Captaris
The Way Information Moves

WHITE PAPER

Captaris Delivers Workflow Business Solutions

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Every business engages in repeatable daily business cycles (purchase order approvals, expense claim submissions, contract approvals, **Return** to **Manufacturer Authorization** (RMA) verification and routing). It is documenting and automating the flow of these functions (the progression, the associated business rules, the assignment for completion) that creates workflow solutions.

WHAT IS THE VALUE OF WORKFLOW?

- **Effectiveness -** Capturing the streamlined route for a repeatable business function means faster completion, fewer errors and omissions
- **Efficiency -** Streamlined workflow reduces time spent on current functions and creates staffing reductions or re-allocation of resources
- **Accountability -** Monitoring time to execute business functions creates productivity measurement and continual process improvement

CAPTARIS WORKFLOW WHITE PAPER INTRODUCTION

Captaris Workflow is a Business Process Management (BPM) / workflow product developed using the Microsoft .NET framework. The purpose of this white paper is to discuss how the product works from a technical perspective and not to discuss in great detail the functionality and wide range of applications that can be automated with the product.

Captaris Workflow is powered by Teamplate and is a fifth generation of a product first released in 1995 called BreakAway, then Teamplate and now Captaris Workflow. The original concept behind the product was to provide a toolset that would enable a non-programmer, albeit someone with some technical ability, to build collaborative workflow applications that could automate repetitive business processes carried out everyday and in a variety of different business environments. Examples of a repetitive business process might be the processing of insurance claims by an insurance company or tracking the contract approval cycle. At the core of these business processes are business rules that need to be followed, specific data that needs to be captured, documents that need to be generated, notifications that need to be made and reminders that need to be set up. Also, and perhaps more importantly, the ability to integrate with existing applications available at the desktop is crucial.

Although the fundamentals of Captaris Workflow remain consistent with the original release (collaboration, data capture, business rules and document generation), the core functionality has been greatly enhanced. For example, support for VB.NET has been added to provide more flexibility and a more open integration environment and code generating Wizards have been added to reduce the need to actually write code.

With the introduction of the concept of the .NET framework in 1999, the design of Teamplate for .NET, which is now named Captaris Workflow, was started. Based on what was learned from the previous three releases, the .NET framework would provide the infrastructure that would enable us to take our original concept to a new level. Rewritten entirely in C#, Teamplate for .NET proved that applications built on the .NET framework could deliver on the .NET promise of access to systems and data anywhere, anytime, on any device and to provide seamless interconnections between people, processes and data.

Built on this foundation, today Captaris Workflow has three types of objects that are used in building collaborative workflow applications. These are the Workflow Objects, Resource Objects and Data Objects. Within an environment that would be familiar to Visual Studio .NET developer, a knowledge worker can visually create a business process map by dragging and dropping Captaris Workflow objects on to the process modeling canvas. This business process "map" is referred to as a **Model** and the Workflow objects used to build a model are:

- Task
- Link
- Label
- Viewer
- Table
- Chart

A **Task** encapsulates all of the functionality associated with a specific step in a business process. Among other things, this might include capturing data through a data entry form, generating an email, creating some documents integrating with another system or any combination of these. Each **Task** object has properties that not only control the appearance of that task on the workflow canvas, but also serve to provide some control over the execution of that task.

Each task also has a set of predefined events. These events can be trapped and used to customize the task and the workflow model to a particular environment. Different actions can be associated with a task when the task becomes "ready" as opposed to when it is "executed", when it is "completed", when it is "reset" (or rolled back) or when a property is changed.

In addition to a standard task which involves user interaction, there are four special types of tasks: Web Form, System, Event and Sub-process.

The **Web Form** task is used when a step in the business process requires input from a user interface such as a Web-based form or an office document. For example, you may have a task that requires the user to complete a Web-based form and along with the form, submit a document as an attachment.

The **System** task is a step in the business process executed by the system. That is, no person needs to be involved with executing the task. This can be useful in several situations. For example, where there are tasks that are executed by two or more individuals in parallel and "something" needs to be done when all users have completed their tasks, this "something" can be done with a system task.

The **Event** is a type of task that will execute only when a certain condition is met. It can be assigned to a specific user, a group of users or it can be executed by the system (i.e., no user involvement). For example, after a particular task has been executed, an Event might be added to the model to trigger an email to be sent five days later. Or, in the example of a business process for the collection of over due accounts, the same Event might also first check the accounts receivable database for a payment prior to sending the email.

