

Paper 068-2008

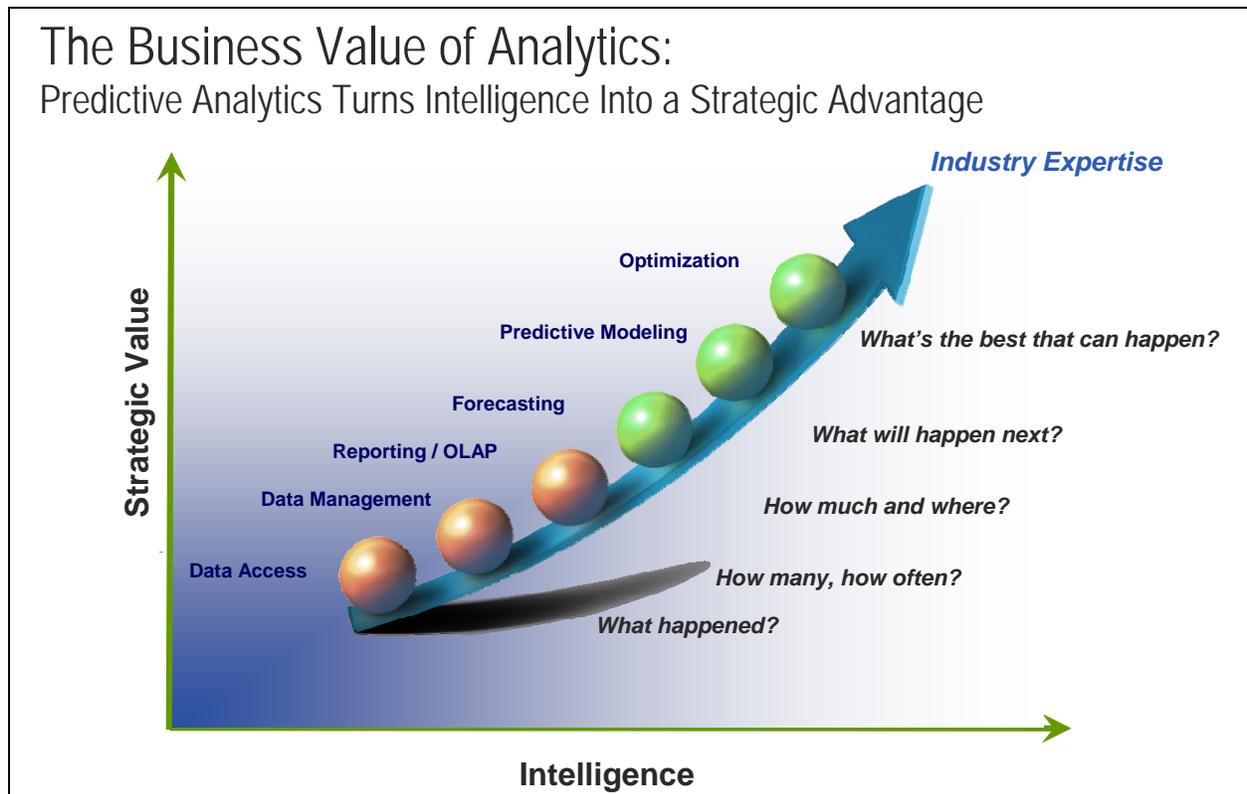
## **How SAS<sup>®</sup>9 Allows the Delivery of the Power of Predictive Analytics and Forecasting to the Masses**

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### **ABSTRACT**

The SAS<sup>®</sup>9 architecture has made it easier than ever to share the true power of SAS<sup>®</sup> software throughout an organization. Businesses can benefit greatly from using SAS<sup>®</sup> Enterprise Business Intelligence as the perfect delivery mechanism for sharing predictive analytics from SAS<sup>®</sup> Enterprise Miner™ and forecasting from SAS<sup>®</sup> Forecast Server throughout their enterprise. Furthermore, SAS<sup>®</sup> Enterprise Data Integration Server streamlines the process of cleaning and preparing data for analysis and reporting as well as providing a mechanism for easily creating web services.

