



# The Workbook for Embedded BI

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## Introduction — Why Embedded BI?



### Does this situation sound familiar?

You've developed a great application — maybe one that collects great data, streamlines a complicated process, or enriches the lives of its users in some other way. You either sell this application to customers, or you have internal customers that you serve.

But despite all your great work, your customers are still not using your application to its fullest potential. Decisions are being made that don't take advantage of the full insight your application could provide. Many people use the application for awhile and then stop altogether. You hear complaints about the reports you provide or the difficulty of getting data out of your application into a spreadsheet or other tool. And, if you have paying customers, your application doesn't sell as well as you'd like.

You want to make your application that much more useful and impactful to your users, and solve more of their problems.

### But how?

Enter Embedded Business Intelligence, also known as Embedded BI. With Embedded BI, you can transform your operational application into an analytical one that goes well beyond simply reporting. You can add indepth analysis and intelligence capabilities to your application – providing your users with real value and insight into their data so they can do their jobs better.

A bolt-on or separate tool is simply not enough to reach these goals because many users just won't use it. Instead, you need to embed analysis, visualizations, reports, and dashboards seamlessly within your application so they are readily available at the appropriate point in the user's workflow. Where the questions normally occur. Where a decision can be made and tied into the application's usual workflow. Where the user experience is best.

## Introduction — Why Embedded BI?

### Why this workbook?

The prospect of turning your operational application into an analytical tool can seem daunting. This workbook provides a framework to help you prepare and think through the major issues ahead of time. It will first help you figure out if Embedded BI is appropriate for your users, and guide you through the first phase of preparatory work needed to ensure a successful project.

### It will help you answer key questions like:

- Is Embedded BI right for my application?
- What benefits can I expect from embedding BI?
- What is the best approach to embedding BI into my application?
- How many different types of users would use the Embedded BI capabilities in my application?
- What features do these different user groups need and want from Embedded BI?
- What are the requirements for data handling now and in the future?
- How do different data sources impact my BI solution?
- How do I decide whether to build; use free, open-source stacks; or buy Embedded BI capabilities?
- What do I need to consider technically?

This workbook does not develop the concept of Embedded BI and its benefits. For that, we recommend the Jaspersoft book *“Five Levels of Embedded BI from Static to Analytic Applications.”*

In this workbook, we assume that you have a basic understanding of Embedded BI, but are now trying to figure out if it is right for you and, if so, learn how to add analysis and interactivity to your application.



## Introduction — Why Embedded BI?



### Embedded BI in action:

## A Case Study

*Steve is the head of inventory operations for Bucks Electronics retail chain stores. He is one of many internal users of the IMS2 inventory management application, developed by the company's IT department. IMS2 organizes product information, inventory units, and location, movement, and material data. In addition to Steve, other users of IMS2 include inventory clerks, retail clerks, warehouse managers, shop floor managers, and other executives.*

*Steve uses IMS2 every day, and while he and his assistant can often get the information they want, the process is laborious and sometimes involves exporting data from various screens and then manipulating it in a spreadsheet. This tedious process often misses trends in the data across time.*

*Steve wants to streamline this process so everyone can make better and faster decisions.*

*Ideally, he wants to see up-to-the-minute metrics for key inventory and point-of-sale performance indicators, presented in a single, easy-to-read dashboard within the IMS2 application, not a separate tool. Steve wants his reports to be interactive and provide drill-down to detailed data, filters, and easy-to-see flags associated with metric outliers. And he wants the ability to immediately take action on the flags – such as increasing order quantities or readjusting schedules – all built into his workflow within the IMS2 application.*

*In other words, he wants Business Intelligence embedded in the IMS2 application.*

## Step 1: Is Embedded BI Right for Me?



First, see if it's likely that Embedded BI can help you and your users. Take this little quiz to gauge your users' experience with your current application:

		Yes	No
1	Do users complain that your application does not provide enough pre-defined ("canned") reports?		
2	Do users ask for a lot of look and feel customizations to the canned reports?		
3	Are users currently exporting data from your application into a tool like Excel or even into their own databases?		
4	Would better use of visualization make your users more aware of trends and outliers, and help them make better decisions?		
5	Are additional reporting and analysis capabilities so valuable your customers would be willing to pay extra for it?		
6	Are users asking for data in many different formats (e.g., web grids, web charts, print, pdf or PowerPoint files)?		
7	Have one or more of your users become the "expert" in creating reports or analyzing your data?		
8	Does your application bring together data from several different sources?		
9	Does the structure of your data sources change often?		
10	Do you need to provide reports and visualizations to mobile devices, as well as over the web?		
<b>TOTAL:</b>		<b>#Yes</b>	<b>#No</b>

**!** If you've answered "yes" to three or more of the above questions, then both you and your customers are likely to benefit from Embedded BI.

If you want to know more about WHY answering yes to these questions indicates a need for Embedded BI, see the Answer Notes on the next page.

Otherwise, continue onto the next section where we'll help you identify your primary objectives.

## Step 1: Is Embedded BI Right for Me?

### Answer Notes

**1** On not having enough canned reports: You might hear this even if you provide dozens of standard reports. The answer is not more canned reports, but a solution that lets your users customize and create their own.

**2** On “look-and-feel” customizations: Users can be notoriously picky about the look of their reports. Do they overload you with requests to modify the style and format—the fonts, colors, orientation or column order—of your predefined reports? If so, Embedded BI can empower these users to make such changes on their own.

**3** On exporting a lot of data: This is a classic sign that you are not meeting the analytic needs of your users. They value the information you provide, but you are making it too difficult for them to gain INSIGHT. When users export lots of data into Excel, this leads to a proliferation of “spreadmarts” — spreadsheets that are basically databases. With spreadmarts, everyone starts to treat the Excel spreadsheets as if they were the system of record, instead of your application. The result is the circulation of stale, inaccurate, and unsecure data, ultimately leading to bad decisions.

