



TIBCO JASPERREPORTS® IO USER GUIDE

RELEASE 1.0

<http://www.jaspersoft.com>

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CHAPTER 1 INTRODUCTION TO JASPERREPORTS IO PROFESSIONAL EDITION

TIBCO JasperReports IO is an HTTP-based reporting service for JasperReports Library, providing an interface to the JasperReports Library reporting engine through the use of a REST API and a JavaScript API. The REST API provides services for running, exporting, and interacting with reports while the JavaScript API allows you to embed reports and their input controls into your web pages and web applications using JavaScript frameworks for the layout and style sheets (CSS) to control the look and feel. Report templates, data sources, and all report resources are stored in a local repository or in an Amazon Web Services (AWS) S3 bucket and you have the option of creating new report templates using Jaspersoft Studio.

The JasperReports IO service can be deployed in a variety of ways, from a single web application with interactive reports for small-scale deployments, to container-based deployments in the cloud, where specialized services running in separate containers work together to deliver a single, embeddable reporting service for large-scale deployments.

JasperReports IO is available as a downloadable standalone package and as an hourly offering on the AWS Marketplace.

This chapter contains the following sections:

- **JasperReports IO Professional Edition License Usage and Restrictions**
- **Installing JasperReports IO Using the Standalone Package**
- **Installing JasperReports IO For Amazon Web Services**

1.1 JasperReports IO Professional Edition License Usage and Restrictions

JasperReports IO Professional Edition usage is restricted to a single machine instance and may not be installed into a distributed or clustered machine configuration.

JasperReports IO licensees are entitled to use TIBCO Jaspersoft Studio Professional to create reports. JasperReports IO Professional for AWS users must register via a link on the AWS Marketplace product page to receive a copy of Jaspersoft Studio Professional. Users that obtain the downloadable copy of JasperReports IO from the Jaspersoft.com site are entitled to apply the license file from the JasperReports IO Professional installation to their Jaspersoft Studio installation.

1.2 Installing JasperReports IO Using the Standalone Package

1.2.1 Requirements

JasperReports IO needs a 64-bit or 32-bit processor and at least 1 GB of Hard Disk space. 1 GB of RAM dedicated to JasperReports IO is recommended.

1.2.2 Starting JasperReports IO

JasperReports IO is available as a standalone ZIP package, downloadable from Jaspersoft.com.

Different download packages are available for Windows, Linux, and macOS.

This installation package contains all the services and components needed for creating your own client applications and embeddable reports, including the JasperReports IO Professional reporting service, the JavaScript API, a web server, a sample web application, data source adapters, and a Java Runtime Environment. The reporting service and sample web application are deployed when you start the web server. The sample web application helps you get started with creating your own application by demonstrating the capabilities of the JasperReports IO reporting service and the JasperReports IO JavaScript API.

See Chapter 2, Managing JasperReports IO for information on the contents and directory structure of JasperReports IO.

To start the JasperReports IO reporting service:

1. Download the standalone package for your machine's operating system.
2. Extract the standalone package and open the extracted folder.
3. Run the start script to launch the web server.
 - a. If you are using Windows, run the start.bat script.
 - b. If you are using Linux or macOS, run start.sh.

The script starts the web server. The two JasperReports IO web applications are ready for use.

4. To test the demo web application, open a browser and go to the following URL: <http://localhost:8080>
The browser opens the sample JasperReports IO web application. The sample application displays details about how to work with JasperReports IO.
5. To shut down the web server, run the stop script.
 - a. If you are using Windows, run the stop.bat script.
 - b. If you are using Linux or macOS, run stop.sh.

1.3 Installing JasperReports IO For Amazon Web Services

This section covers the JasperReports IO For Amazon Web Services (AWS) Hourly offering. You can purchase the product directly on the AWS Marketplace.

1.3.1 Prerequisites

You'll need a few things before you can install and run JasperReports IO on Amazon Web Services:

- An Amazon Web Services account.

If you already have an account, [log in to AWS](#).

To create an AWS account, go to the [Amazon Web Services sign in page](#), click **Create a new AWS account** button, and follow the instructions.