**INTRODUCTION: WHY IS DELIVERING ANALYTICS AND FORECASTING TO AS MANY PEOPLE AS POSSIBLE WITHIN AN ORGANIZATION IMPORTANT?**

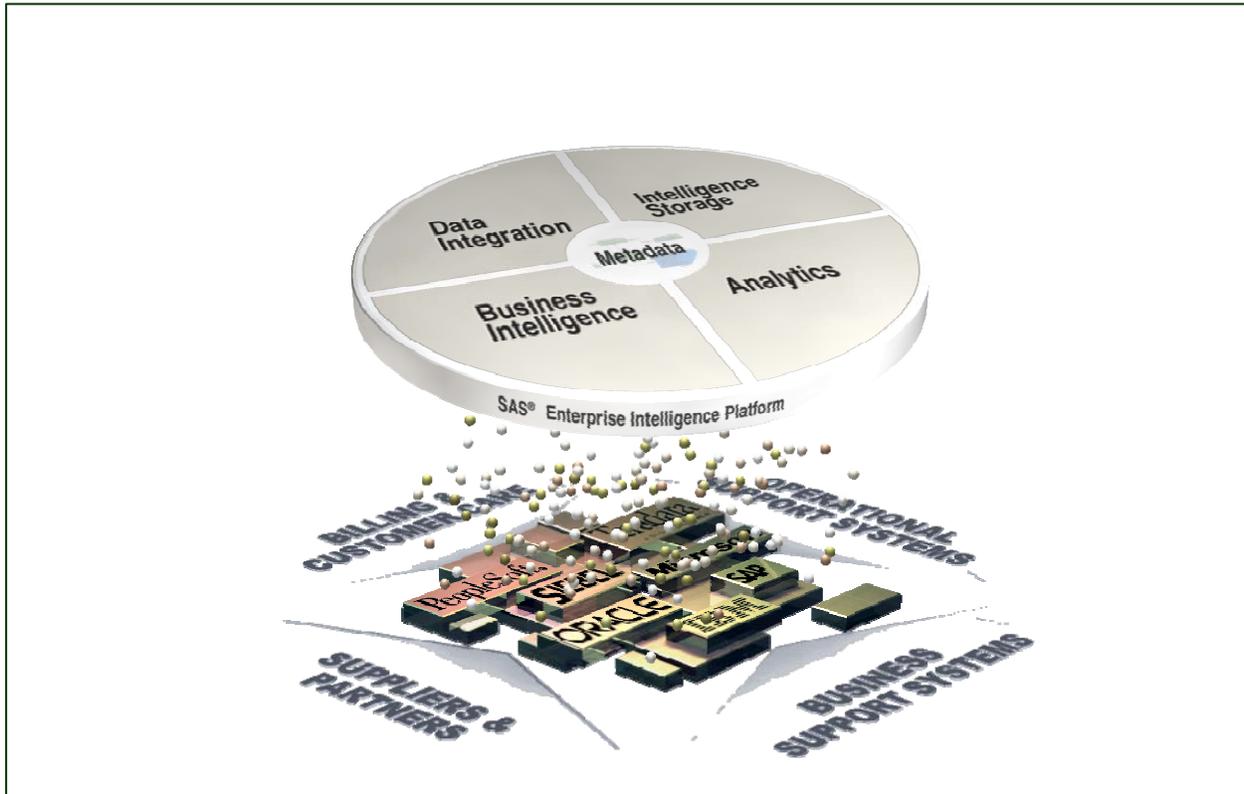


**Figure 1.** The Business Value of Analytics

Analytics and forecasting provide organizations with a strategic advantage because they are used primarily to increase revenues or reduce costs. Using either analytics or forecasting helps any organization save time and money, which means the organization becomes more efficient and profitable. For example, you can use analytic modeling to better understand customers and their wants and expectations, which ultimately leads an organization to become more profitable or better able to meet customers' demands. Forecasting helps answer vital questions in many areas of planning and development: sales and marketing, promotions, resource planning and scheduling, facilities, inventory planning, and new products. Analytics is the key to success, and SAS, with 28% of the market, compared to the closest competitor, who has 13%, is the clear leader in this market space. IDC has verified the importance of analytics: "The median ROI for business intelligence projects using predictive technologies was 145%, compared with a median ROI of 89% for projects without them."<sup>1</sup>

The integrated analytics that SAS offers is the engine that provides the extra power that competitors cannot match in other market spaces such as data integration and business intelligence.