**4** On visualization: It is common to neglect the “over-time” view of data with homegrown analytics. But without a good view of time, you can’t see important trends. Powerful visualizations – provided in many Embedded BI tools – can make it very easy for users to quickly understand the “over-time” view, identify trends, and spot outliers.



*continued next page*

## Step 1: Is Embedded BI Right for Me?

### Answer Notes

**5**

**On additional capabilities:** If you sell your application and want to charge more, or sell more units, you need to provide more value. BI capabilities are highly visible, easy to understand, and very popular, and often increase sales revenues.

**6**

**On different formats:** Supporting different output formats for all your application reports can be time-consuming and tedious, especially since there is always a new format on the horizon. Virtually all Embedded BI platforms include the ability to export to a wide variety of output formats, so you can avoid coding these capabilities on your own.

**7**

**On the in-house “expert”:** This is another sure sign that your users need to customize and create their own reports. Let the “experts” get back to their real jobs.

**8**

**On different sources and structure:** Constantly dealing with several different data sources can be challenging, especially if they keep changing. An Embedded BI solution can isolate your application from these changes, and provide a user-friendly “face” to all your data sources.



## Step 2: Define Your Objectives

OK, now that you've decided that there is potential value in embedding BI capabilities in your application, let's take it down a level.

**What do you hope to achieve by embedding BI?**

**What benefits do you hope to gain?**

At this point, it's okay if you are not super-clear on your goals and the expected benefits. That's the purpose of this section of the workbook. We'll help you get clearer, because the more precise you are about your goals, the more likely your project is to succeed.

To help you think this through, consider common benefits that others receive when they embed analytic capabilities within their applications.





**Think through your situation and your application. Do you expect other benefits? In the next section, you'll note them so that they can guide your project going forward.**



### For your users, benefits might include:

- The ability to “self-service” and modify reports and analyses to meet their needs on their own timetable.
- Smarter decisions that are more data-driven and less gut-feel driven.
- Faster business response (also known as “business agility”).
- Increasing the number of analytical users.
- Less time spent on complicated analysis workflows that often involve many manual steps.
- Fewer errors in decision making.

### For you, the application provider, benefits from embedding analytical capabilities might include:

- The increased competitiveness of your product.
- Increased “stickiness” and importance of your application, as it creates greater value for your customers who then use it more.
- More revenue, if you can charge more or sell more units of your product.
- Reduction or elimination of a large backlog of requests for minor customizations to reports.
- Increased customer satisfaction because of faster responses to customer requests.
- Developer efficiency, by enabling your customers to do more of their own analysis and report/visualization creation. In so doing, you will be freed to add more functionality and value in your area of core expertise, which more than likely is not analysis or business intelligence.
- An end to the “canned reports” war, where prospective customers focus on the sheer quantity of canned reports you provide versus your competitors. Instead, they will focus on the insights they can derive using your application, rather than the number of canned reports.

## Step 2: Define Your Objectives



### Write them down: your top objectives.

To set the stage for your project, capture your top objectives below. This will help ensure you focus on the items that are most important to the success of your project.

As your project proceeds, you'll probably refer back to this section often, to keep the project on track.

<b>1</b>	<b>What's the single biggest goal you want to achieve from Embedded BI?</b>
	----- _____ _____
<b>2</b>	<b>How will you measure your progress toward your goal?</b> (e.g., by increasing revenue X% by 12/31/2012? By increasing application usage by X% in that same timeframe? By improving the accuracy of forecasts by X%? By increasing user satisfaction scores by X%?)
	<b>Be as specific as possible – include numerical goals and timeframes to achieve them.</b>
	a) Achieve _____ by (date) _____
	b) Achieve _____ by _____
	c) Achieve _____ by _____
<b>3</b>	<b>Are there any secondary or less-measurable objectives (e.g., satisfaction, reduced time spent in customization)?</b>
	a) _____
	b) _____
	c) _____
<b>4</b>	<b>What are the most important benefits you expect to realize in your application?</b>
	----- _____ _____

## Step 2: Define Your Objectives



### Rank your expected benefits from Embedded BI.

Below is a list of benefits that can be realized by Embedded BI. Of the 15 listed, chose the 3 that are most important to your project and rank them 1, 2, or 3. This prioritization will help you guide your project.

Improved Decision Making	
<input type="checkbox"/>	Decreased time to make decisions
<input type="checkbox"/>	More accurate decisions
<input type="checkbox"/>	New business insights
<input type="checkbox"/>	Reduced costs by eliminating separate analytic or decision-making tools
<input type="checkbox"/>	Improved communication and teamwork, as everyone receives the same information
Increased Revenue	
<input type="checkbox"/>	Increased revenue due to quicker time to market
<input type="checkbox"/>	Increased revenue from commanding a higher price from a value-added offering
<input type="checkbox"/>	Increased revenue from greater sales of your enhanced application
<input type="checkbox"/>	Increased revenue due to increased competitiveness
Increased Usage of Core Application	
<input type="checkbox"/>	Increased number of people using the application
<input type="checkbox"/>	Greater responsiveness to user requests for more analysis, visualization, reports, etc.

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## Step 2: Define Your Objectives

### Rank your expected benefits from Embedded BI.

*(continued)*

Reduced Costs	
	Less reliance on technical resources for customization
	Less time creating customer reports, visualizations, datamarts, and the like
Reduced Risk and Improved Security & Compliance	
	Improved security because the data is not exported from the system into another (possibly insecure) application like a spreadsheet for analysis
	Assurance that all reports and analyses comply with regulations and company policies
Other	



## Step 3: Understand Your Users' Requirements

Now that you've outlined your goals from embedding BI, let's move on to your users.

Without enthusiastic users, your application and Embedded BI initiative won't produce the desired results. And, to make your users enthusiastic, you need to understand what they need from Embedded BI.

Whenever you embed BI in your application, you usually need to satisfy different types of users, who often have different goals, requirements, and expectations.