If you have a personal Amazon.com account stored in your browser, AWS uses that account by default. You need to sign out of Amazon or, preferably, use a different browser to set up an AWS account separate from your personal account.

- A valid Amazon key pair in your account. If you don't have a valid key pair, follow the instructions on the AWS documentation site: <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-key-pairs.html>
- The Required Permissions for using our CloudFormation template.

1.3.2 Required Permissions

Using our CF templates typically requires some admin permissions. AWS permissions required to launch a new JasperReports IO instance include:

- CloudFormation create stack and events
- Create and run EC2 instances
- Create EC2 security groups
- Create IAM resources
- Create S3 bucket
- Create CloudWatch log (if selected)

1.3.3 Accepting Terms of Use

You need to accept the terms of use for both the AWS Marketplace and Jaspersoft. This is a single process with multiple steps.

To accept the license agreement:

1. Go to the [Jaspersoft listing](#) on the Amazon Marketplace. You can use the link provided here, or use the Marketplace search function to locate the page.
2. Click the link for the JasperReports IO For AWS product.

This page shows the total projected charges plus EC2 charges. Simply visiting a page does not place your order.

3. Click **Continue** to go to the Launch page.
4. Verify the information on this page and click **Accept Terms**.

When your order is processed you'll receive an email confirmation.

1.3.4 Supported Instance Types

The following is a list of the instance types supported for JasperReports IO:

- T2 Micro (t2.micro)
- T2 Medium (t2.medium)

Performance may vary based on system attributes, such as network, bandwidth, memory requirements for a given use case, query requirements, and the like.

For more information about EC2 instance types, see the AWS documentation:

<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/instance-types.html>


1.3.5 Creating a JasperReports IO Instance from a CloudFormation Template

A stack is a collection of AWS resources you create and delete as a single unit. Our CloudFormation template creates the following resources and bundles them into a usable stack:

- IAM role.
- S3 bucket.
- EC2 instance with JasperReports IO installed, configured, and using the IAM role for appropriate credentials.

To create a JasperReports IO instance:

1. Open the Launching Jaspersoft for AWS web page.
2. Click the **Launch Jaspersoft IO for AWS** tab.
3. Click the URL for your region. The **Select Template** page appears.
By default, AWS provides a stack template source URL. Do not change this.
4. Click **Next**. The **Specify Details** page appears.
5. In the **Stack Name** field, give your CloudFormation stack a unique name.
6. Select an **InstanceType** from the drop down. See [1.3.4, “Supported Instance Types,” on page 9](#) for more information.
7. In the **KeyName** field, enter an existing key pair name.
8. In the **RemoveSamples** field, select whether to remove the sample web application and reports from your JasperReports IO instance's repository.
9. Choose the **VpcId** from your account.
10. Choose the **SubnetId** from the VPC.
11. Choose whether to create a publicly accessible IP address for the instance using **EnablePublicIp**. Default is True. Select False to refuse.
12. In the **SecuredIp** field, enter the IP address and mask for SSH access.
13. Choose whether to enable CloudWatch logs for your instance by selecting Yes for **CloudWatchIntegration**.
14. In the **S3BucketName** field, enter the name of the S3 bucket where you want to store your JasperReports IO reports and customizations. The S3 bucket must be in the same region as your JasperReports IO instance. A new S3 bucket will be created if you leave the field empty.

 If you enter an existing S3 bucket's name incorrectly, you will experience errors when using JasperReports IO because the S3 bucket doesn't exist. See [1.3.7, “Correcting an Invalid S3 Bucket,” on page 11](#) for instructions on fixing the issue.
15. Click **Next**. The **Options** page appears.
16. Add any tags you want use to simplify administration of your infrastructure.
A tag consists of a key/value pair and will flow to resources inside your stack. You can add up to 10 unique keys to each instance, along with an optional value for each key.
17. If you want all operations for the stack limited to a certain role, use the **Permissions** section to choose the role.

