Prophix

Technology & Architecture Guide

Prophix®

Prophix Technology and Architecture Guide

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Contents

Introduction

As a leading global provider of corporate performance management software (CPM), Prophix Software pays close attention to technology trends and ensures the most relevant and appropriate technology is deployed. Technology is a vital aspect of a robust CPM solution. Both the technology and underlying product architecture must fit well into an existing corporate IT infrastructure to yield maximum return. IT needs to be assured that the technology is open and standardized to ensure there are no future roadblocks or surprises that may impede access to the underlying data. By the same token, business users, the primary users of CPM applications, must feel comfortable with the product architecture and be empowered to manage their own solutions.

Prophix Software understands the dynamic relationship between business users and IT, and has developed a product that satisfies the needs of both groups. Prophix achieves this goal through a unique product design philosophy focusing on empowering users for difficult tasks in non-technical ways, and by leveraging standard technology based around Microsoft products. This white paper highlights the product architecture and technologies employed by the Prophix application platform and its relationship with users.

This document is for technical audiences such as IT directors, IT managers, systems administrators, and technical consultants to help improve their understanding of the Prophix platform.

Product Design Philosophy

The product design philosophy behind Prophix is to empower non-technical users around regular business-centric application tasks, thereby unburdening IT. At Prophix Software, we believe firmly that business users need the autonomy and ability to manage their own CPM application. The IT group is required for infrequent or one-time tasks such as server setup, initial server hardware and software installation, regular database backups, and network maintenance; however, regular tasks such as developing reports, creating and managing business models and associated business logic, importing data, performing consolidations, and managing workflows for budgeting, planning, or forecasting are best done by business users. This is the cornerstone of the design philosophy of the Prophix application user interface and capabilities. Prophix includes patent-pending technologies such as Infoflex, Delta Analysis and SmartSwap which allow business users to proactively engage their business challenges in a systematic and automated fashion.
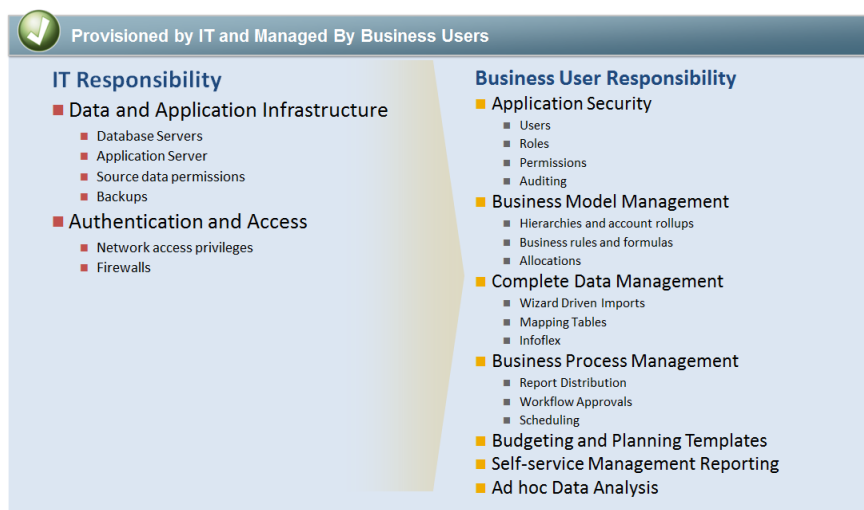
The dynamic and changing nature of today's business environment means that there is no time to wait and call for help from IT. Similarly, IT's role is not to respond to ongoing requests from business users, but rather to take a more strategic role to ensure core infrastructure and applications are always operating at peak efficiency with no outage and to be the stewards

of the data that is consumed by the application. By unburdening IT and empowering business users, significant cost savings may be realized immediately. Additionally, Prophix better aligns with the objectives of business users, so that they are the ultimate masters of their own solution.

Technology Strategy

The technology and architecture behind Prophix have been carefully selected and designed to support the robust requirements for CPM across a wide spectrum of organizations from mid-sized to enterprise. Through using a single platform (Microsoft), Prophix Software is able to deliver products that are scalable, can be rapidly implemented, reduce the burden on IT resources, and lower future support and development costs.

A key concern that Prophix Software is sensitive to is the ability to offer compatibility with future releases of core Microsoft technologies. Customers and partners can be assured that Prophix Software is continuously researching upcoming technologies from Microsoft. As a member of the Microsoft Partner Network with Gold Certification in the Independent Software Vendor (ISV) competency and active participant in Microsoft community technology preview programs, Prophix Software has access to all future technologies being considered for release by Microsoft. Product development strategies are aggressively aligned with Microsoft product roadmaps to ensure the highest levels of compatibility upon new releases.

Unified Platform

An important aspect of becoming a leading CPM application is to have a unified platform designed from the ground up for CPM. Prophix Software did not grow by acquiring diverse products; all the core functionality in the application for budgeting, forecasting, planning, reporting, and

consolidation has been designed to ensure a consistent front-end user experience with a unified back-end for maximum integration. Being designed in this way is important because it ensures all data is fully integrated between modules, there is a consistent look and feel across the product to minimize training, and that overall maintenance is reduced as there is only one application to manage.