## Step 3: Understand Your Users' Requirements

According to Wayne Eckerson of TDWI, there are two major classifications of BI users: Casual Users and Power Users.



### CASUAL USERS



**Casual Users (also called “business users”) — “Casual users are primarily information consumers, using information in their jobs.”<sup>1</sup> They generally include people who make business decisions based on information obtained from reports or analyses by others. While casual users might tweak these reports or analyses slightly (such as filtering the data to a specific date range, or adding a bar chart or a line chart), they generally work with something created by someone else. BI industry metrics show that 80% of business users are casual users. The ranks of casual users typically include customers, executives, managers, and non-technical employees. Our “Big Boss Bob” persona, below, is an example of a casual user.**

<sup>1</sup> The Secrets of Self-Service BI, by Wayne Eckerson.

## Step 3: Understand Your Users' Requirements



### POWER USERS



**Power Users (often called analysts, data scientists, Excel junkies, or “number crunchers”) — These folks use data to dig deep and find the answers to important business questions. They are information producers, often found in the line of business. Power users create reports, dashboards and models for themselves and casual users. Power users are about 20% of the total.<sup>2</sup> TDWI further divides power users into four subcategories:**

#### **Business analysts.**

Data- and process-savvy business users who identify trends, solve problems and devise plans.

#### **Departmental super users.**

Technically savvy departmental business users who create ad hoc reports for their colleagues.

#### **Analytical modelers.**

Business analysts who establish statistical and datamining models that quantify relationships and can be used to predict behavior or conditions. Our “Data Diva Debbie” persona, below, is this type of user.

#### **IT report developers.**

IT developers, analysts or administrators who build complex reports and train and support super users.

<sup>2</sup> TechTarget. [http://www.b-eye-network.com/blogs/eckerson/archives/2011/01/the\\_secrets\\_of.php](http://www.b-eye-network.com/blogs/eckerson/archives/2011/01/the_secrets_of.php)

## Step 3: Understand Your Users' Requirements

In addition to these two major categories there is a third important usertype — the Administrator.



### ADMINISTRATOR



**Administrators are usually tasked with keeping IT systems (such as the database, your application, or a BI server) running. This type of user is very technical and well-versed in database administration and IT operations. Unlike all other types of users, Administrators might not even view reports or analyses. Even so, Administrators may have their own requirements for any Embedded BI solution.**

**Remember, all users are not created equal. One or two of your user types are more important than the rest because they disproportionately affect the business results you'll get by embedding BI. Usually the needs of the casual users, business analysts, and departmental super users trump the needs of the IT report developer or administrator.**

## Step 3: Understand Your Users' Requirements



### Create user personas.

To make sure you meet the needs of each type of user, a best practice is to develop a “persona” for them. A persona is basically a profile of a fictional character who represents an entire class of users, reflecting their typical motivations, goals, skill level, experience, and attitudes.

Creating personas might sound unnecessary, but they will help everyone working on your project keep your end-users’ goals in mind at all times. Personas are powerful tools for communicating about different types of users and their needs, and then deciding which of those needs are most important to target.

It is easy to develop personas. We recommend that you start off by using our template below. It will help you identify each persona’s motivations, frustrations, and ideal experience with BI inside your application. You’ll note that we prompt you to name your persona and provide his or her age, as well as a representative photo. While these details might seem a little silly, they really help bring your persona to life in the minds of all who work on your project.



**Below, we provide a few sample personas. Appendix A has blank persona worksheets that you can use for each of your types of users.**

## Persona Example #1

<p><b>NAME &amp; PERSONA TYPE</b></p>	<p><b>Data Diva Debbie</b> <b>Data Analyst</b></p> 
<p><b>AGE</b></p>	<p>38</p>
<p><b>JOB TITLE</b></p>	<p>Data Analyst</p>
<p><b>TECHNICAL COMFORT</b></p>	<p>Debbie has a MS degree in statistics and has done some PhD work. Debbie is not a software engineer, but she is an absolute power user of any and all tools that help her crunch numbers. She can code SQL, R and SAS; use any OLAP tool; and is a master of Excel.</p>
<p><b>MOTIVATIONS</b> Why does she need analytic capabilities in your application? What is she trying to accomplish?</p>	<p>Debbie has regularly recurring analysis projects, such as forecasting market demand for different products for the next quarter. She also juggles many ad-hoc/one-off projects, such as answering the CEO's questions or conducting an experiment with the website or in the retail stores.</p>
<p><b>FRUSTRATIONS</b> When it comes to gaining insight from your application and acting on it, what's stopping her? What's annoying her?</p>	<p>Debbie spends about half her time doing tedious work that could be done by someone with half her education (hunting down data). She wishes she could automate all this. Debbie produces analyses that many people in the company use, but she's frequently asked follow-up questions that take a lot of her time.</p>
<p><b>THEIR IDEAL EXPERIENCE</b> What would this user ideally like their experience with BI embedded in your application to be like? What features and content will help her have a great experience?</p>	<p>She would like to be able to create a starting point of analysis that would give users the ability to self-service (e.g., change the format, bring data into the report), and answer their own questions. Debbie wants to assure this foundation is solid, so that their conclusions are correct and that they're not committing "data abuse" by unintentionally misinterpreting the structure of data sources and then misusing them, ending up with incorrect conclusions.</p>