## ESTABLISH THE SAS 9 ENTERPRISE INTELLIGENCE PLATFORM



**Figure 2.** The SAS 9 Enterprise Intelligence Platform

The SAS® Enterprise Intelligence Platform (EIP) is the key to delivering analytics throughout an organization. EIP is the foundation on which SAS builds its own solutions like SAS® Enterprise Business Intelligence (EBI), as well as a user-development platform. The EIP is defined by SAS across marketplace-defined areas such as data integration, business intelligence, and analytics, as well as intelligence storage and metadata. SAS is ranked by third-party analyst organizations as a recognized leader in any of the areas of our EIP. This is important because if you choose to use SAS for any or all of these areas you are getting the best solution possible. While SAS is designed with the flexibility to integrate well with any environment, the more SAS you use, the fewer number of integration points your organizations will need to worry about. Programmers can use the EIP to

integrate with other systems and to deliver the power of SAS analytics and forecasting to the masses.

One of the most important features of the EIP is the stored process. Stored processes are the key to integrating and delivering the power of SAS easily throughout an organization. SAS solutions, and in particular SAS<sup>®</sup> Enterprise Business Intelligence, is built upon the EIP and makes use of stored processes.

## OVERVIEW OF SAS<sup>®</sup> ENTERPRISE BUSINESS INTELLIGENCE

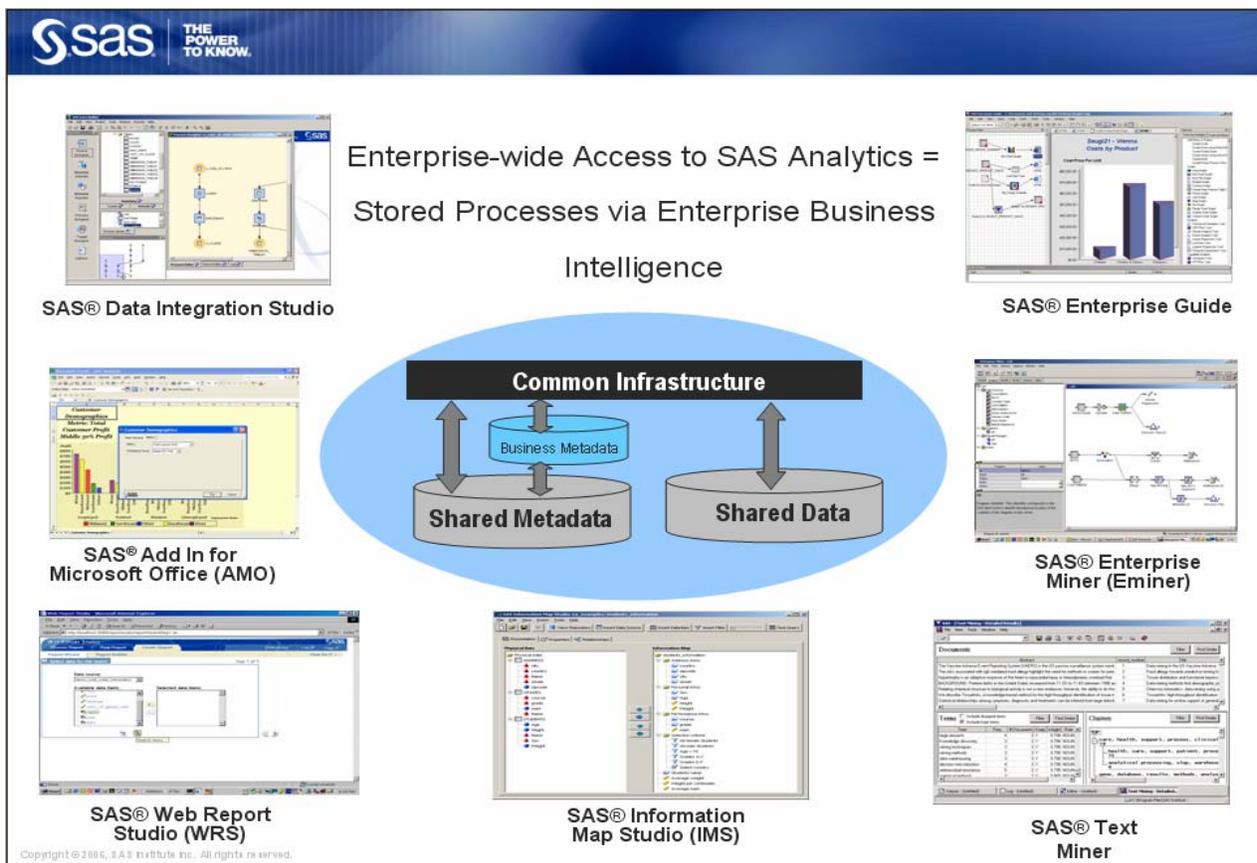


Figure 3. Some Examples of SAS 9<sup>®</sup> Interfaces

SAS<sup>®</sup> Enterprise Business Intelligence provides an easy framework for delivering SAS results instead of having to custom build your own solutions. SAS EBI has multiple interfaces that are designed to meet the needs of different people or personas within an organization. The interfaces have different levels of functionality based on the person for

whom it is designed to be used. All of the interfaces are built for ease of use by the people who use them. SAS provides interfaces for a wide variety of users:

- power users (SAS Enterprise Guide, SAS<sup>®</sup> OLAP Cube Studio, and JMP)
- business analysts (SAS<sup>®</sup> Add-in for MS Office)
- web-based users that range from report creators (SAS<sup>®</sup> Web Report Studio) to strictly report consumers (SAS<sup>®</sup> Information Delivery Portal)

SAS EBI provides and supports APIs that allow you to extend the functionality and security built into the solution. In addition, there are hooks that allow other SAS solutions, such as SAS<sup>®</sup> Enterprise Miner<sup>™</sup> and SAS<sup>®</sup> Forecast Server, to deliver their results through these integrated interfaces that make up the SAS EBI solution. SAS provides many interfaces and integration points, but only one version of the truth, which is tied together by the backend metadata server. The metadata contains the location of data; the variables that are in the data; the reports that are available; the stored processes that are available and which server to execute them on; the names of those who have access to which data, reports, and stored processes; and predictive models and forecasts.

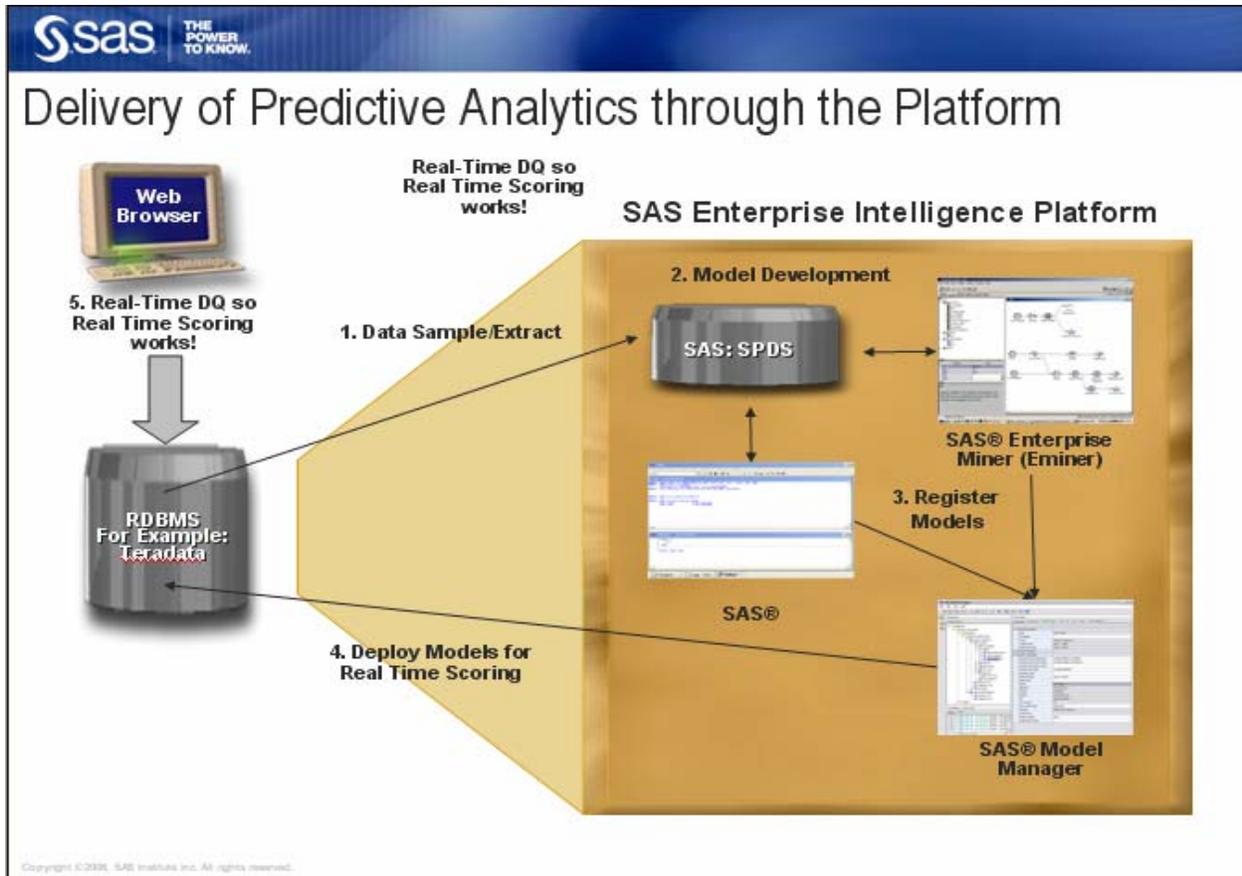
## **DELIVERY OF PREDICTIVE ANALYTICS THROUGH THE PLATFORM**

There are several methods to deliver predictive analytics through the platform. Some methods involve custom programming and other methods use existing solutions that deliver the results through SAS EBI. A paper entitled “Creating Web Services using SAS Analytics,” which is being given in the Applications Development section at this SAS Global Forum, addresses the programmatic approach. In this paper I describe how to use SAS<sup>®</sup> Enterprise Miner<sup>™</sup> and SAS EBI together to surface a predictive model developed in SAS EM for users via SAS EBI interfaces. The whole process can be done through drag-and-drop functionality. If you want to extend it further with some coding you can make the use and delivery available through a stored process, which you could then make into a web service if you choose. Here is the process I used:

1. Develop a champion model in SAS<sup>®</sup> Enterprise Miner<sup>™</sup>.
2. Publish this model to the metadata server (built-in functionality).
3. The model is now available for use in SAS<sup>®</sup> Data Integration Studio,

- SAS<sup>®</sup> Enterprise Guide<sup>®</sup>, and even the SAS Add-in for MS Office.
4. (Optional) Use SAS Data Integration Studio or SAS<sup>®</sup> Enterprise Guide<sup>®</sup> to incorporate the scoring of the model into a stored process. SAS Data Integration Studio can also be used to make this into a Web Service.
  5. (Optional) You can add a parameter to allow the user to specify the location of the new data that they want to score. Now this stored process is available through SAS EG, SAS Add-in to MS Office, and Web Report Studio. If you created a web service, then it is available to third-party applications as well.