This is very different from traditional CPM applications that have often grown and morphed through strategic acquisition of other vendors' solutions. When this occurs, there are always overlapping technologies making it much more difficult to manage the application. In addition, exchanging data between modules can be difficult and cumbersome due to incompatible data formats. Finally, the look and feel of the application can vary widely between modules resulting in increased training costs that are not attractive to end users. This is not the case with Prophix, where a single common interface is used throughout all aspects of the CPM process from the design of business models all the way to end user experiences such as reporting and data entry into budget plans. A single application platform solution leads to lower user training costs as well as greater transparency and data integrity as there is no duplication of data.
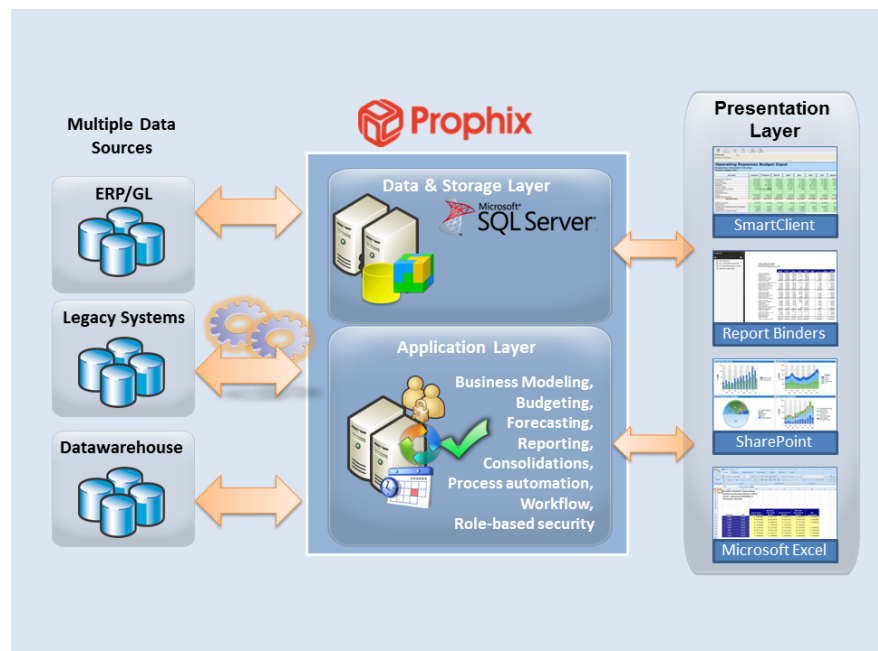
In Prophix, all components are integrated in a single, unified code-base, which means there is only one installation and upgrade process. Risk and

additional future costs are also significantly mitigated by maintaining a single application for CPM. The homogenous architecture also ensures better scalability and performance as there is only a single application to monitor and tune.

Standard Open Architecture

Prophix only leverages standard open technology from Microsoft to minimize deployment costs and ensure maximum compatibility with existing corporate IT standards. There are built-in functions such as Process Manager featuring easy to use step-by-step wizards to import numeric data and structural data from a variety of external applications and databases. Prophix also handles common extract transform and load (ETL) challenges such as data mapping, conforming, and merging through easy-to-use purpose built functionality. With pre-defined links into the Prophix workflow engine, import data processes can easily be automated, are auditable, and can be validated by business or IT users. Exceptions are handled automatically using email notification processes to affected stakeholders.

Leading Microsoft Technologies

Prophix has been developed, tested, and certified entirely on leading Microsoft technologies including Visual Studio 2013, Microsoft .NET Framework, SQL Server , SQL Server Analysis Services (SSAS), SQL Server Reporting Services (SSRS), SQL Server Integration Services (SSIS), Microsoft SharePoint 2013, Microsoft Office 2013, and Windows Server 2012 R2.
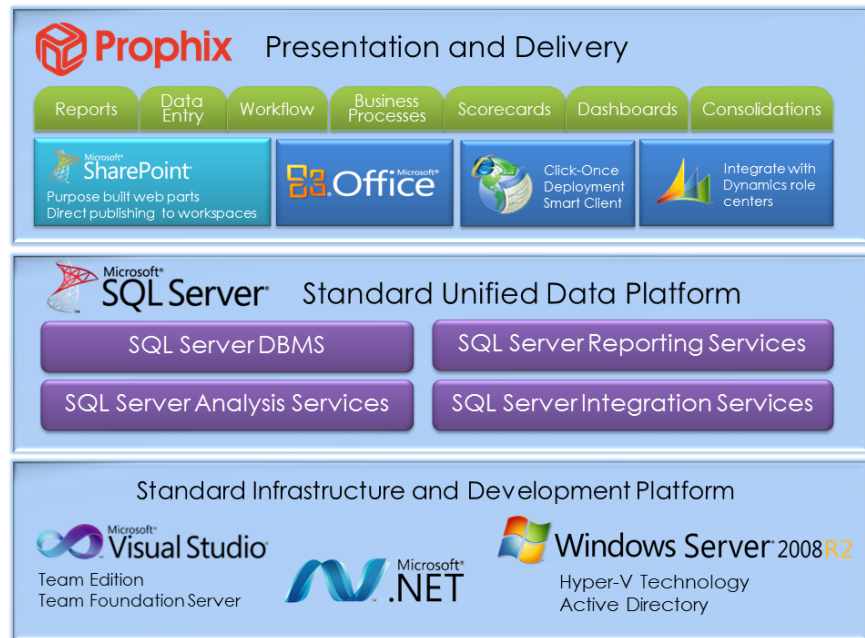
Microsoft SQL Server