Events can also be used to check the conditions in a database and initiate a business process. For example, an accounting system typically would keep track of accounts receivable. A company might have a process whereby every time an account has not been paid after 90 days, someone phones the customer regarding payment of the account. To automate this process a Captaris Workflow Event could be set up that would check the accounts receivable database for accounts 90 days overdue, and then notify a clerk that a phone call needs to be made.

The **Sub-process** is a task that links one business process to an entirely different business process model. In an organization, there are many discreet business processes but quite often each of these business processes are connected in a manner where one process will very often spawn another process. Captaris Workflow provides the ability for data to persist from one business process to another and, via the sub-process, to break down complex business processes into more manageable pieces.

In building a business process **model** using Captaris Workflow, the Knowledge worker drags and drops the different types of task objects onto what is referred to as Captaris Workflow canvas. Quite often an organization will already have built a process map using a process modeling tool like Visio 2002. Captaris Workflow includes a feature whereby existing Visio 2002 diagrams, saved as a .vdx file, can be imported into Captaris Workflow. All tasks are automatically created. The user can then make any functional adjustments to the **model**.

After the knowledge worker has placed the different tasks involved in the business process on the canvas, they will then use the **Link** to connect each of the tasks together in the order that they will need to execute.

Sometimes a business process will need to follow one path or another depending on the conditions associated with the specific instance of the process. To accommodate for this, a **Link** can have an expression associated with it that will evaluate to either true or false. If the expression evaluates to true, then the path represented by the **Link** will be followed. For example, an expense claim of over $5,000 may need the approval of a senior manager. In this case, an expression in the **Link** to the Senior Manager Approval task would be set up. This expression would check the total amount of the expense claim against the $5,000 threshold.

A **Link** also has properties that can be set to determine its appearance and style.

A business process model developed with Captaris Workflow becomes an application. As in the case of most applications, there generally is the need to inquire on specific data captured as a result of the execution of that application and, perhaps, to integrate with other systems in order to make all of the information relevant to a specific process available to the knowledge worker. In order to accommodate this requirement, a **Label** object can be used.

Labels can also be used to enhance the overall visual appearance of the workflow application. The company's logo, the name of the **model**, or other words and graphics relating to the functionality of the **model**, can provide the user with a better sense of being oriented to the task the **model** is meant to automate.

The remaining workflow objects, the **Viewer**, Table and Chart, can be used to add other visual elements to the workflow canvas. The Viewer can be used to display content within the workflow canvas. This content could be a Web page, a document, a PDF file or some other type of document or content. The **Table** and **Chart** can be used to graphically display information.

Next is a set of objects that are called Resource Objects. These are Windows forms, Web forms, Documents and Images.

As would be expected, **Windows forms** and **Web forms** are used to capture data. Each of these resource objects has their own set of data entry controls. The main difference between the two types of forms is the **Web form** is deployed on a Web server.

The **Document** object is used to point template documents that will be used by the document assembly engine. The **Image** object is used to store images that will be used in different areas of the business process model.

The third set of objects is called the Data objects. There are two different Data objects: XML and Database. Each of these objects is used to store and retrieve data that will be needed in the business process model. The XML data object will save data within a defined XML schema. The schemas can be built within Captaris Workflow using an XML editor, or they can be imported from another source.