18. In the **Rollback Triggers** section, set alarms you want CloudFormation to use to monitor the creation of the stack. If any alarms are triggered, CloudFormation stops of the creation of the stack and rolls it back.
19. Expand the **Advanced** section and set your notification, timeout, and other options.
20. Click **Next**. The **Review** page appears.
Double-check your template, parameter, and option information.
21. Click the acknowledgment check box, then click **Create**.
You'll see your Stack Name listed in a table. While it's being created the Status column will display `CREATE_IN_PROGRESS`. After a few minutes the status should change to `CREATE_COMPLETE`. If the status changes to `ROLLBACK` instead of `CREATE_COMPLETE`, you may need to accept the Terms of Use. Check the **Events** tab for more information.
22. Select your complete instance and click the **Outputs** tab. Here you'll find the name of the S3 bucket for your repository, the link for the CloudWatch log, and the Getting Started URL for logging into the JasperReports IO web application if you enabled a publicly accessible IP address.

1.3.6 Creating a Repository Folder in Your S3 Bucket

When setting up your JasperReports IO instance, you will need to create a repository folder in your S3 bucket to store the resources to create and run your reports.

To create a repository folder:

1. On the AWS Management Console home page, click **S3**.
2. Click the name of the bucket for your instance or cluster.
3. Click **Create Folder**.
4. Enter `remoteRepository` for the name of the folder.
5. Select **None (Use bucket settings)** for the encryption setting.
6. Click **Save**.

AWS creates the new `remoteRepository` folder.

You can create the repository directories for your report resources in the new `remoteRepository` folder and upload your files. See [Managing JasperReports IO](#) for more information on the repository directory structure.

1.3.7 Correcting an Invalid S3 Bucket

If you enter the incorrect name for an existing S3 bucket when creating your instance, you will need to update the settings for the instance and associated IAM role to point them to the correct S3 bucket.

To correct the S3 bucket:

1. On the AWS Management Console home page, click **EC2**.
2. Click **Instances** in the sidebar.
3. Click on the instance with the invalid S3 bucket in the table.
4. Click **Actions > Instance State > Stop** to stop the instance.
5. Click **Actions > Instance Settings > View/Change User Data**.
6. Locate the `s3.repository.bucket` and replace the invalid S3 bucket name with the correct one.
7. Click **Save**.
8. Return to the AWS Management Console home page and click **IAM**.

9. Click **Roles** in the sidebar.
10. Click the name of the IAM role created for your JasperReports IO instance in the table.
11. On the **Permissions** tab, expand the policy and click **S3** under Service.
The tab displays a list of S3 actions.
12. Click **Edit Policy**.
13. Click the **JSON** tab.
14. Locate `Resource` and replace the invalid S3 bucket name with the correct one. For example:

```
{
  "Statement": [
    {
      "Action": [
        "s3:Get*",
        "s3:List*"
      ],
      "Resource": [
        "arn:aws:s3:::jrio-jrios3bucket-12",
        "arn:aws:s3:::jrio-jrios3bucket-12/*"
      ],
      "Effect": "Allow"
    }
  ]
}
```

15. Click **Review policy**.
AWS displays the S3 service you are updating. You can click **S3** to review the service before committing your changes.
16. Click **Save changes**.
AWS updates the IAM role with the S3 bucket changes.
17. Return to the AWS Management Console home page and click **IAM**.
18. Restart your instance.

CHAPTER 2 MANAGING JASPERREPORTS IO

After installing JasperReports IO, you will need to create the reports, web applications, and anything else you require for reporting and store the files in a repository for the reporting service to use. The JasperReports IO installation includes many sample files you can use for reference. You will need to use a file browser on the host machine to view and manage the contents of the JasperReports IO installation.

This chapter covers the basics of managing your JasperReports IO installation, including:

- file directory structure
- the web application server and web applications
- the repository
- AWS S3 buckets
- security permissions

Unless noted otherwise, all references to JasperReports IO are for the standalone version, not JasperReports IO for AWS.



For JasperReports IO for AWS, the reporting service is part of an instance hosted on Amazon Web Services. Use the AWS Management Console to manage the JasperReports IO instance hosted on the service. See [2.5, “Managing Amazon Web Services for JasperReports IO,” on page 18](#) for information on managing JasperReports IO for AWS.