## Persona Example #2

<b>NAME &amp; PERSONA TYPE</b>	<b>Big Boss Bob</b> <b>Casual User</b> 
<b>AGE</b>	50
<b>JOB TITLE</b>	VP Operations, Solar System Region
<b>TECHNICAL COMFORT</b>	<b>Bob is a savvy Internet and computer user, but he can't create reports.</b>
<b>MOTIVATIONS</b> What concerns does he have? Why does he need analytic capabilities in your application?	<b>Bob wants to make sure that the company is running as planned. As his title indicates, he is concerned with the entire operation, including sales, manufacturing, and distribution.</b> <b>Bob wants to be able to highlight things like forecasts versus actual production, and outliers. He wants to get enough information in a timely way so that he can act while he still has time.</b>
<b>FRUSTRATIONS</b> When it comes to gaining insight from your application and acting on it, what's stopping him? What's annoying him?	<b>Bob gets a boatload of reports, but they often don't give him the information he really needs, the "why," because some content is not easily accessible.</b> <b>He often has to ask IT to crunch numbers, and then wait for answers.</b>
<b>THEIR IDEAL EXPERIENCE</b> What would this user ideally like his experience with BI embedded in your application to be like? What features and content will help him have a great experience?	<b>He wants actionable, semi-automatic information that he can filter and drill down when he needs more data. He wants to be able to ask the "why" questions and quickly get answers.</b> <b>He won't do a lot of analysis, but he needs to be able to get answers to basic questions on the spot without needing help. Immediate information is important to him.</b>

## Step 3: Understand Your Users' Requirements

Now that you've looked at our two example personas, start creating your own. Appendix A has some blank sheets to help you create personas for your application.

Don't be concerned with making sure that everything is precisely correct. But this should help you identify gaps in your understanding of your users. And hopefully, from this, you can get a general idea of what level of Embedded BI is needed to meet your users' needs.



### **Help! I don't know all the information!**

If you don't know how to fill in all the boxes in the previous tables, congratulate yourself for having identified gaps in your knowledge before you got started on the project.

Then remedy the situation by asking actual users. Briefly interview them, asking questions such as the following.

## Step 3: Understand Your Users' Requirements



### Questions to ask users.

**1** In what areas of your job do you need access to data and analysis? For what purpose?

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**2** What are you trying to accomplish when using our application?

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**3** Are you succeeding?

---

**4** In improving your application with reporting and analytics, are you seeking new insights, efficiency, or something else?

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**5** How do you envision this problem might be alleviated or solved by having embedded analysis and reports in our application?

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**6** What do you typically do once you get the data and analysis from our application (make a decision, take an action)?

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## Step 3: Understand Your Users' Requirements

### Questions to ask users.

*(continued)*

**7** Do you get all the data you need?

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**8** Can you “crunch” the data the way that you want? Why do you want to crunch it that way?

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**9** Do you get the data in the format you want? Why do you want that format?

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**10** What other applications have affected your expectations about BI applications?

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**11** If you could wave a magic wand and somehow harness the data from our application in whatever way you wanted, what would you do?

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## Step 4: What Reports and Analyses Do You Want to Provide?

Once you embed BI in your application, you will probably want to provide a few reports or analyses that your users can use immediately. In deciding on the reports, consider the following questions.

You'll want to work through this worksheet for each analytic problem you are trying to solve for your user. You'll find extra worksheets in Appendix B.

**1** What is the purpose of this analysis or report (e.g., to make a decision, to comply with regulatory requirements)?

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**2** Who are the primary users (the applicable personas)?

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**3** What are the most important insights that this report or analysis could provide the users?

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## Step 4: What Reports and Analyses Do You Want to Provide?



**4** What actions might the users take immediately?

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**5** How would the users ACT on that insight (e.g., drill down to more detail, trigger a business process)?

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**6** How might the users want to filter or drill down on this information (e.g., date ranges, regions, product lines)?

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**7** How often would users want to access the report (should they be triggered on-demand or proactively scheduled and delivered)?

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**8** How do they want to access it (e.g., run it on-demand from a website, get it on a mobile device, receive in an e-mail, access it from an applications dashboard)?

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**9** What other interactive features (parameters, filtering, column reordering, pivoting, changing chart type, drilling) would be useful to users?

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## Step 5: Determine What Level of Embedded BI Is Right for You

There are five basic levels of Embedded BI, which differ in the capabilities the end user gets and the control an IT department has over the application.

The five levels are:

- 1 Static reporting
- 2 Managed interactive reports
- 3 Highly interactive reports and dashboards
- 4 Self-service reporting analysis
- 5 Advanced analytics for insights



## Step 5: Determine What Level of Embedded BI Is Right for You



### Are you level 1? (Static Reporting)

To get a good idea of your level, answer “True” or “False” to the statements in each subsection below.

Static reports are “old-style reports,” which are primarily meant to be printed out or viewed on the web, with little modification or tweaking by the user. Generally the reports are not interactive.

1	I know exactly what type of reports my users need (perhaps because they have been used without complaint for years).	True ___	False ___
2	Only a few variables might affect what the user needs to do.	True ___	False ___
3	The reports are usually for operational matters: what needs to be handled right now. They are not for identifying trends or patterns over time.	True ___	False ___
4	I don't see any need to change my reports on the horizon.	True ___	False ___
5	Printed output is very important to my users.	True ___	False ___
6	My reports are highly regulated; the output is specified.	True ___	False ___
7	I have professional report developers available to handle one-off requests from users (or I do not expect any one-off requests).	True ___	False ___
8	“Export” is limited to Excel.	True ___	False ___
9	Precise formatting is very important.	True ___	False ___
10	Drill-to-detail is not needed.	True ___	False ___

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## Step 5: Determine What Level of Embedded BI Is Right for You

(continued)

11	The data sources have plenty of capacity. I am not concerned if many users run the same report or query simultaneously.	True ___	False ___
12	A limited number of users simultaneously use the system. We have no traffic cop, no control.	True ___	False ___
13	We are okay with having lots of one-off reports, each for a specific purpose. If different users have slightly different requirements, we are okay with building a separate report for each.	True ___	False ___
14	We require that the embedded BI tool be completely encapsulated within our application's footprint. There should be no evidence that there is an external BI tool beyond the report itself.	True ___	False ___

TOTAL LEVEL 1:	#True	#False
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## Step 5: Determine What Level of Embedded BI Is Right for You



### Are you level 2? (Managed Interactive Reports)

Level 2 has a lot of the same needs as Level 1, but you can control the load that reporting and analysis puts on your data sources, and monitor usage patterns of reports and analyses.