PRODUCT ARCHITECTURE

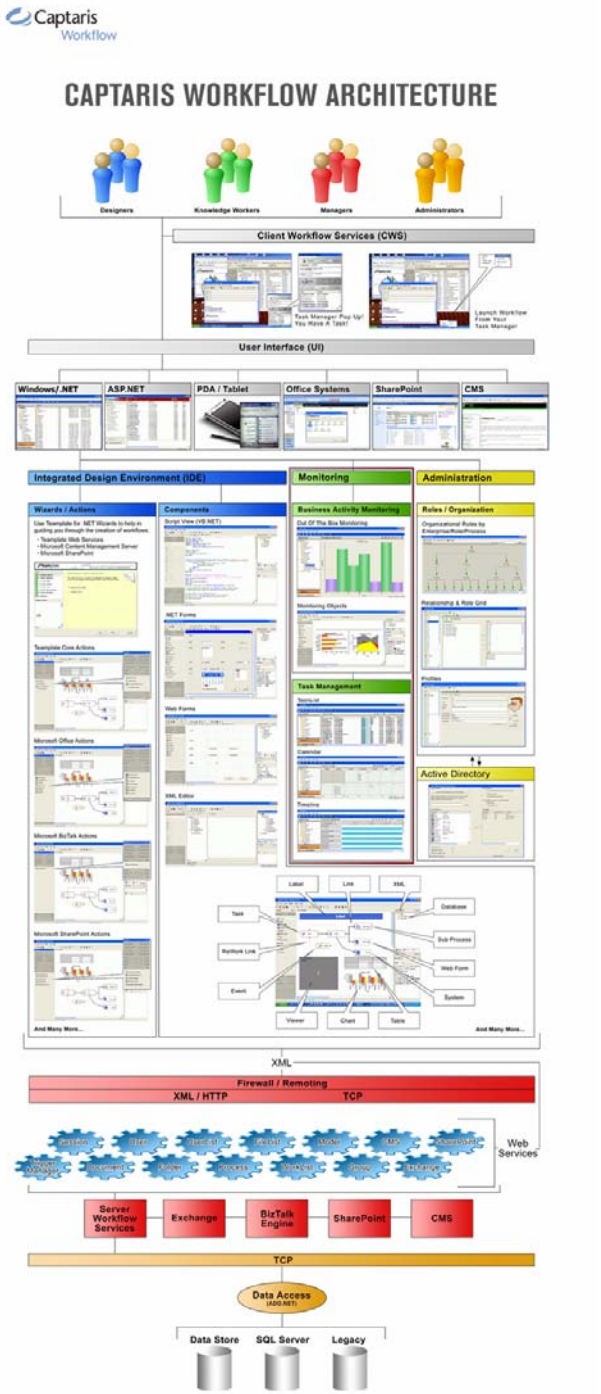
It is outside of the scope of this document to fully define and discuss the details associated with Microsoft's .NET initiative. But as Captaris Workflow relies heavily on the .NET framework, a brief description is warranted.

Recently, a senior executive for Microsoft described .NET in terms of "interconnections". That is, .NET provides the ability to interconnect different software applications and to deliver those applications to different devices. Although somewhat simplistic, these "interconnections" are really at the heart of what .NET delivers. For an application like Captaris Workflow, the .NET framework provides the infrastructure to deliver on what was conceived back when the first version was developed.

These interconnections are facilitated through the use of XML and Web services, which are small building block applications that connect to each other as well as to other larger applications. This is all done via the Internet using a protocol called SOAP (Simple Object Access Protocol).

Captaris Workflow is built using a traditional three-tiered architecture: a database tier, a business tier and a user interface. The advantages of a three-tiered architecture, including scalability and n-tiered deployment, are well documented. Captaris Workflow exploits all of these inherent advantages in providing a loosely coupled environment. The business and the data tier can be deployed on the same physical server or across many servers where scalability is important.

All of the workflow, resource and data objects that make up a **model** are stored within a single XML file. This XML file essentially encapsulates all of the functionality associated with a business process. This provides a very elegant means of communication between the three tiers and with the different user interface devices that may be a part of those processes.



The role of the database tier is to process data related requests. This can be requests to the SQL Server based Captaris Workflow database or to other data sources. Using ADO.NET, connections to other databases can be set up as required for the automation of business processes. For example, if 'customers' are stored in an Oracle database and 'invoices' are stored in SQL Server, data sources to both database products using ODBC or OLEDB can be created on the server where the database tier is deployed.

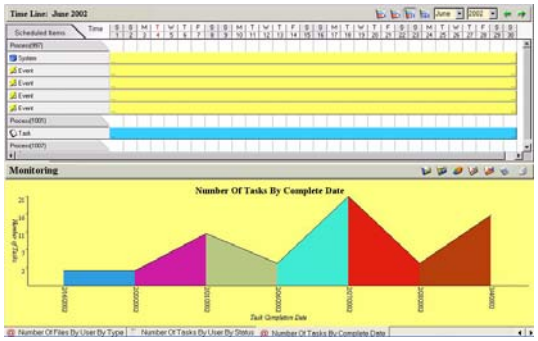
The business tier is where the Captaris Workflow business objects reside. When requests for an object's services is made, an execution thread for that object on the business tier is invoked and the specific action or method required will be executed.

Each object on the business tier has been developed using C#. Going forward, these objects can now be exposed as a server workflow service (a Web service). Also, because all communications between the user interface and the business tier are completed with XML, workflow applications developed with Captaris Workflow can communicate behind firewalls and access remote servers. More importantly, it allows for easier integration at the desktop or at the server through XML.

Where a business process needs to consume a Web service, this Web service can be easily integrated into the **model**. For example, where a business process needs to validate a credit card number, the URL for that Web service can be specified through a unique Web service consumer wizard.