Another approach to delivering analytics through the platform involves using the SAS<sup>®</sup> Model Manager to manage and deploy SAS<sup>®</sup> Enterprise Miner<sup>™</sup> models. Perhaps even more valuable is the ability to register and monitor code-based models from BASE and STAT. Prior to SAS Model Manager, if you needed to audit or determine what these code-based models did, you had to go through all of the code. Now you have an interface that registers these models and can track changes to them. SAS Model Manager surfaces the ability to see what these code-based models are designed to predict and what variables are being used to make the predictions. The SAS V9 platform is what makes all of this transparency, monitoring, and ease of deployment possible.



**Figure 4.** Delivery of Predictive Analytics through the Platform

## DELIVERY OF FORECASTING THROUGH THE PLATFORM

Whether you are using SAS/ETS or SAS Forecast Server, you can deliver your forecasting results easily through SAS EBI to anyone in your organization. I have used an application written by a fellow SAS employee to show “What-If” forecasting capabilities using a web browser as the delivery mechanism. You can choose the data you want to be forecasted and what variables to use. You can also manually update values and instantly see the impact on forecasts with a simple push of the button. SAS Forecast Server has hooks built-in that allow you to surface forecasting results through the SAS EBI interfaces, in particular the SAS Add-in for MS Office and SAS® Web Report Studio. The SAS® Add-in for MS Office even enables Excel users to create new forecasting projects within SAS Forecast Server. You can find a SAS whitepaper on the SAS website that is devoted entirely to this topic, “Turbo-Charging Spreadsheets Accessing

SAS Forecast Server from Microsoft Excel.” Available at [http://sww.sas.com/corpcom/vpr/images/103244\\_1007.pdf](http://sww.sas.com/corpcom/vpr/images/103244_1007.pdf).

## **CONCLUSION**

SAS® Enterprise Business Intelligence makes it easy to deliver analytics and forecasting to anyone within your organization. SAS EBI leverages the EIP to provide a pre-built framework that is extensible, but includes several easy-to-use interfaces that make it the best choice for spreading the power of SAS analytics and forecasting throughout your organization. SAS is the industry-acknowledged leader for analytics, and it is one of the top business intelligence vendors. This combination of SAS analytics and SAS® Enterprise Business Intelligence is a perfect example of using the SAS V9 platform/architecture to develop a strategic business advantage that is based on predictive analytics and forecasting, and to share the results throughout your organization.

