleges)	In process
Provide professional development and training opportunities for MAIS staff, campus staff	Start immediately
Implement archive/purge process in conjunction with planned approach to increase load frequencies and revise ETL processes (e.g., Changed Data Capture) as appropriate	Start July 2006 (some investigation is currently underway)