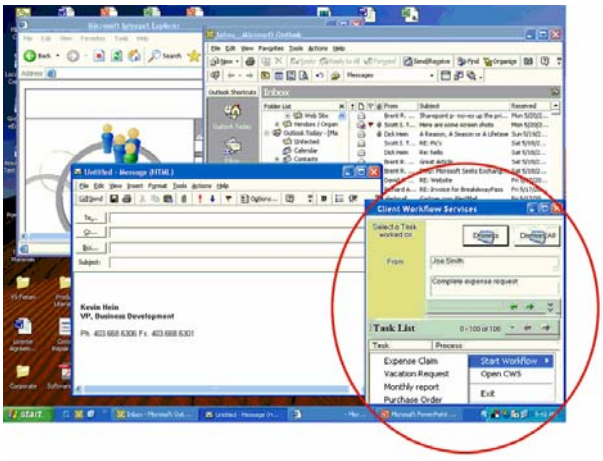
Another feature of Captaris Workflow made available via the .NET framework is the ability to deploy the user interface on different devices. Devices such as Pocket PCs support a subset of ASP.NET facilitating the execution of Web forms built using Captaris Workflow. This provides a tremendous increase in the scope of people that can participate in automated business processes.

Wizards have been added to enable even faster development and deployment of workflow applications. Wizards enable the development of simple workflow applications without the need for programming. This is a major step forward in providing the knowledge worker with the tools required to define, build and automate their day-to-day repetitive functions.



Wizards for the creation of forms, database connections, email notifications, document assembly and task assignment are all part of the main wizard used to create the overall business process. This represents a major step forward in empowering the knowledge worker and enabling them to automate their repetitive day-to-day tasks.

Business Activity Monitoring (BAM) has been built into Captaris Workflow. BAM is an emerging area of business management. Being able to identify process bottlenecks and to analyze workload across all workflow participants are extremely useful tools for the mid and upper manager. Captaris Workflow provides the manager with the ability to build their own monitoring schemes using the metrics of their choice.



Captaris Workflow includes a very sophisticated and graphical organizational chart. Not only can workflow tasks be assigned to roles rather than individuals, but the maintenance of the organizational chart can be completed very easily. Making this facility even easier is the ability of Captaris Workflow to synchronize itself with Microsoft's Active Directory (AD).

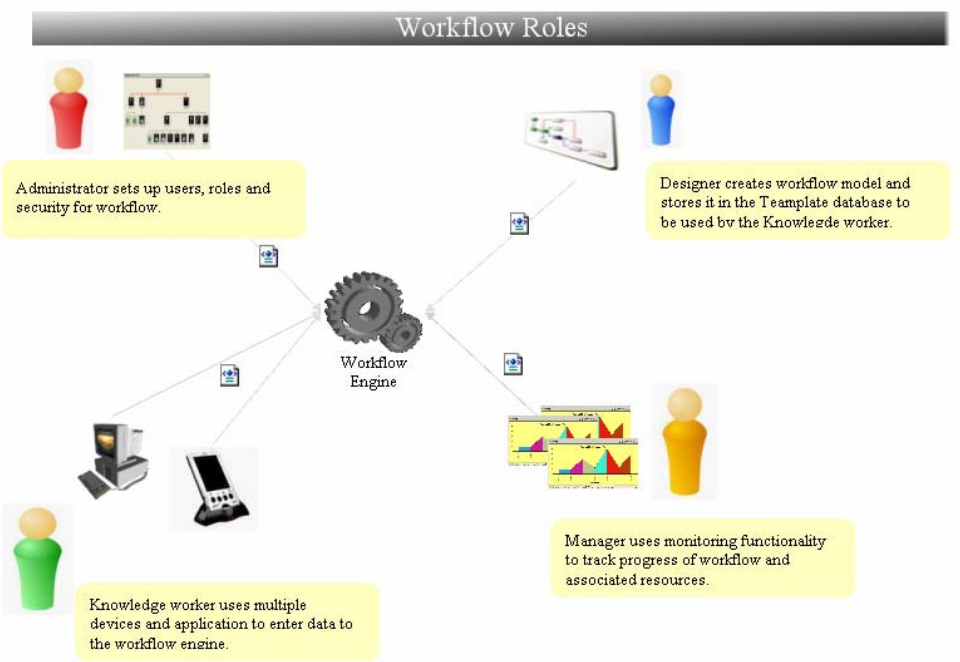
Another feature is the Captaris Workflow Client Workflow Services (CWS). Using CWS, users can be notified of tasks they need to complete via an interface similar to Microsoft's MSN Messenger product. As tasks are assigned, a 'pop-up' message is displayed and the user can choose to execute the task without launching the full Captaris Workflow user interface.