1	<b>We might need to look into the numbers of users who simultaneously use the system.</b>	True ___	False ___
2	<b>Security is important. Not all types of users will be able to run all types of reports, such as salary information. (So user "A" might get different data than user "B," because they have different levels of security access.)</b>	True ___	False ___
3	<b>Scheduling reports, running reports at specific times, is important to my users.</b>	True ___	False ___
4	<b>It is also important to allow asynchronous report submission (run later when there is time and notify the user later) in order to reduce the load against the original data sources or your application.</b>	True ___	False ___
5	<b>Some users want to have their analyses pushed to them via e-mail or mobile notifications.</b>	True ___	False ___
6	<b>E-mail notifications and distribution are important.</b>	True ___	False ___
7	<b>I need to have control over how users share their reports and analyses with each other.</b>	True ___	False ___
<b>TOTAL LEVEL 2:</b>		<b>#True</b>	<b>#False</b>

## Step 5: Determine What Level of Embedded BI Is Right for You

### Are you level 3? (Highly Interactive Reports & Dashboards)

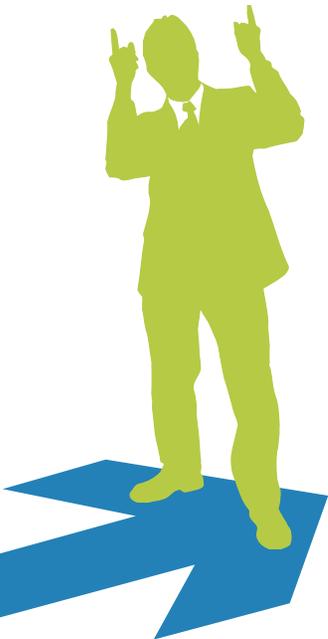
Many of today's casual users expect interactive reporting features – such as on-the-spot filtering via slider bars and checkboxes, re-sorting by clicking on column headings, one-click pivoting, changing chart types, and selectively hiding various sections of the reports. The casual users of Level 3 still generally want someone else to create their reports and analyses, but they want to be able to tweak them to fit their personal tastes.

Many casual users also expect information to be displayed in a customizable dashboard. A dashboard, by definition, incorporates many different reports, charts, and analyses so that your users can get a holistic view. Creating a dashboard might seem like a simple matter of creating one big master report that contains several charts and tables, but this usually doesn't meet user expectations.

Today, most casual users expect highly interactive reports and dashboards, an expectations that has been formed by years of interacting with the cloud-based consumer applications, newer enterprise applications, and – now – smartphone mobile apps – most of which offer the ability for users to specify and tweak their own view of reports, and many of which provide informative dashboards as the main screen of their application.



## Step 5: Determine What Level of Embedded BI Is Right for You



### Are you level 3? (Highly Interactive Reports & Dashboards)

To see if your Embedded BI solution requires a more robust dashboard framework or the ability for users to modify their own reports, ask yourself the following questions:

1	I need dashboards, so that I can present high-level views of several reports, charts or analyses on one page.	True ___	False ___
2	My users are on-the-go and need dashboards and reports that can be readily accessed (with full functionality) from mobile devices, like the iPhone and iPad.	True ___	False ___
3	I also need interactive controls that let users change the view of the data by time, location, or some other categorization.	True ___	False ___
4	The report might be connected so that all fields respond to the change in views, location, etc.	True ___	False ___
5	I need interactive charts that let users quickly understand and explore their data.	True ___	False ___
6	I need easy integration with the application's broader look and feel. (Often the dashboard becomes the main "home page" of the application and makes your users aware of all the things they need to do.)	True ___	False ___
7	It's important we have the ability to drill down to detail from any "dashlet" on the dashboard.	True ___	False ___
8	Each of my users should be able to personalize the dashboards.	True ___	False ___
9	The users should have the ability to modify their own reports.	True ___	False ___
<b>TOTAL LEVEL 3:</b>		<b>#True</b>	<b>#False</b>

## Step 5: Determine What Level of Embedded BI Is Right for You

### Are you level 4? (Self-Service Reporting & Analysis for Operational Applications)

In many organizations, there are non-technical users (“level 4” users) that want to create their own reports and analyses from the ground up, and not merely modify an already-existing report. In the past, these users would have dumped a lot of data into Excel and then used Excel to create their reports and visualizations.

There are many issues with this approach of using Excel as a report authoring tool. Foremost is “data abuse,” where users misinterpret data or use it incorrectly, leading to inaccurate conclusions. Second is inaccuracy, due to data or formula errors introduced after the data export. Third, and perhaps most importantly, is stale data. Once the data is exported from its original data source into the spreadsheet, it instantly becomes out-of-date and disconnected from the source data. Fourth is security. When users create their own Excel reports, to share them they email them around, usually without any access control on the spreadsheet itself or the data stored within it.



## Step 5: Determine What Level of Embedded BI Is Right for You



1	Some “non-technical” users need to be able to create (not just modify) their own reports using an web-based interface.	True ___	False ___
2	We need to enable users to report on against large volume of data, beyond what can fit in the user’s computer’s RAM.	True ___	False ___
3	Our users must be able to do modify their reports in certain ways without training (e.g., specify an order, generate a chart).	True ___	False ___
4	We need to be able to report on the most current data, and cannot risk making decisions based on stale data.	True ___	False ___
5	Our data changes often enough that an export to a spreadsheet would contain incorrect data within a few hours or days.	True ___	False ___
6	Our reports are handled often, so the risk of introducing an error is high if a spreadsheet were used.	True ___	False ___
7	Our data is complex enough that users might misinterpret the fields and the proper way to use each field.	True ___	False ___
8	We are concerned about the insecurity and lack of control inherent in users emailing spreadsheets around.	True ___	False ___
9	The analysis is constrained to basic slice and dice including pivoting, filtering, sorting, and drilling against a moderate set of data (under 500GB).	True ___	False ___

<b>TOTAL LEVEL 4:</b>	<b>#True</b>	<b>#False</b>
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## Step 5: Determine What Level of Embedded BI Is Right for You



### Are you level 5? (Advanced Analytics for Insights)

In Level 5, analyzing data IS the job. These are the “numbers jocks,” the hardcore analysts. In our earlier personas, Debbie is a Level 5. Until recently, few applications would even try to meet the needs of these users for any reporting or embedded analytics. Instead, external (and complex) statistical tools like R would be needed. Today, it is possible to embed analytics within your application that let your most sophisticated users explore data, do hypothesis-driven analysis, and identify trends.