The Microsoft SQL Server business intelligence technology stack provides the ideal platform for CPM applications such as Prophix by providing all the components required to acquire data from line of business applications (SSIS), store the data in a centralized repository (SQL Server), enable multidimensional analysis and calculations (SSAS), and generate operational reports (SSRS). With Prophix, users do not need to learn all these technologies; Prophix has created purpose-built functions wrapped in a simple-to-use interface that masks the underlying complexities. The interface with these technologies is always through Prophix; users do not have to understand scripts, stored procedures, packages, and other highly technical items. Users get the best of both worlds: they are able to leverage best-in-class features from Microsoft without having to learn some of the technical complexities, while IT departments can ensure their investments in Microsoft technologies are fully utilized.

SQL Server and SQL Server Analysis Services are the primary database technologies employed by Prophix. SQL Server provides a centralized relational database for storing all data and metadata for Prophix to consume. SQL Server Analysis Services is the market leading OLAP database engine that enables rich multidimensional analysis in large data

models with millions of fact records, automatic aggregation of data across multiple hierarchies, and support for complex business calculations.

Microsoft SharePoint Integration

Microsoft SharePoint provides a platform for collaboration and syndication of different elements from within Prophix to a large user community. As SharePoint has become the leading collaboration system at many organizations, it naturally made sense to leverage this great technology, as CPM is inherently a collaborative process involving multiple stakeholders. The Prophix Extensions for SharePoint are a set of fully integrated web parts that enable key Prophix capabilities such as workflows and report distribution to be accessible from within a SharePoint portal. In addition, automated processes for publishing and soliciting data capture leverage Excel and SharePoint to provide a truly unified experience. Users who already know their way around SharePoint and Excel can become full participants in the CPM process, reducing the learning curve.
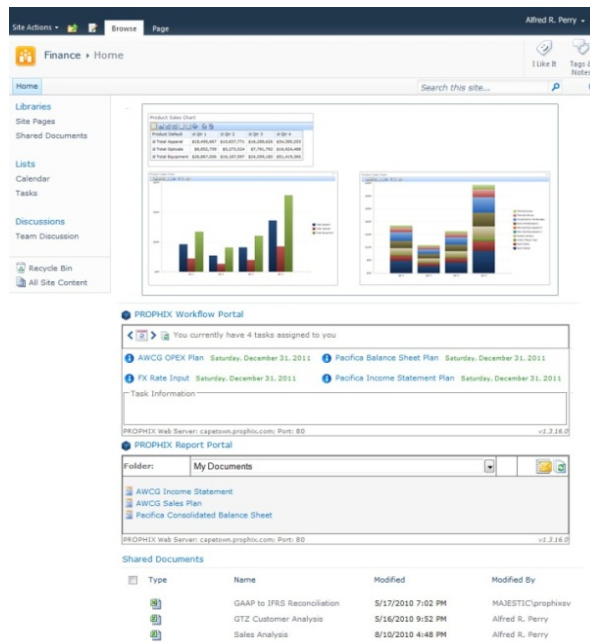

As Prophix only uses SQL Server and SQL Server Analysis Services databases, all solutions automatically support PerformancePoint Services components embedded in SharePoint. These components offer rich business analytics and visualization options for users of SharePoint. Sophisticated

interactive dashboards may be embedded in SharePoint sites alongside Prophix Extensions such as Workflow and Report Portal.

Flexible and Scalable Deployment Architecture

The Prophix platform is built on modern modular service-oriented design principles with full separation of presentation, application, and data storage tiers. This highly flexible architecture permits several deployment configurations from a single server to multiple servers, allowing Prophix to grow with the organization. The three distinct tiers are client/presentation, application, and database/storage:
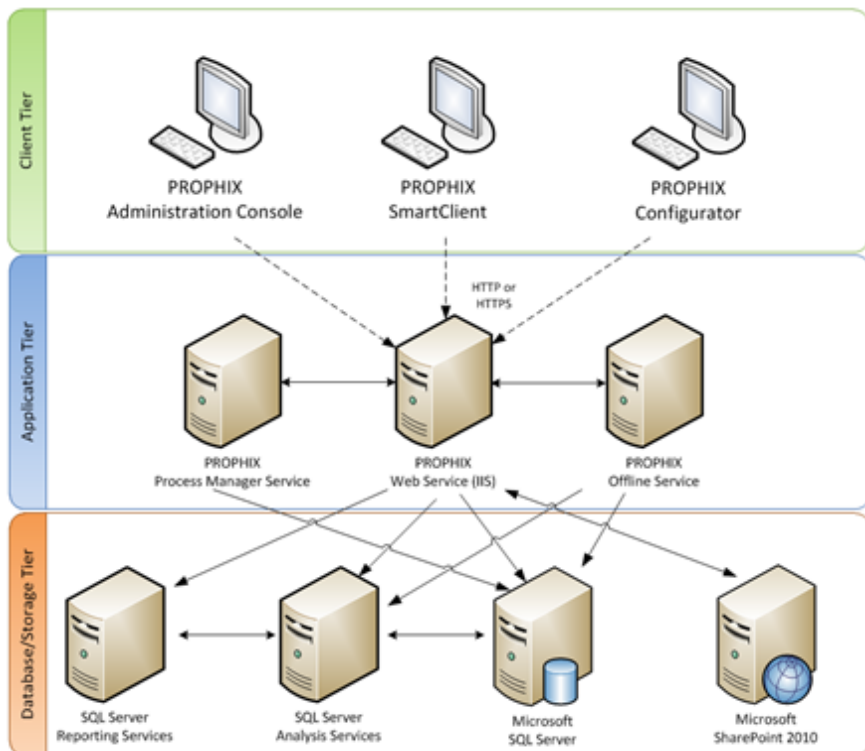
The **Client Tier** is comprised of three applications:

- **Prophix Configurator** – This utility streamlines the initial configuration of Prophix. Configurator only needs to be run during installation by an IT administrator on the server and features a wizard interface for ease of use. Configurator makes it effortless to split Prophix server components from one server to additional servers when needed.

- **Prophix Administration Console** – The Administration Console is a client tool that runs on the server and enables IT administrators to set up databases, manage vital application settings, create the initial Prophix Global Administrators, and manage license keys.
- **Prophix SmartClient** – The main Prophix client is based on Microsoft Click-Once deployment SmartClient technology, which features centralized deployment and management, with single point of upgrade. The Prophix SmartClient features a unified interface and provides access to all CPM capabilities of the product from the development of models, business rules, automated processes, to report building and data entry.

The **Application Tier** contains the Prophix server application, consisting of a number of services that handle requests from the Prophix client. These services manage the financial and business modeling logic, security, workflow management and orchestration of business processes; for example, the Prophix web service, the Process Manager Service, and the Offline Service. The Prophix web service leverages Microsoft Internet Information Services (IIS).

The **Database/Storage Tier** features a unified database with single metadata source across all applications leveraging the robust Microsoft SQL Server stack. This tier is comprised of:

- **SQL Server Analysis Services Databases** – The SSAS databases hold the dimensional structure, cube, and calculations for each model defined in Prophix. A Prophix model can contain one or more cubes that can be automatically linked together, and reside in one or more SSAS databases.
- **SQL Server Databases** – The Prophix metadata and model fact data all reside in SQL Server relational databases. Prophix metadata contains all information related to Prophix models, including definitions for workflow, business processes, report template definitions, audit logs, and other structured data. The fact database contains information related to dimension structures and fact data for a model. Every Prophix model has one fact database.
- **SQL Server Reporting Services** – This server provides the operational reporting capabilities for Prophix such as audit logs, financial controller reports, and workflow reports. It also provides visualization components that can be presented in the form of dashboards over a web browser.

- **Microsoft SharePoint Server** – When deployed, this optional server provides the centralized storage for Prophix reports and data entry templates. Prophix can natively publish reports directly to SharePoint and can easily fit in with existing SharePoint installations.

This architecture allows Prophix to fit seamlessly into any IT infrastructure and be flexible to adapt to future changes in deployment scale (see the appendices for technical specifications and requirements).

Depending on requirements, all tiers can reside on a single server or be split into multiple servers. The actual configuration of servers is greatly simplified with the Prophix Configuration Manager, which helps set up the core components on each server, streamlining expansion from single to multiple servers. The servers can also be physical or virtual. The Prophix architecture has been designed to be scalable and maintain performance. Prophix supports scaling up and scaling out. Prophix can be scaled up by increasing the available system resources on the server by adding additional processors, memory and disks. To scale out, additional servers may be deployed for SQL Server, Analysis Services or Prophix Services. Each Prophix model can be deployed on its own Analysis Services server to better balance the load.

Finally, as CPM applications nearly always involve multiple concurrent users updating data in budgets and forecasts, Prophix has developed technology to manage this process.

Private Cloud Ready

Prophix can be deployed in a private cloud environment and supports both Microsoft Hyper-V and VMware virtualization technologies without sacrificing functionality. By making use of leading virtualization technologies, the number of physical servers can be consolidated and easily scaled, thus helping to maintain established IT standards and procedures (for example, backups, redundancy, resource monitoring). Prophix Software supports customers who run Prophix products on supported operating systems and hardware, regardless of whether they are running in a virtualized environment or not.

Low Maintenance Updates

Prophix utilizes the best of both deployments by implementing a Smart Client application using ClickOnce Deployment technology. With smart clients, businesses can take advantage of opportunities to distribute information, streamline procedures, and provide better control over operations.