This chapter includes the following sections:

- **JasperReports IO Directories**
- **JasperReports IO Reporting Service and Web Application Directories**
- **Web Application Server**
- **JasperReports IO Repository**
- **Managing Amazon Web Services for JasperReports IO**
- **Security**

2.1 JasperReports IO Directories

The directory where JasperReports IO is installed on the host machine is referred to as `<jrio-install>` in this guide. The `<jrio-install>` directory contains the start and stop scripts for the server, a README file, and the license agreement. The contents of JasperReports IO are organized as the following directories when first installed:

Table 2-1 JasperReports IO Directories

Directory	Description
docker	Contains a dockerfile for creating a docker image of JasperReports IO, a start script for the image, and a repository configuration file.
docs	Contains a PDF of the JasperReports IO User Guide.
jetty	Contains the Eclipse Jetty web application server that hosts the JasperReports IO web application. See 2.3, “ Web Application Server ,” on page 14 for more information.
jre	Contains the Java Runtime Environment for running the JasperReports IO reporting service.
jrio	Contains the files for the JasperReports IO reporting service and web applications. See 2.2, “ JasperReports IO Reporting Service and Web Application Directories ,” on page 14 for more information.
repository	The repository stores all the resources used to run and create reports, including data source definitions, JRXML files, datatypes, and helper files such as images. See 2.4, “ JasperReports IO Repository ,” on page 16 for more information.

2.2 JasperReports IO Reporting Service and Web Application Directories

The `<jrio-install>/jrio/webapps` directory contains the files for the JasperReports IO reporting service, JavaScript API, and the sample web application.

Table 2-2 Web Application Directories

Directory	Description
jrio	The JasperReports IO web application, including the reporting service and all configuration files.
jrio-client	Contains the files for JasperReports IO's JavaScript API, including the <code>jrio.js</code> file and UI themes. See JavaScript API for more information.
jrio-docs	Contains the files for the JasperReports IO sample web application, which demonstrates the capabilities of the reporting service, as well as documentation and report samples.
ROOT	The sample html file in this directory forwards root requests to the <code>jrio-docs</code> web application.

2.3 Web Application Server

The JasperReports IO reporting service is deployed in a Java web application on a Eclipse Jetty web server included with JasperReports IO. You can create a web application with interactive reports and the web

application server will handle all HTTP requests from users. The web application server is located in the <jrio-install>/jetty directory. For information on the Eclipse Jetty web server, see the [Jetty documentation](#).

In JasperReports IO, there are two scripts in the <jrio-install> directory to start and stop the Eclipse Jetty server and the JasperReports IO reporting service. The script to start the web application server is start.bat for Windows and start.sh for Mac OS and Linux, and the stop script is stop.bat for Windows and stop.sh for Mac OS and Linux.

2.3.1 Configuring the Web Application Server

The start script specifies several startup configuration parameters for the server that can be changed to better suit your needs.

2.3.1.1 Java Virtual Machine Heap Memory

There are two parameters for specifying the amount of heap memory allocated to the JasperReports IO reporting service's Java web application when it starts up. The -Xms<size> parameter specifies the initial heap memory size for the web application and the -Xmx<size> parameter specifies the maximum heap memory size. The following examples shows an initial heap memory size of 256 MB and a maximum size of 512 MB:

Linux: ./jre/bin/java -Xms256m -Xmx512m -jar ./jetty/start.jar

Windows: jre\bin\java -Xms256m -Xmx512m -jar jetty\start.jar

Mac OS: ./jre/Contents/Home/bin/java -Xms256m -Xmx512m -jar ./jetty/start.jar

2.3.1.2 Web Application Server Port

By default, the web application server starts on port 8080, but if this port is already in use on your host machine, you can edit the start script to change the following setting to another port number:

```
-Djetty.http.port=8080
```