## REFERENCES

1. Morris, Henry D. 2003. "Predictive Analytics and ROI: Lessons from IDC's Financial Impact Study." *IDC: INDUSTRY DEVELOPMENTS AND MODELS*.

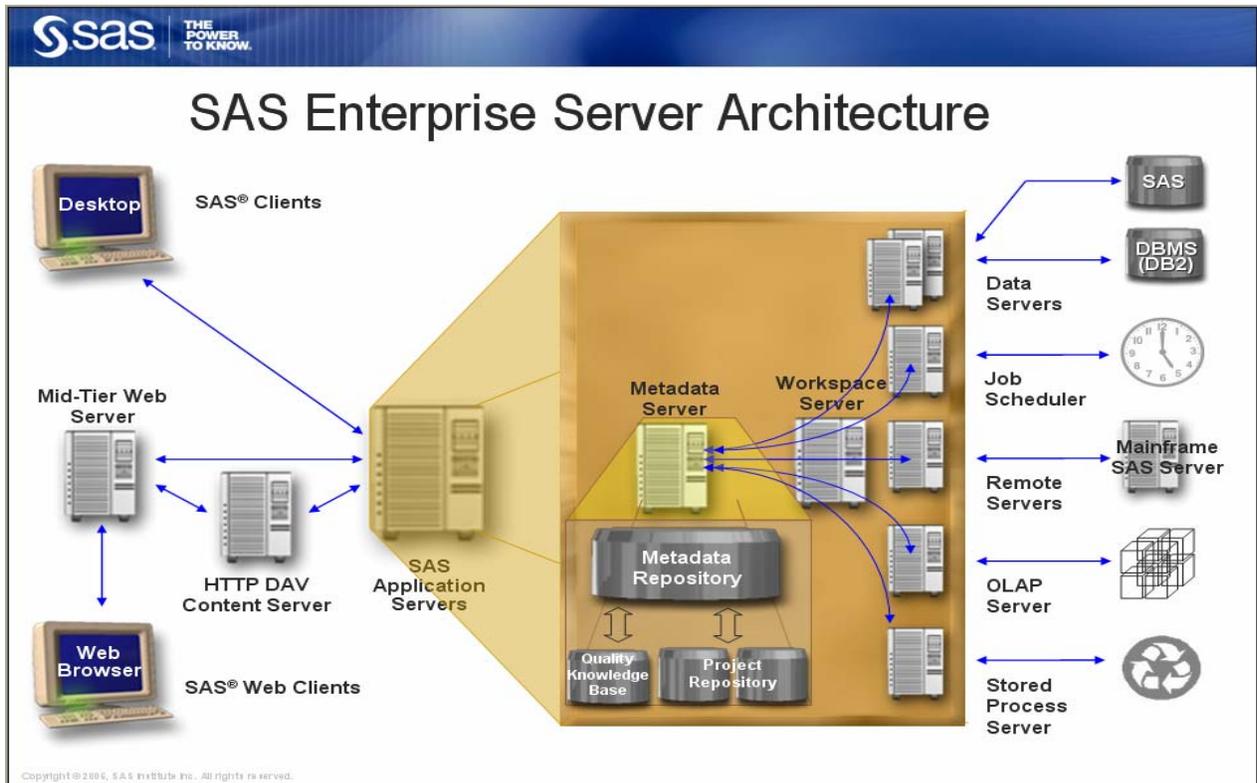


Figure 5. SAS® Enterprise Server Architecture

## RECOMMENDED READING

Klenz, Brad and Jahn, Dan "Creating Web Services using SAS Analytics." *Proceedings of the SAS Global Forum 2008 Conference*. Cary NC: SAS Institute Inc.

SAS Institute Inc. 2007. SAS Institute white paper. "Turbo-Charging Spreadsheets Accessing SAS® Forecast Server from Microsoft Excel." <http://www.sas.com/apps/forms/index.jsp?id=wp&cid=3837>

Pope, David. 2007. "Empowering Your SAS® Business Intelligence End Users via a SAS® Stored Process." *Proceedings of the SAS Global Forum 2007 Conference*. Cary NC: SAS Institute Inc. Available at <http://www2.sas.com/proceedings/forum2007/038-2007.pdf>

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