Installation and maintenance is greatly simplified with ClickOnce Deployment technology. Historically, client software needed to be painstakingly installed by IT personnel on each desktop client computer, taking much time and effort. With ClickOnce Deployment, all client files required by Prophix are installed on the application server from day one. Users then install the client by pointing their web browser to a predefined URL address (for example, $http://mycompany/prophix$), starting the installation process automatically. The process of updating client software is fully automated using ClickOnce. Every time the SmartClient is launched it checks the installed local version against what is currently on the server. If the Prophix server has been updated with newer files, then the new client files are automatically pushed out to the client and installed. The number of resources required to keep large client installations up-to-date is dramatically reduced.
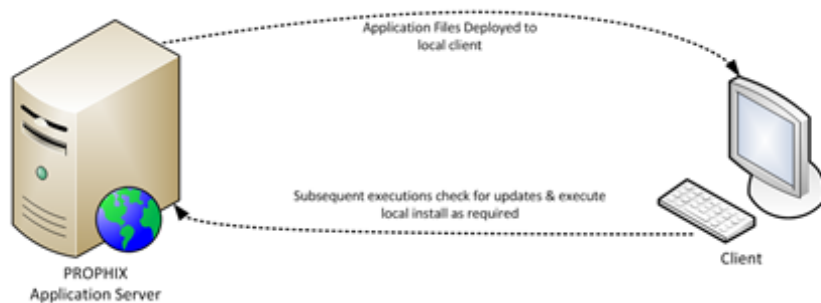
Smart Client applications bridge the gap between web applications and desktop applications. They provide the benefits of a web application (such as leveraging the Internet and offering remote access to data) while still providing a rich look and feel inherent to desktop applications and taking advantage of local computing resources.
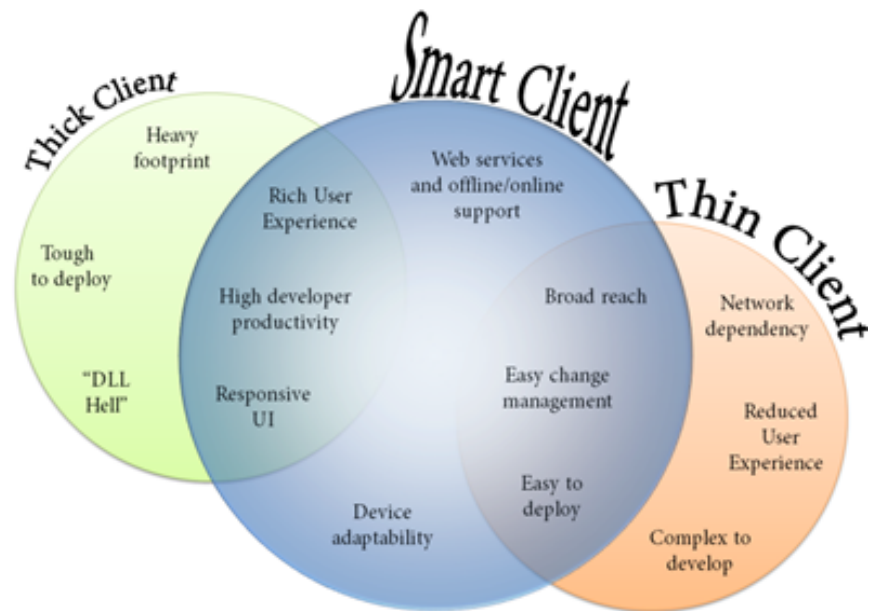
High Interoperability

Data Integration

CPM applications must co-exist well with existing line-of-business applications that have already been deployed. Examples of these include ERPs, General Ledgers, HRIS, CRMs, MRPs, and data warehouses. Both structural and transactional data is often needed from one or more of these systems in order to develop plans, budgets, forecasts, and reports in a CPM application.

Prophix provides a wide range of options for data integration. It offers easy to use wizard-driven import processes for loading data from a variety of sources including flat files, Microsoft Excel, Microsoft Access, Microsoft SQL Server, and any ODBC-compliant database. In addition, Prophix includes sophisticated data-handling capabilities within the product, such as mapping tables, data validation, error logging, ability to merge, trim, and split fields, and financial intelligence to handle data signage in the case of debits and credits in financial accounts. All of these capabilities streamline the data integration process and makes it possible for business users to manage most of the process themselves without having to burden IT.

Automation and notification options are also easily accessible within the application from a centralized hub called Process Manager, which orchestrates data integration and other business modeling tasks such as currency conversion, consolidations, and allocations. The Infoflex process makes it easy to change large amounts of data without writing a single line of code, making it highly maintainable by business users. Import processes can be scheduled to run on recurring intervals such as daily, weekly, or monthly, and notification options can be defined to inform stakeholders of process completion through email. Process Manager and all its associated options are housed in a single unified interface. In many other applications, these capabilities may be in the form of separate modules with dissimilar interfaces, further increasing the learning curve.

Under the covers, SQL Server Integration Services (SSIS) powers all the data integration features in Prophix. Data import processes generate SSIS packages on the fly without the user's knowledge and requiring no complex coding. The benefit of using the SSIS engine is that it enables tremendous flexibility. Existing data integration packages may be readily accessed and consumed by Prophix in tandem with its own import processes within Process Manager. Costs can be significantly reduced because this minimizes the amount of rework needed.