1	<b>My users are sophisticated power users who want to explore the data to form new hypotheses, etc.</b>	True ___	False ___
2	<b>These people want to be able to slice and dice the data in an ad hoc manner. They used pivot tables in Excel in the past.</b>	True ___	False ___
3	<b>My users are exploratory and hypothesis driven. They like to identify trends based on historical data sets.</b>	True ___	False ___
4	<b>My users typically deal with “unbounded” problems, and don’t know what other data sources they’ll pull in (e.g., weblog information).</b>	True ___	False ___
5	<b>My users need really “cool” visualizations, like sophisticated charting.</b>	True ___	False ___
6	<b>Security is a paramount concern.</b>	True ___	False ___
7	<b>We need a web-based solution.</b>	True ___	False ___
8	<b>We need a robust metadata layer to help the users understand the data better. (The more data sources there are, the more important this is.)</b>	True ___	False ___
9	<b>We need ways to moderate, and if necessary throttle, the load our users create against data sources.</b>	True ___	False ___
<b>TOTAL LEVEL 5:</b>		<b>#True</b>	<b>#False</b>

## Step 5: Determine What Level of Embedded BI Is Right for You



### Scoring

In the table below, copy your "True" and "False" scores for each level.

		#True	#False
<b>Level 1</b>	<b>Static Reporting</b>		
<b>Level 2</b>	<b>Managed Interactive Reports</b>		
<b>Level 3</b>	<b>Highly Interactive Reports &amp; Dashboards</b>		
<b>Level 4</b>	<b>Self-Service Reporting Analysis</b>		
<b>Level 5</b>	<b>Advanced Analytics for Insight</b>		

For any section where you have more "Trues" than "Falses," you are **AT LEAST** at that level. Remember, the levels are progressive. So, in general, your level is the **HIGHEST** level where you have more "Trues" than "Falses."

So, for example, if you have all "Trues" for Level 1, 70% "Trues" for Level 2, and 40% "Trues" for Level 3, you are a Level 2.

In determining your level, remember that there is no need to overdo it. Decide what you need right now and get started. You might migrate to a higher level later.

**My level is** \_\_\_\_\_

This is a short introduction to the various levels. For more detail and some case studies, we strongly recommend you read the Jaspersoft document: *"Five Levels of Embedded BI from Static to Analytic Applications."*

## Step 6: Think About Your Data

The next step is to think about the data your Embedded BI solution will consume and analyze – your source data.

- **What form is it in?**
- **How is it structured?**
- **How secure is it?**
- **How many other applications and users might access the same data at the same time?**

These technical details can have a major impact on the type of BI solution you should embed in your application. If you don't know much about your source, never fear. It is not unusual for the leader of a BI project not to know these details at first. For the moment our focus is at a high level – making sure the BI solution that you embed in your application (whether you buy it or build it) can connect to the data sources you need.



**A side note: The quickest, dirtiest way to deal with this challenge is to programmatically create a report or analysis and, within the application, hardcode the database connection and SQL command to query the database. Naturally this has lots of disadvantages and quickly becomes impossible to maintain, especially as user requests for changes start to pour in (and they always do).**

## Step 6: Think About Your Data



So make an appointment with your “data guy or gal” and hammer out the answers to these high-level questions.



1	Your application will need to consume data from more than one data source.	True ___	False ___
2	You will likely want to incorporate more data sources in the future, especially social media data sources or “big data” data stores.	True ___	False ___
3	Your application is a desktop application with no centralized BI or application server, meaning that when users run reports each person’s desktop connects directly to the database.	True ___	False ___
4	Many users will trigger new queries against the database at the same time.	True ___	False ___
5	Your data sources sometimes have performance problems. They are overloaded at various times of the month; queries sometimes take too long to complete, etc.	True ___	False ___
6	The quantity of your data is increasing rapidly.	True ___	False ___
7	Your power users want to create their own reports against the source data.	True ___	False ___
8	The source database is complex. The relationships between columns and tables are not obvious without instructions or documentation. The column names are non-intuitive; the join logic is complex; and the data is not readily formatted for use in reports.	True ___	False ___

*continued next page*

## Step 6: Think About Your Data

(continued)

9	Security is important. Some users shouldn't be able to see portions of the source database and others should be able to. You need security that takes into account both the user and the database.	True ___	False ___
10	It is difficult or impossible to incorporate another data source into your primary data source (i.e., you can't add another data source to the data warehouse).	True ___	False ___
11	You are concerned about users creating queries that are faulty or will be so resource intensive that they will negatively impact other users.	True ___	False ___
<b>TOTAL LEVEL 4:</b>		<b>#True</b>	<b>#False</b>



Give yourself a point for each "True" answer above. If your score is 4 or greater, it points to the following potential requirements for your Embedded BI solution:



1

**Need for metadata** — You need to create a "business-friendly" view of the underlying data, to hide its complexity without changing the data itself. With metadata, the column names are user-friendly; the relationships between different columns and tables are cleaned up and presented as one big whole; and data gets "formatted" appropriately for its use (e.g., a date in the data source looks like "04/01/2012 6:00:00 am" instead of the timestamp "1333260000").