2.3.1.3 Web Application Server Stop Port and Stop Key

The start and stop scripts define the stop port and stop key settings required for stopping the web application server. The stop port is the number of the port on the host machine that listens for termination requests and the stop key is a key that must be part of the stop request. These settings must match in both scripts in order for the web application server to shut down properly. The following is an example of the stop port and key settings:

```
-DSTOP.PORT=8989 -DSTOP.KEY=st0p_J3Tty
```

2.3.2 Web Application

When the web application server is running, the user's web browser will access the HTML files in the <jrio-install>/repository/ROOT folder when they open http://<jrio>:8080 in their browser. You can store the files for your web application in this folder or create an index.html file to redirect the user's browser to a web application in another directory. For example, the sample index.html in the directory that was created during installation redirects the user's browser to http://<jrio>:8080/jrio-docs, where the sample web application that comes with JasperReports IO is installed.

2.4 JasperReports IO Repository

The JasperReports IO repository is a folder-based structure where all the resources used to run and create reports are stored and from where they are retrieved when reports are executed by the JasperReports IO reporting service. You can have the repository on the host machine or an AWS S3 bucket.

The type of repository, its location in the JasperReports IO file structure, and other specific repository implementation properties can be specified the following configuration file:

```
<js-install>/jrio/webapps/jrio/WEB-INF/applicationContext-repository.xml
```

JasperReports IO comes with a repository full of sample reports and resources in the `<js-install>/repository` directory, but you can create your own repository. If you are using JasperReports IO for AWS, you will have to create a repository in an S3 bucket. See [1.3.6, “Creating a Repository Folder in Your S3 Bucket,” on page 11](#) for more information.

2.4.1 Repository Directory Structure

The JasperReports IO repository is structured as follows:

Table 2-3 Repository Directories for Sample Reports

Directory	Description
data	Contains the data source adapters and data source files for your reports.
images	Contains image files used in reports.
JR-INF	Contains the configuration files for report execution.
reports	Contains report templates.

2.4.2 Data Sources and Data Adapters

A data adapter is a resource that specifies how and where to obtain data. Specifically, it is an object that contains information about how to connect to or retrieve the data, and the logic to do that. This information includes, URL, user, password, paths, etc. Data adapters also contain the logic to prepare all parameters for JasperReports IO to run the query and iterate data. All the connections are opened and passed directly to JasperReports during report generation. A data adapter does not contain any data itself, which are stored in data sources.

The sample repository installed with JasperReports IO contains multiple data adapters and data sources in the `<js-install>/repository/data` directory that you can use for your own reports. These data adapters include:

- JDBC connection
- CSV connection
- Excel connection
- Empty connection
- JNDI connection
- Remote XML connection

JasperReports IO can use other types of data adapters that are not included in the sample repository. You can create your own data adapters for JasperReports IO either by using the DataAdapter Wizard in Jaspersoft Studio or by creating a custom data adapter using an XML file.

2.4.3 Reports

The repository resource that aggregates all information needed to run a report is called a JasperReport. A JasperReport is based on a JRXML file that conforms to the JasperReports Library that JasperReports IO uses to render reports. Users can create reports for JasperReports IO using Jaspersoft Studio.

A JasperReport is a complex resource composed of other resources:

- The main JRXML file that defines the report.
- A data source that supplies data for the report.
- A query if none is specified in the main JRXML.
- The query may specify its own data source, which overrides the data source defined in the report.
- Input controls for parameters that users may enter before running the report. Input controls are composed of either a datatype definition or a list of values.
- Any additional file resources, such as images and fonts.
- If the report includes subreports, the JRXML files for the subreports.

End users interact with a JasperReport as a single resource, but report creators must define all of the component resources.

Refer to the *Jaspersoft Studio User Guide* for more information on creating reports.

2.4.3.1 Configuring the Web Application Server to Reference the Repository

In JasperReports IO, the repository containing the sample report templates used by the sample web application is located in the `<jrio-install>/jrio/repository` directory. Since this repository folder is not located within the JasperReports IO web application folder, you will need to configure the `<js-install>/jrio/webapps/WEB-INF/applicationContext-repository.xml` file to point the web application to the repository directory.