Business Intelligence Agnostic

The use of standard open technology has permitted the Prophix platform to be Business Intelligence (BI) agnostic. This allows the data residing in Prophix to be accessible by a large number of applications. In fact, any application that can connect to Microsoft SQL Server Analysis Services databases can fully leverage the data (for example Microsoft PowerPivot or PerformancePoint Services). From an IT management perspective, this means Prophix can easily inter-operate with existing BI infrastructures. Organizations can continue to use their custom applications to import CPM data from Prophix.

Unfortunately, this is often not the case with many other CPM applications, which feature proprietary databases. A proprietary database locks in the customer to a single vendor to provide all the tools required to access their own data. Not only is this costly, but it makes integrating with other future applications extremely difficult and potentially costly. In

addition, highly trained specialists are needed in order to develop the queries, reports, and data integration processes. Prophix Software does not subscribe to the notion of proprietary database technology, and instead supports open connectivity through the use of third party applications. Customer data must be owned by the customer and be viewable at the customer's request, not the vendor's.
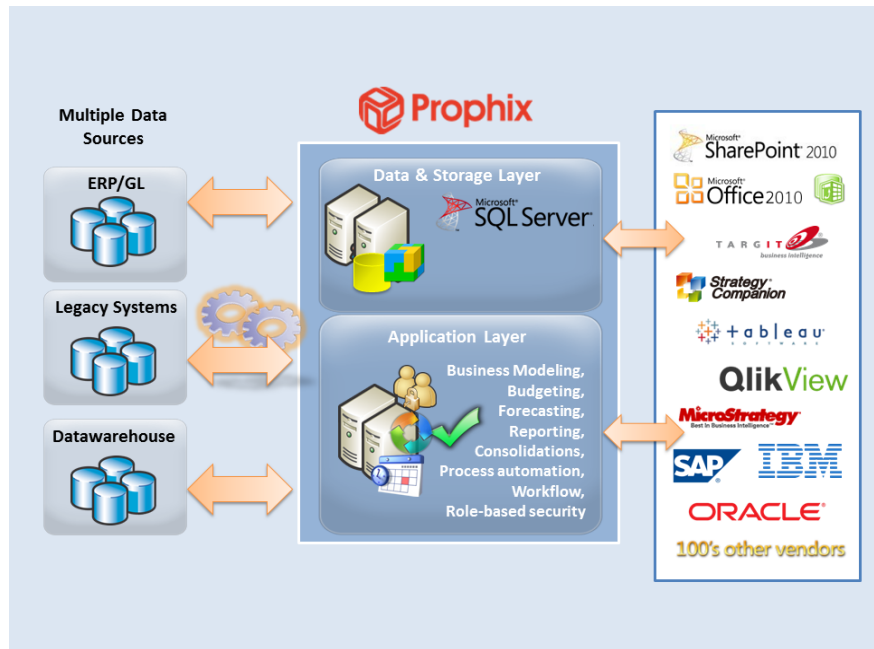
Single Set of Metadata

Whether there is one business application or multiple ones in production, Prophix will always contain a single set of metadata residing in one SQL Server database (*ProphixMetadata*). By utilizing a single metadata approach, all core application logic, user information, security permissions, and reports are housed in one location. This provides a single point of maintenance for backup and archival purposes, minimizing IT effort. Additionally, for CPM applications this lends itself well to the concept of a single version of the truth: all relevant metadata related to all CPM applications is centralized, reducing the potential for duplication and confusion.

Flexible End-User Experience

Prophix provides a highly flexible end-user experience that can be matched to the role of the user. Whether the user is a power user or a casual user who wants to participate in the CPM workflow process, Prophix can easily accommodate them. As mentioned previously, the Prophix SmartClient offers a consistent user experience across all functions from ad hoc analysis, formal reporting, and data entry, to business modeling. However, not all functions have to be exposed to the end user. Role-based security defines the functionality that each user has access to. When using the Prophix SmartClient, users are exposed to a rich and high interactive experience.

Users who are more familiar with Microsoft Excel can continue to use that application and still be included in the Prophix workflow processes for CPM. Reports and data entry forms can be published to Excel and syndicated through SharePoint to reach a large user base. From there, users can participate in the budgeting and planning process using Excel, where they may be most comfortable.

Security, Access Control, and Auditing

CPM applications typically contain highly confidential data where access must be properly controlled. Authentication and authorization mechanisms are needed to control access to the data. The security model in Prophix is comprehensive, with built-in functions to monitor access to the system and audit changes that have been applied.

Access to Prophix is controlled by two separate mechanisms: application-level security and data-level security. Application security is role based and establishes the privileges granted to an account associated with the logged-in user. Data security involves granting permissions to users to view or

update specific pieces of data. Only users who have been explicitly granted privileges to Prophix can access the system and change data.