Roles

Within the Captaris Workflow environment there are four different roles that a user can assume: Knowledge Worker, Manager, Designer and Administrator. The type of role will determine how they interact with workflow applications developed with Captaris Workflow.

As a Knowledge Worker, the CWS will prompt the user to complete tasks that are assigned to them. The Manager will have access to all BAM reporting in addition to being able to respond to the CWS prompt. As a Designer, the user will have full access to the Captaris Workflow development environment. The Administrator will have access to all functions including administrative functions such as adding and deleting users and maintaining organization chart relationships.

The following diagram shows the different roles and functionality required to implement workflow in an organization.



BUSINESS AND DATA TIER

Although all of the pieces of Captaris Workflow play an important role in the products functionality, perhaps the most interesting parts of the product from a technical perspective are the business and the database tier. This is where the "guts" of the product are and where all of the functionality of the objects that make up the product is contained.

For the most part, workflow is about the routing and manipulation of databases on defined **business rules**. Ideally a well-formed workflow model can work independent of the client side device or User Interface (UI) applications that are used to collect and submit the data. This achieves the greatest flexibility in the workflow's ability to process data from many different sources as well as abstracts the complexity of UI design from the company's business rules.

To achieve such a system, the workflow engine of Captaris Workflow has been designed as a Windows Service called the Server Workflow Services (SWS). This service runs continuously processing workflow requests. The SWS uses a group of .NET component packages together, the Business Logic Layer (BLL) and Web services called the Web Service Layer (WSL), to perform all required workflow functions. The BLL and WSL have published functions that allow Captaris Workflow client applications as well as other clients such as Microsoft Office to communicate with the engine.

- Objects
  - **BSession -** used for user authentication
  - **BFolder -** used to create folders to contain files
  - **BDocument -** object representing documents
  - **BModel -** object used to create a business process definition
  - **BProcess -** primary object used to represent a business process
  - **BFileList -** list used to query all files in the system
  - **BWorkList -** list used to query tasks assigned to a user
  - **BUser -** object used to manipulate user information
  - **BGroup -** object used to manipulate group information
- How the objects communicate
  - By taking advantage of .NET remoting technologies, all communication between the client and server is completed via SOAP. Client application can also specify the Transport Protocol (such as HTTP or TCP) as well as the port number the data will pass through. This guarantees that the workflow data will pass through firewalls.

DEPLOYMENT

From an IT perspective, one the biggest concerns for any application is deployment. "How easily will the product integrate with the existing hardware and networking infrastructure?" and "What type of maintenance will be required?" are probably two of the most often asked questions.

Although Captaris Workflow has its own required user information, it does provide a seamless, bi-directional synchronization between its user tables and AD. After installing the Captaris Workflow server, all AD users can be 'synched' into Captaris Workflow. All changes in AD will be automatically reflected in Captaris Workflow. This takes cares of one of IT's concerns over installation and integration with existing network infrastructure.

Captaris Workflow is built entirely with C#. It has a well-defined object model that is fully exposed and accessible by other products. As a by-product of strictly adhering to Microsoft protocols and standards, Captaris Workflow requires no other underlying software other than Windows 2000 Server and Microsoft's SQL Server. When a user connects to the server the first time through a browser, all required client side components are automatically downloaded and installed.

Patches and upgrades can be installed on the server and will be automatically downloaded to the user's desktop when they connect to the server the first time after the patch has been installed.

The application **models** themselves are installed as XML files on the Captaris Workflow server. The user will access the models through the user interface appropriate to their job function. Captaris Workflow and the .NET Framework handle the rest.

Client Workflow Services is an .exe file and can be installed on the desktop by providing the user with a link. When the user clicks on that link, the .exe file can be downloaded and automatically installed.

SUMMARY

Captaris Workflow is the fourth generation product, providing workflow and business process automation functionality to the desktop. Its focus is on connecting the person to the process and the data. Also, Captaris Workflow provides an added level of automation to existing applications and extends their functionality within the organization.

FOR MORE INFORMATION

Captaris Business Information Delivery solutions capture, process, archive and deliver data and documents enabling customers to reduce costs and increase the performance of critical business information investments. Through its global distribution network, Captaris delivers cost-effective software products and services that help organizations manage and leverage the value of corporate information. In partnership with leading enterprise technology companies, Captaris has installed more than 90,000 systems in 95 countries in companies of all sizes, including the entire Fortune 100. For more information please contact us at www.Captaris.com or +1.520.320.7000.