2

**Need for security** — Most databases require a password, but anyone who has the password can basically access everything in the database, no matter how sensitive the data. A server-based BI solution with data-security features can provide more fine-grained access to the data. For example, you could restrict certain users to particular analyses, and not allow them to hit the database directly.

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## Step 6: Think About Your Data

Give yourself a point for each “True” answer above. If your score is 4 or greater, it points to the following potential requirements for your Embedded BI solution:



3

**Need for administrative control** — You need to see, in a centralized place, what queries, reports and analyses are running and how they are progressing. And you need the ability to cancel them if necessary. It also helps to have the ability to prioritize certain reports, analyses or queries over others, and to see the history of past queries (e.g., how long they took, whether they were successful or not).

4

**Ability to “protect” the database from traffic overload** — For this you need to be able to schedule, prioritize and cancel queries and reports.

5

**Ability to join separate data sources** — It is always best to push joins to the source database itself. However, sometimes that is not possible. For example, if you want to start correlating your customer satisfaction with Twitter activity, you need to add a Twitter data source to your Embedded BI solution and then join the two data sources. Sometimes it is not practical or possible for you to bring all that data into a centralized data warehouse, and you cannot wait for a bureaucratic process to make it possible. So it can be important for your BI solution to have the necessary security and ability to access and join two disparate data sources.

6

**Ability to handle new types of data sources** — New data source types are coming online these days due to the “big data” and NoSQL movements. Your Embedded BI solution needs to be able to pull data out of these newer data sources.

7

**Ability to deal with large volumes of data** — This capability can be non-trivial to implement on your own.

8

**Historical reporting and trends** — These are becoming more important because they need a lot of data.

## Step 7: Application Integration Considerations

BI solutions are typically integrated in one of four ways, which differ in the degrees of automation and control. Remember, you can always start with one approach and gradually move to another.

Here are the four ways:

### 1 Embedding Approach A: Completely embed a reporting library within your application.

This is a limited approach, which lets you run a report but do little else. In this approach, your application and the embedded BI solution will actually become part of the same executable, and the distinction between your app and the BI capabilities will be seamless to the end user. This is appropriate for Level 1 users.

### 2 Embedding Approach B: Embed a BI server and incorporate the BI vendor's user interface into your application.

This, like the next two methods, requires incorporating a server that includes a BI application server, a robust API, and a repository database for storing designs for reports, analyses and visualizations. In effect, the application and BI solution are separate applications, although they look like they're the same if you use Single Sign-On integration or single user authentication. In this scenario, you might not even change the BI application URL, but you might change the look and feel of the interface. This "mashup" style integration is a good low-cost option and an easy way to get started. You'll enjoy a host of capabilities right off the bat.

*continued next page*



You also need to think about how the BI application will fit into your application. The best case is to have a BI solution that is designed to be embedded in a variety of different ways for maximum flexibility.



## Step 7: Application Integration Considerations

**In addition to determining your integration method, you also need to consider how your BI solution will:**

- **Fit with how the administrators of your application work.**
- **Provide the types and levels of security needed, on the application login, the data sources, and the reports/visualizations/analyses.**
- **Give you the ability to cancel or override reports.**
- **Save reports that have already been run.**
- **Manage versioning.**
- **Handle backups.**



*(continued)*

### **3 Embedding Approach C: Get a deeper level of integration with a BI server via URI APIs.**

Here users access the BI capability through a URL interface that you maintain. The two applications still run independently. Some pages appear in a form generated by the BI solution (e.g., “run this,” “send this”). Again, SSO (single sign-on) integration or single user authentication can produce a largely seamless experience for the end user.

### **4 Embedding Approach D: Do a full API integration with a BI Server.**

This is the deepest server-based level of integration. In this scenario, your application can control the entire server. You have control of users, can give more granularity to their security access, and automatically deploy reports to the BI server. If you need this level, you need a BI solution with a robust, complete API with REST or SOAP based webservice.

A special consideration is support for multi-tenancy and SaaS deployments. If your application supports multiple tenants or is a cloud-based service, then you will want an embedded BI solution that can also support multitenancy, in order to properly separate and secure the data and the reports, visualizations, business logic, and analyses of your different customers. Properly supporting multiple clients requires the ability to integrate with several different security mechanisms (one for each customers) and support for a special “customer admin” type of user.

## Step 7: Application Integration Considerations



The following quiz will help you get a better handle on which approach is best for you.

1	What is your level from Step 5?	_____	
2	It is very important that the BI portion of my application have exactly the same colors, look & feel as the rest of my application.	True ___	False ___
3	There must be no evidence to users that a non-native BI solution has been embedded in my application. (this includes URL formats, look/feel, etc).	True ___	False ___
4	I want to include BI in my application by including a separate “report center” section (such as under a tab).	True ___	False ___
5	I don’t want BI to be in a separate section/module of my application -- I want it to be embedded deeply with BI functionality added to several of the existing pages in my application that serve purposes beyond just BI.	True ___	False ___
6	It is important that other websites or other applications be able to directly run reports/analyses via a URL.	True ___	False ___
7	It is important that users not have to login once for my application and then again to access the BI functionality.	True ___	False ___
8	All of my application users could potentially map to a single user in the BI system.	True ___	False ___
9	Different users need to be able to access different reports/analyses.	True ___	False ___
10	The results of running a particular report, with exactly the same parameters, might change depending on who the user is. For example, when Joe runs a “customer report” he would see just his customers, and when Jill runs it she would see just her customers, even if she provides the same parameters to the report as Joe.	True ___	False ___

## Step 7: Application Integration Considerations



### Scoring key.

Use the following table to determine what approach of embedding BI is best for you. For each of question, look at your answer and circle each time it appears in a column. For example, if you answered "Level 2" for Question 1, then circle the answers in the Question 1 row, and the Approach B, Approach C, and Approach D columns.