Authentication

Prophix features a single-sign-on system using Windows Active Directory logins (Windows Authentication). After a user logs in to a Windows AD domain, her credentials are automatically recognized during the login process for Prophix and no additional passwords need to be supplied. Appropriate access is then granted to the authenticated user based on application-level security stored within Prophix, based on roles.
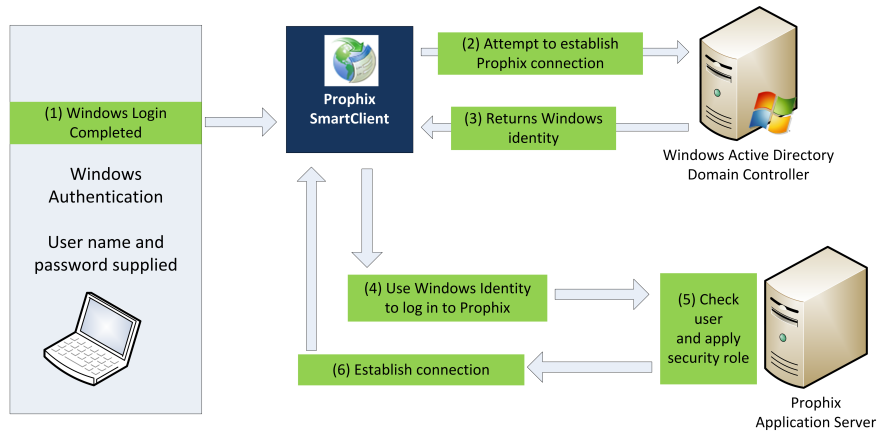
Prophix includes the ability to directly import users from an Active Directory through its Security Manager interface. This includes the ability to import information about a user including his email address and first and last names. The import capability greatly streamlines user maintenance and permits even business users to set up users within their own models, without IT support.

Role-Based Application Security

After users have been authenticated, Prophix determines the security level within the application. Security is based on roles within the Prophix application, making it very easy to add new users to existing security assignments, or move users between assignments. A role defines application functions (for example, Process Manager, Ad Hoc Analysis, Business Model Manager, etc.) that are accessible by a user when working in Prophix. An unlimited number of roles can be created to satisfy highly granular business

requirements. Roles allow many combinations of functions to be generated and assigned to users. Each user must belong to a role in order to gain access to any application functions. Groups are also supported in Prophix and can be used to collectively assign a series of users to a particular role.

For achieving delegated security, Prophix has been designed to fully accommodate multiple administrators. This highly flexible security arrangement permits the administration of separate cubes within the same Prophix system to be segregated between multiple users. For example, the administrator of a human resources cube can be different than the one for a finance cube. In CPM applications, this is often a necessity as access to various functional models may need to be governed by different security rights.

Data Security

Whereas roles specify the application functions available to a user, data security defines what data the user (or group of users) can actually view. Data security is completely independent of application roles, permitting highly flexible security arrangements to satisfy even the most stringent business requirements.

Data in Prophix models can be secured at the dimension-member level by model for each individual user or group. Independent data permissions can be created for read or write access, further increasing flexibility.

Finally, all data in the native SQL Server and SSAS databases are completely secure. Users can only access relational fact and metadata housed in SQL Server when they are using Prophix. Data permissions defined in Prophix are also persisted inside the SSAS database ensuring that security is respected even if the database is opened by a third-party application. Harmonizing security between the application and the database minimizes time required to manage permissions for users and ensures maximum compatibility with other applications.

File System Security

Prophix allows users to create several types of documents including templates, report binders, data views, processes, and data connectors.

Prophix includes an advanced file management system where users can manage and organize these types of documents. The Prophix file system resides within the Prophix metadata database and is not exposed to external non-Prophix users. Maintenance is reduced by storing the file system entirely within SQL Server, so that the only backup required is at the database level.

Network Security

Prophix supports the use of Secure Socket Layers (SSL) to enhance the security of data transmitted over local area networks between the Prophix SmartClient and server through HTTP communication with Internet Information Services (IIS). If SSL is enabled, all data transmitted between the application server and client is secure.

Summary

The unified Prophix application platform consists of the best mix of leading technologies for delivering a solution for the widest audience of organizations. With a front-end user interface designed for business users, and back-end architecture that keeps IT priorities in mind, Prophix ensures that the concerns of both groups are addressed to maximize adoption. Powered completely by Microsoft technologies, including Microsoft SQL Server and SharePoint, Prophix extends this platform by making it even easier for users to fully realize its capabilities for accomplishing regular business tasks.

Prophix supports every aspect of CPM, including budgeting, planning, forecasting, reporting, consolidations, and visualization. All these functions are housed under a low-maintenance single unified platform with a highly flexible deployment architecture that grows with the changing demands of the organization.

Prophix Software's attention to deployment flexibility, scalability, data management, and integration, as well as its BI-agnostic nature, user security, and total support for standard technologies, allows organizations to easily orchestrate, produce, and consume information for stronger performance management.