There are two different ways to point the web application to a repository on the host machine: using a relative file path using the `WebappRelativeRepositoryFactory` bean or an absolute file path using the `FileRepositoryService` bean.

To use an relative file path, locate the `WebappRelativeRepositoryFactory` bean in the `applicationContext-repository.xml` file and enter the relative file path as the value for the `root` property:

```
<bean class="com.jaspersoft.jrio.common.repository.WebappRelativeRepositoryFactory">
  <property name="jasperReportsContext" ref="baseJasperReportsContext"/>
  <property name="root" value="../../repository"/>
</bean>
```

Since the web application is deployed to the `<jrio-install>jrio/webapp/jrio` directory, use `"../../repository"` as the relative file path to point the web application to the repository in the `<jrio-install>/jrio/repository` directory.

If you want to use an absolute file path to the repository directory, change repository bean class from `com.jaspersoft.jrio.common.repository.WebappRelativeRepositoryFactory` to

`com.jaspersoft.jrio.common.repository.FileSystemRepository` and edit the value for the second `<constructor-arg>` to add the absolute file path:

```
<bean class="com.jaspersoft.jrio.common.repository.FileSystemRepository">
  <constructor-arg><ref bean="baseJasperReportsContext"/></constructor-arg>
  <constructor-arg><value>/mnt/jrio-repository</value></constructor-arg>
</bean>
```

Use a slash (/) at the beginning of the URI for the root directory.

If you are using an AWS S3 bucket for the repository, refer to the [2.5.1, “AWS S3 Bucket Repository,”](#) on [page 18](#) for instructions on configuring the web application server to use the bucket.

2.4.3.2 Configuring the Web Application Server to Use Multiple Repositories

If you use multiple repository directories to store your report templates and resources, JasperReports IO can treat these separate directories as a single repository through absolute file paths. A report will work if its JRXML template is in one repository and its resources are in a second. Add a `FileRepositoryService` beans to the `<js-install>/jrio/webapps/WEB-INF/applicationContext-repository.xml` file for each repository you want to use.

```
<bean class="com.jaspersoft.jrio.common.repository.FileSystemRepository">
  <constructor-arg><ref bean="baseJasperReportsContext"/></constructor-arg>
  <constructor-arg><value>/mnt/repository1</value></constructor-arg>
</bean>

<bean class="com.jaspersoft.jrio.common.repository.FileSystemRepository">
  <constructor-arg><ref bean="baseJasperReportsContext"/></constructor-arg>
  <constructor-arg><value>/mnt/repository2</value></constructor-arg>
</bean>
```

2.5 Managing Amazon Web Services for JasperReports IO

This section describes how to use an AWS S3 bucket for a repository for JasperReports IO, referring to reports stored in an S3 bucket, and customizations for JasperReports IO for AWS.

2.5.1 AWS S3 Bucket Repository

JasperReports IO comes with a sample configuration settings for connecting your standalone JasperReports IO instance to an AWS S3 bucket as a repository. The S3 bucket can either be public and accessed without credentials or accessed securely using AWS credentials. Locate and the `S3RepositoryService` bean in the `<js-install>/jrio/webapps/WEB-INF/applicationContext-repository.xml` configuration file to implement an AWS S3 bucket for a repository:

```
<bean class="com.jaspersoft.jrio.common.repository.s3.S3RepositoryService">
  <property name="jasperReportsContext" ref="baseJasperReportsContext"/>
  <property name="s3Service">
    <bean class="com.jaspersoft.jrio.common.repository.s3.S3ServiceFactory">
      <property name="region" value="us-east-1"/>
    </bean>
  </property>
  <!--
  <property name="accessKey" value="put-id-here"/>
  -->
```

```

        <property name="secretKey" value="put-key-here"/>
    -->
    </bean>
</property>
<property name="bucketName" value="jrjio-repo-sample"/>
<property name="pathPrefix" value="jrjio-repository"/>

    <bean class="com.jaspersoft.jrjio.common.repository.s3.S3RepositoryPersistenceServiceFactory" factory-method="instance"/>

</bean>

```

You will need to enter the region, S3 bucket name, and the path to the repository.