	Approach A	Approach B	Approach C	Approach D
Question 1	Level 1	Level 2, Level 3, Level 4 or Level 5	Level 2, Level 3, Level 4 or Level 5	Level 2, Level 3, Level 4 or Level 5
Question 2	True	False	True	True
Question 3	True	False	False	True
Question 4	False	True	False	False
Question 5	True	False	True	True
Question 6	False	False	True	False
Question 7	True	True	True	True
Question 8	True	True	?	False
Question 9	False	False	?	True
Question 10	False	?	?	True

Total up the number of answers that matched your answers (and thus were circled) for each column:

Approach A:	Approach B:	Approach C:	Approach D:
-------------	-------------	-------------	-------------

## Step 8: The Open Source Decision



### EMBEDDED BI SOLUTION



**As you select your Embedded BI solution, an important factor is whether you should use open source, a commercial solution, a hybrid approach, or build your own. What you chose partially depends on the complexity of your application and the level of BI capability you desire.**

#### OPEN SOURCE

In some ways, open source is safer, because it generally has the support of a community. You'll probably find fuller APIs and more programmability.

Its advisable to consider a formal support contract if you plan to use the BI functionality in a production setting or as part of a commercial application.

Also, make sure that the open source stack "leads somewhere" (e.g., that it could deal with larger volumes of users). You don't want to get more than you need, but you do want to make sure your chosen solution is not a dead end.

#### COMMERCIAL

The primary advantage of commercial products is that you have support, and might have access to more leading-edge tools. For example, interactive charting is typically only found in commercial products.

#### HYBRID

Another approach is a hybrid mode where you use the free software while you figure out more of what you need. In some ways this is the best of possible worlds. Just make sure you have commercial backing so that you'll have support as you move forward.

A detailed discussion of the merits of open source versus proprietary products is beyond the scope of this document, but we recommend the following white papers (by Jaspersoft) to help you think it through.

- [Jaspersoft Commercial and Community Edition Comparison](#)
- [Open Source Business Intelligence in a Down Economy](#)

## Summary

**Congratulations.** You have come a long way. You've outlined the high-level requirements for your BI solution and have a sense of how you evaluate the different solutions. At this stage, you have the guidelines needed to select the appropriate solution.

More specifically:

- 1** You have clarified your objectives and decided whether Embedded BI is right for your application.
- 2** You have a concept of the benefits you can expect from embedding BI.
- 3** You have a sense of the best way to embed the BI solution into your application.
- 4** You have an idea of your different types of users.
- 5** You understand many of their requirements and desired features for Embedded BI.
- 6** You have thought ahead, and have a sense of your requirements for data handling now and in the future.
- 7** You understand how your data sources impact your BI solution.
- 8** You're probably evaluating right now whether to build, use free open source, or buy Embedded BI capabilities.
- 9** And you have a good sense of your technical considerations.



## Summary



**We recommend you run your conclusions by others before you proceed.**

**If there is disagreement, congratulations. You didn't invest more time and effort into something that probably wouldn't have gone any further.**

**If there is agreement, you can evaluate further. Use this process as a way to identify any holes in your thinking, and as a consensus-gathering tool.**

**By evaluating your options up front, you have dramatically increased the likelihood that, by embedding BI into your application, you will meet your users' needs, and help them – and you – do your jobs that much better.**

## Appendix A: Persona Worksheets

<p><b>NAME &amp; PERSONA TYPE</b></p> <p><b>PHOTO</b></p>	
<p><b>AGE</b></p>	
<p><b>LOCATION</b></p>	
<p><b>JOB TITLE</b></p>	
<p><b>TECHNICAL COMFORT</b></p>	
<p><b>MOTIVATIONS</b></p> <p>What concerns do they have?</p> <p>Why do they need analytic capabilities in your application?</p>	
<p><b>FRUSTRATIONS</b></p> <p>When it comes to gaining insight from your application and acting on it, what's stopping them?</p> <p>What's annoying them?</p>	
<p><b>THEIR IDEAL EXPERIENCE</b></p> <p>What would these users ideally like their experience with BI embedded in your application to be like, including the features and content which will help them have a great experience?</p>	

## Appendix A: Persona Worksheets

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## Appendix B: Report / Analysis Worksheet

**1** What is the purpose of this analysis or report (e.g., to make a decision, or to comply with regulatory requirements)?

---

---

**2** Who are the primary users (the applicable personas)?

---

---

**3** What are the most important insights that this report or analysis could provide the users?

---

---

**4** What actions might the users take immediately?

---

---

**5** How would the users ACT on that insight (e.g., drill down to more detail, trigger a business process)?

---

---

**6** How might the users want to filter or drill down on this information (e.g., date ranges, regions, product lines)?

---

---

**7** How often would the users want to access the report?

---

---

**8** How do they want to access it? (e.g., actively run it on a website, get it on a mobile device, receive in an e-mail, access it from an applications dashboard).

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## Appendix B: Report / Analysis Worksheet

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**2** Who are the primary users (the applicable personas)?

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**3** What are the most important insights that this report or analysis could provide the users?

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## Additional Jaspersoft Resources for Embedding Your BI Solution



See how companies have successfully deployed Jaspersoft BI solutions and are extending the value and performance of their data:

<http://www.jaspersoft.com/embedded-bi>



For detailed information on Embedded BI, learn more by visiting:

[Jaspersoft Embedded BI Solutions](#)



For questions on your potential embedded solution or further guidance on what the right approach for your BI solution, e-mail us at:

[EmbeddedBI@jaspersoft.com](mailto:EmbeddedBI@jaspersoft.com)

### About Jaspersoft:

Jaspersoft's open source business intelligence software has 14 million product downloads worldwide, 175,000 production deployments and 14,000 commercial customers in 100 countries. Its BI suite is advanced regularly by a development community of more than 250,000 registered members. For more information visit:

<http://www.jaspersoft.com> and <http://www.jasperforge.org>