Appendix A:
Technical Specifications

Technical Component	Description
Relational Database: Microsoft SQL Server 2012 Standard Edition	Enterprise-class relational database server for storing all fact data and metadata.
OLAP Database: Microsoft SQL Server 2012 Analysis Services	Market leading OLAP database engine that provides multidimensional analytical cap-abilities.
Relational Reporting: Microsoft SQL Server Reporting Services	Comprehensive reporting solution for man-aging and delivering operational reports and management dashboards
Prophix Web Service: Microsoft Internet Information Services (IIS	Scalable web server that provides a reliable, manageable performance infrastructure.
Data Services: Microsoft SQL Server Integration Services 2012	Robust ETL tool that automates processes for extracting, transforming, and loading data from multiple sources
Application Services: Microsoft .NET Framework 4.0	A set of software technologies to ensure robust, scalable integration of systems and web services

Server Software	Description
Operating System	Microsoft Windows Server 2008 R2 Standard or Windows Server 2012 Standard Edition
Database Software	Microsoft SQL Server 2012 Standard, Business Intelligence, or Enterprise Edition (64-bit)
Collaboration Platform	Microsoft SharePoint 2013 (64-bit) (optional)
Other	Microsoft .NET Framework 4.0

Client Software	Description
Operating System	Microsoft Windows XP SP2 (32-bit only) or Microsoft Windows 7 or Windows 8
Browser	Microsoft Internet Explorer 8.0 or higher
Microsoft Office	Microsoft Office 2010
Other	• Adobe Acrobat Reader 9.0 or higher • Microsoft .NET Framework 4.0 • ADOMD.NET 11.1 • Analysis Management Objects (AMO) 11.1

Appendix B: Hardware Specifications

The tables in this section lay out sample server configurations and production environments.

Note that all server configuration samples are for reference only. Actual requirements are affected by many factors including: the number of concurrent users, number and size of dimensions, number and complexity of models, and overall data density.

Mixing 32-bit and 64-bit server configurations is not supported. Servers need to be all 32-bit or all 64-bit. Prophix Software recommends 64-bit configurations for all production deployments. If needed, 32-bit environments may be used for development or proof of concept purposes only.

All-In-One Deployment

Server Role	Required Minimum	Recommended
Combined server	2 Dual Core AMD/Intel 2.8 GHz CPUs 8 GB RAM 72 GB Available disk space - RAID 5 100 Mbps Network interface	2 Quad Core AMD/Intel 3.0 GHz CPUs 16 GB RAM 100 GB Available disk space - RAID 5 1 Gbps Network interface

Two-Server Deployment

Server Role	Required Minimum	Recommended
• Application Server • Analysis Services • Integration Services	• 2 Dual Core AMD/Intel 2.8 GHz CPUs • 8 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 3.0 GHz CPUs • 16 GB RAM • 72 GB Available disk space • RAID 5 • 1 Gbps Network interface
• SQL Server • Reporting Services • Integration Services*	• 2 Dual Core AMD/Intel 2.8 GHz CPUs • 4 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 3.0 GHz CPUs • 8 GB RAM • 100 GB Available disk space • RAID 5 • 1 Gbps Network interface

*In multiple-server configurations, Integration Services is recommended for all servers in order to run SSIS backup or data integration jobs.

Three-Server Deployment

Server Role	Required Minimum	Recommended
• Application Server • Integration Services	• 2 Dual Core AMD/Intel 2.8 GHz CPUs • 4 GB RAM • 36 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 3.0 GHz CPUs • 8 GB RAM • 72 GB Available disk space • RAID 5 • 1 Gbps Network interface
• SQL Server • Reporting Services • Integration Services*	• 2 Dual Core AMD/Intel 2.8 GHz CPUs • 8 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 3.0 GHz CPUs • 16 GB RAM • 100 GB Available disk space • RAID 5 • 1 Gbps Network interface
• Analysis Services • Integration Services*	• 2 Dual Core AMD/Intel 2.8 GHz CPUs • 8 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 3.0 GHz CPUs • 16 GB RAM • 100 GB Available disk space • RAID 5 • 1 Gbps Network interface

*In multiple-server configurations, Integration Services is recommended for all servers in order to run SSIS backup or data integration jobs.

Four-Server Deployment

Server Role	Required Minimum	Recommended
• Application Server • Integration Services	• 2 Dual Core AMD/Intel 2.0 GHz CPUs • 4 GB RAM • 36 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 2.8 GHz CPUs • 8 GB RAM • 72 GB Available disk space • RAID 5 • 1 Gbps Network interface
• SQL Server • Reporting Services • Integration Services*	• 2 Dual Core AMD/Intel 2.0 GHz CPUs • 4 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 2.8 (or higher) GHz CPUs • 8 GB RAM • 100 GB Available disk space • RAID 5 • 1 Gbps Network interface
• Analysis Services • Integration Services*	• 2 Dual Core AMD/Intel 2.0 GHz CPUs • 4 GB RAM • 72 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 2 Quad Core AMD/Intel 2.8 (or higher) GHz CPUs • 16 GB RAM • 100 GB Available disk space • RAID 5 • 1 Gbps Network interface
• Process Manager • Integration Services*	• 1 Dual Core AMD/Intel 2.0 GHz CPUs • 4 GB RAM • 36 GB Available disk space • RAID 5 • 100 Mbps Network interface	• 1 Quad Core AMD/Intel 2.8 GHz (or higher) CPU • 8 GB RAM • 72 GB Available disk space • RAID 5 • 1 Gbps Network interface

*In multiple-server configurations, Integration Services is recommended for all servers in order to run SSIS backup or data integration jobs.

Client Hardware Requirements

The required hardware for a client environment is as follows:

- Dual Core AMD/Intel 2.0 GHz CPUs
- 1 GB RAM
- 40 GB Available Disk Space
- 100 Mbps Network Interface

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