TIBCO Spotfire
Guided Analytics

Transferring Best Practice Analytics from Experts to Everyone
Introduction

Business professionals need powerful and easy-to-use data analysis applications in order to make important decisions. TIBCO Spotfire DXP™ enterprise analytics speed data analysis for decision-makers across the organization, helping them make decisions faster, more easily and with increased confidence.

In this whitepaper, we take a detailed look at how Spotfire DXP™ software and the TIBCO Spotfire Library are used to easily and quickly transfer best-practice analytics from experts to business users in order to speed decision-making by means of automating common analysis tasks, capturing best practices and providing a framework for distribution of analysis applications to meet the ever-changing needs of your organization.

What are Guided Analytics?

TIBCO Spotfire Guided Analytics™ applications are interactive analyses built using Spotfire DXP analysis workflow, often involving step-by-step procedures for solving particular analytical problems. Spotfire Guided Analytics™ are configured by individuals in your organization – be they business users themselves or IT – to reflect your standard operating procedures and best practices.

Spotfire DXP software streamlines and integrates authoring, deploying and distribution of Spotfire Guided Analytics, delivering a rich, interactive and highly intuitive analysis environment that guide other business users to known places of insight and discovery—while simultaneously leaving those same users free to explore the data and pursue their own questions on demand.

Spotfire Guided Analytics applications can range from simple, dynamic templates built in minutes by business users for their daily analysis needs, to sophisticated, multi-step, multi-data-source, enterprise-deployed analyses built by developers or consultants and using the full breadth of analytical capabilities in Spotfire DXP software. Regardless of the complexity involved in creating the analysis, the software’s simple and intuitive user experience makes it possible for anyone to follow and interact with an analysis—providing all end users with a rewarding and insightful experience.

Consider the Spotfire DXP guided analysis in Figure 1. This application contains descriptive text that puts the analysis into proper context, one-click links that guide the user through the analysis workflow, instructions for how to interpret the interactive visualizations and how to operate the relevant dynamic filters, and options for calculating metrics on-the-fly that will help generate instantaneous insights.
Figure 1. Spotfire Guided Analytics capabilities in the TIBCO Spotfire DXP enterprise analytics platform increase the productivity and quality of decision making by intuitively automating repetitive tasks and easily standardizing analysis procedures.
Several things are worth noting:

- The analysis contains its own instructions, so it is not necessary for the analysis “consumer” to be an expert in the field of analysis. In many cases, the analysis consumer does not need to be a domain expert either, since the analysis will contain annotations and explanations about the conclusions reached. This makes it possible to share insights and hypotheses with a broad range of colleagues within and beyond the enterprise.

- Because Spotfire DXP software automates the process of getting to the right data, it is not necessary for the user to know where the data resides or how it has been put together. In fact, the data may very well come from several data sources.

- The analysis has suitable filters for all the columns in the data—all filters are created when importing data, based on the different data types. These filters allow users to interactively query the analysis, asking and answering new questions as they arise.

- The analysis displays one or more visualizations that are suitable for the data and the decision at hand.

- Spotfire DXP software also suggests a particular set of calculations and statistical measures, so it is not necessary for the user to be an expert in statistics in order to draw sound conclusions.

- Finally, Spotfire DXP software captures a particular analysis workflow that can be used to standardize analysis processes across a department or an organization.

Together, these features enable Spotfire Guided Analytics applications to increase productivity, lower the cost of training, and improve the speed and quality of decision-making.

Let’s go into more detail about some of the core features:

**DATA SOURCES**

To provide access to server-based data sources, you can utilize TIBCO Spotfire Analytics Server’s centrally managed Information Services. To provide access to local data sources such as spreadsheets, custom files or client side applications, you can utilize Spotfire DXP software’s native file import capabilities, enrich the application with custom file import capabilities, or implement a client-to-client integration.
VISUALIZATIONS
You can choose from a wide range of powerful visualizations to represent and drill-down into multi-dimensional data. Different types of visualizations can be shown simultaneously. They can be linked to each other, and are updated dynamically when the corresponding filters are manipulated. Visualizations can be made to reflect many dimensions of data simultaneously by letting values control visual attributes such as size, color, shape, etc. Aggregation and re-aggregation is done on the fly, instantaneously.

FILTERS
Filters are powerful tools that quickly let you see various aspects of your data and make discoveries. Filters appear in several forms, and you can select the type of filter device that best suits your needs (e.g., check boxes, sliders, etc). When you manipulate a filter by moving a slider or by selecting a check box, all linked visualizations are immediately updated to reflect the new selection of data. By adjusting filters, you reduce the data seen in the visualizations to “drill down” to the things that interest you. By default, Spotfire DXP software will automatically create and display a filtering device type for each data column that best enables the user to manipulate that particular field type.