Use the `accessKey` and `secretKey` properties to enter your AWS ID and key. These credentials are optional if the S3 bucket is public.

If you created your JasperReports IO from the CloudFormation template for AWS, this configuration file will appear similar to the following:

```

<bean class="com.jaspersoft.jrjio.common.repository.s3.S3RepositoryService">
    <property name="jasperReportsContext" ref="baseJasperReportsContext"/>
    <property name="s3Service">
        <bean class="com.jaspersoft.jrjio.common.repository.s3.S3ServiceFactory">
            <property name="region" value="${s3.repository.region:null}"/>
        <!--
            <property name="accessKey" value="put-id-here"/>
            <property name="secretKey" value="put-key-here"/>
        -->
    </bean>
</property>
<property name="bucketName" value="${s3.repository.bucket:null}"/>
<property name="pathPrefix" value="${s3.repository.path.prefix:null}"/>
</bean>

```

The `${...}` is automatically populated by user data that was generated when the JasperReports IO instance was created.

You do not have to provide your AWS credentials if you created a new S3 bucket or selected an existing one as when creating the JasperReports IO instance using the CloudFormation template. An IAM Role is automatically created that will allow the JasperReports IO instance to connect to the S3 bucket without having to provide the credentials.

2.5.2 Referring to Reports in the AWS S3 Bucket Repository

For storing report resources in an AWS S3 bucket, you will need to create a folder in the bucket called "remoteRepository." See [1.3.6, "Creating a Repository Folder in Your S3 Bucket," on page 11](#) for instructions on adding this folder to your S3 bucket.

JasperReports IO accesses the reports in the bucket through the REST and JavaScript APIs using relative URIs with `/remoteRepository` as the root directory. For example, if you have a report stored in the repository at `/remoteRepository/reports/myReport.jrxml`, the reference through the API will be `/reports/myReport`. When opening the report in the viewer, the URL will be:

```

http://<JRIO domain>:<JRIO port>/jrjio-docs/viewer/viewer.html?jr_report_
uri=/reports/myReport

```

See the REST API and JavaScript API chapters for more information on how to use them.

2.5.3 JasperReports IO for AWS and VPC Security

When creating your JasperReports IO for AWS instance, you select the VPC and subnet it belongs to. An AWS VPC isolates its resources to a virtual network with advanced security features to protect the user's resources. AWS VPCs include security features such as subnets within Availability Zones, IP ranges, route tables, and security groups to protect the resources.

In order to access the services and resources you want to use, your JasperReports IO for AWS instance needs to be on the same VPC as those services and the appropriate subnets across Availability Zones. If you have issues connecting your JasperReports IO for AWS instance to the resources and services it needs, you may need to update the AWS security features for the VPC to allow access.

2.5.4 Customizations for JasperReports IO for AWS

JasperReports IO and JasperReports IO for AWS allows you to use your S3 bucket to store customized configuration files for your JasperReports IO instance. In the S3 bucket, you must recreate the JasperReports IO directory structure for the configuration files in a folder called `customizations`, starting with the folders at the `<jrio-install>` root level, such as `jrio` and `repository`.

If you want to remove the customized file from the instance, you will need to copy the original configuration file to the S3 bucket and reboot the instance. This will replace the file on the instance and remove the customizations from JasperReports IO. Deleting the customized file from the S3 bucket without adding a replacement will not remove the customizations when the instance is restarted. JasperReports IO for AWS includes a special service `jrio start/stop` command for starting and stopping the web application.

To upload your customization:

1. On the AWS Management Console homepage, click **S3**.
2. Find the bucket for your JasperReports IO instance and click on the name.
3. Click **Create Folder** and create a folder called `customizations`.
4. Click on the name of the `customizations` folder.
5. Click **Create Folder** and recreate the paths to your files.
For example, if you want to upload a configuration file that goes in the `<jrio-install>/jrio/webapps/jrio/WEB-INF/classes` directory, you will have to create a new folder for each directory in that file path.
6. After creating the folder paths, browse to the folder for your configuration file.
7. Click **Upload**.
8. Click **Add files** and find the configuration file on your local machine.
9. Click **Upload** to upload the configuration file.
AWS uploads the file and stores it in the S3 bucket.
10. With the configuration file in place, SSH into your instance using your AWS private key and user name.
11. Stop the JasperReports IO instance using the following command:

```
sudo service jrio stop
```
12. Start the JasperReports IO instance:

```
sudo service jrio start
```

When the JasperReports IO instance restarts, the changes based on the configuration file will be in place.