INTEGRATED STATISTICS AND ALGORITHMS
You can deploy your preferred business metrics in Spotfire DXP software, using its embedded statistics, visualizations and completely customizable expression-based calculations.

ANALYSIS VIEWS AND RECOMMENDED WORKFLOWS
You can work with one or several pages in Spotfire DXP software. On each page, you can insert one or many visualizations, and arrange these as you like, capturing an analysis workflow. To set up recommended workflows for your users, use Spotfire DXP software to create Guided Analyses.

Describe the workflow in the Guided Analysis using links to both highlight known places of insight and to guide the user to perform recommended steps, such as, merging additional data sources, applying optional calculations or custom algorithms, creating a set of visualizations to bring insight to the business problems, giving users cues on how to drill down into the data, asking and answering business questions and guiding users on what type of static report to generate, if any.
Guided Analyses are reusable, re-distributable and re-deployable, and can form the foundation of company-wide best practices, by allowing many users across the organization to share the power of analytic expertise previously reserved to a few.

EXTENSIBILITY AND ADAPTABILITY
Spotfire DXP software is easily expanded and adapted using its extensive, native APIs. The TIBCO Spotfire DXP software development kit enables unforeseen levels of configurability and native look-and-feel extensibility, as well as the ability to plug in and deploy external components using any language supported by the Microsoft .NET 2.0 platform.

Elements of Spotfire Guided Analytics Applications
While Spotfire Guided Analytics applications are as varied as their authors, most applications will contain a set of common elements. Once your organization has defined what business problems to address, as you plan to integrate Spotfire Guided Analytics applications into your current workflow, you will need to:

- Organize access to all relevant data sources.
- Establish need of third party integrations, metrics and algorithms, specific to business needs.
- Use and deploy recommended analysis views, workflows and starting points.

Below are some of the elements that may be part of a Spotfire Guided Analytics application. Some are always present and some are optional.

OPENING DATA
Spotfire DXP software can open and merge data from many different data sources, e.g., local sources (such as files residing on your desktop), remote sources (such as data warehouses, data marts or other departmental or company-wide repositories), or dynamic sources (such as databases or TIBCO Spotfire Information Links) offering several options to persist analyses with either single or multi-source data.

EMBEDDING DATA IN THE ANALYSIS
There are several scenarios when embedding data in the Guided Analysis makes sense,
and Spotfire DXP software allows you to efficiently embed static data in its analysis file format.

**TRANSFORMING THE DATA**

The first step in an analysis is often meant to give the user an understanding of what data they are looking at and make it possible to determine whether the data is good enough to base decisions on. Not all data will be ready to start interacting with it in the most productive way: some calculations or transformations may be required. Spotfire DXP contains a powerful tool called Calculated Columns (see Figure 2) that can be used to generate new columns based on arbitrarily complex mathematical formulas or logical expressions.

Typical examples include calculating an average over a set of columns, replacing empty values, or replacing values above or below a certain limit with another value. The resulting columns can be used in new visualizations or to filter the data based on newly-generated criteria.

Most important, all these operations will be automatically re-applied the next time the user loads data, effectively creating a repeatable process.
STRUCTURING YOUR ANALYSES USING PAGES

As shown above, Spotfire DXP allows analysis authors to create several pages of visualizations to help organize and compartmentalize independent analyses or create a linear flow between related analyses. Each page can contain a set of different visualizations, descriptive text areas, details-on-demand and filtering panes, allowing data consumers to analyze and drill down into the data, going through the steps needed to arrive at one or several conclusions at each analysis stage.

BOOKMARKS

Bookmarks are the core of the Spotfire Guided Analytics process. Bookmarks are a simple, effective way to capture the state of your analysis so that it can be recalled later by yourself, a colleague, or anyone else with whom you choose to share your analysis.

Spotfire DXP software can store as many Bookmarks as you’d like to create, and provides you a convenient folder-based system for organizing and arranging them. As examples, the Bookmark feature allows you to capture any and all of the following analysis states:

Save and recall your filtering

Spotfire DXP software allows you to filter your data on any of its attributes, and Bookmarks let you save all the filtering you have applied so that you can easily recall it later. Preserving the state of your filtering is especially useful for capturing the moment when certain filter conditions reveal interesting trends in the data, or when several filter settings represent a data scenario you need to frequently revisit in the course of your analysis.
Save and recall the marked data

Spotfire DXP software allows you to interactively highlight visualization markers of interest by simply clicking on or dragging a box around data points of interest, and Bookmarks let you save and recall which records have been marked. Keeping in mind that visualizations themselves can be made to illustrate only the marked records, this ability to recall certain marked records is a simple and powerful way to preserve important moments of insight during your analysis.

Save and recall the active page

As seen above, the use of pages is encouraged in order to structure your analysis, and Bookmarks let you save and recall a specific page on which to direct focus.

Link to Bookmarks from text area action links

Spotfire DXP software allows you to link to a captured Bookmark from a text area. You can add links to the text areas that can lead to an external web page or to “function links” or “action links” within Spotfire DXP. You can link directly to analysis pages, manage the visibility of control panels, and perform multiple actions with a single link.

Automated data refresh

A key feature of Spotfire DXP Bookmarks is the ability for all of the visualizations, filters, and Bookmarks to properly work or be updated accordingly if the data is refreshed—either manually or by reopening an analysis fetching data from an updated source, e.g., a database or an Information Link.

Figure 5. Action Link details, highlighting both function and page links.
Sharing & Distributing Guided Analytic Applications

The TIBCO Spotfire Analytics Server Library enables users to publish analyses to shared Library Sections with just one click. Library Sections can be set up with the appropriate members of a team, project or site, etc. To quickly get a team started using Spotfire Guided Analytics applications, you might want to have a team member create an analysis as a starting point, save it to the TIBCO Spotfire Library and then e-mail a hyperlink of the analysis to the rest of the team.

In addition to quickly distributing analyses to colleagues in a project or workgroup, you may want to ask your IT department to set up a framework for Spotfire Guided Analytics application distribution across the enterprise, thereby providing standardized analytical processes to a larger user community. IT may also want to centralize the data-access mechanisms and perhaps also programmatically enhance or modify existing Guided Analysis.

ACCESSING GUIDED ANALYSIS FROM THE LIBRARY

Once your analyses are published in the Library, your colleagues can immediately access them from the Web-based Spotfire DXP Library interface or directly from the Spotfire DXP File menu.

Figure 6. Example of Spotfire Library organization.
As described earlier in this whitepaper, if the analysis points to dynamic data, and the data has been modified, all visualizations, aggregations, dynamic calculations, filter settings and Bookmarks will be automatically updated to reflect the new data, utilizing sophisticated algorithms to validate and preserve all aspects of the analysis.

**Guided Analysis Creation Summary**

A step-by-step description of a typical workflow in Spotfire DXP software might look like this:

1. **Open a dataset.** Optionally transform the data by adding new columns, using some mathematical calculations or conditional statements.

2. **Optionally arrange your filtering devices,** e.g., choose which filtering devices to show.

3. **Create a page with one or more initial visualizations of the data.**

4. **Add a text pane describing its purpose,** how to interpret the visualizations and what the user is supposed to accomplish, or maybe state the insights you have made so that other people can verify or comment on your findings.

5. **Optionally use the tagging ability of Spotfire DXP software to create new filtering devices based on your custom data selections.**

6. **Now, use Bookmarks at different points during the analysis,** to highlight patterns or anomalies, to aid in narrowing down to the most interesting data and to guide users to the next logical step in the analysis. **Optionally add links to those Bookmarks from the text areas,** along with a description, to illustrate the workflow reproduction.

7. **Repeat steps 2 to 6 until all business problems targeted by this analysis are satisfactory dealt with.**

8. **Launch additional tools,** such as PowerPoint export or advanced statistical calculations, and add those as optional links in the corresponding text panes.

9. **Review and test the analysis steps you have captured and modify them if necessary.** You might want to split the analysis into several pages to avoid overwhelming users.

10. **Save your analysis to the TIBCO Spotfire Library directly from Spotfire DXP.** Now, your colleagues can begin using your recommended analysis process.
Additional Resources & Professional Services

The TIBCO Spotfire Technology Network (http://stn.Spotfire.com) is a continuously updated online resource containing downloadable developer tools, tutorials, code examples, tips, articles and API references supporting the developer community. This network is an invaluable resource for your developers. With STN, your users will also gain access to downloadable development tools and example code on the TIBCO Spotfire Technology Network. As always, http://spotfire.tibco.com contains the latest information about TIBCO Spotfire products and services.

TIBCO Spotfire Professional Services offers technical training and expert consulting, as well as support and deployment programs to ensure that customers receive maximum value from their TIBCO Spotfire investment. TIBCO Spotfire Professional Services is staffed with a global network of information technology consultants with expertise in helping TIBCO Spotfire customers configure Spotfire DXP software to meet their unique decision-making needs.

The TIBCO Spotfire Experience

The Spotfire Division of TIBCO Software Inc. is a leading provider of enterprise analytics software for next generation business intelligence. The TIBCO Spotfire enterprise analytics platform offers a visual and interactive experience that helps business and technical users quickly discover new and actionable insights in information. Distinguished by its speed to insight and adaptability to specific business challenges, Spotfire software rapidly reveals unseen threats and new opportunities, creating significant economic value.