2.6 Security

JasperReports IO provides security for your web applications and reports through a protection domain used by the Java security manager. A protection domain defines the security permissions, public keys, and URI for a group of JasperReports IO components, such as report expressions and repository JAR files. You can customize the permissions using the `<jrio-install>/jrio/security.policy` file.

JasperReports IO comes with a preconfigured protection domain that by default gives users all permissions to the files for:

- The Java Virtual Machine.
- The web application server.
- The JasperReports IO reporting service web applications.

The preconfigured protection domain restricts users' permissions to the following:

- Repository JARs.
- Report expressions.

The following shows the preconfigured protection domain settings in the `security.policy` file:

```
grant codeBase "file:${java.home}/lib/-" {
    permission java.security.AllPermission;
};
grant codeBase "file:${java.home}/lib/ext/-" {
    permission java.security.AllPermission;
};
grant codeBase "file:${user.dir}/jetty/-" {
    permission java.security.AllPermission;
};
grant codeBase "file:${user.dir}/jrio/webapps/-" {
    permission java.security.AllPermission;
};
//permissions for JRIO repository jars
grant codeBase "file:/__jrio/repository/jars/" {
//permission java.security.AllPermission;
};
//permissions for JR reports
grant codeBase "file:/__jrio/repository/reports/" {
};
```

This default configuration restricts a user's ability to pass parameters within the path of a report. You can edit the protection domain to customize the security permissions for JasperReports IO to meet your security needs.

More details about the syntax of the `security.policy` file and what permissions are available can be found in the [Java Security documentation](#).

The protection domain and the Java security manager for used by JasperReports IO are not active when you first install the reporting service. To activate the security manager and protection domain, edit the start script in the `<jrio-install>` directory to uncomment the following:

```
-Djava.security.manager -Djava.security.policy=jrio/security.policy
```

The Java security manager and protection domain will be active when you start the web application server.

CHAPTER 3 REST API REFERENCE - THE reports SERVICE

The `rest_v2/reports` service has a simple API for obtaining report output, such as PDF and XLS. The service also provides functionality to interact with running reports, report options, and input controls.

3.1 Running a Report

The reports service allows clients to receive report output in a single request-response. The reports service is a synchronous request, meaning the caller will be blocked until the report is generated and returned in the response. For large datasets or long reports, the delay can be significant. If you want to use a non-blocking (asynchronous) request, see [Chapter 4, “REST API Reference - The reportExecutions Service,” on page 25](#).

The output format is specified in the URL as a file extension to the report URL.

Method	URL	
GET	http://<host>:<port>/jrio/ rest_v2/reports /path/to/report.<format>?<arguments>	
Argument	Type/Value	Description
<format>	output type	One of the following formats: <ul style="list-style-type: none">Regular output: html, pdf, csv, docx, pptx, xls, xlsx, rtf, odt, ods, xmlMetadata output: data_csv, data_xls, data_json
page?	Integer > 0	An integer value used to export a specific page.
anchor?	String	An anchor name in the generated report.
ignore pagination?	Boolean	When set to true, the report will be generated as a single page. This can be useful for some formats such as csv. When omitted, this argument's default value is false and the report is paginated normally.
<parameter>	String	Any parameter that is defined for the report. Parameters that are multivalue may appear more than once. See examples below.

baseUrl	String	Specifies the base URL that the report will use to load static resources such as JavaScript files.
attachmentsPrefix	attachments	For HTML output, this property specifies the URL path to use for downloading the attachment files (JavaScript and images).
Return Value on Success		Typical Return Values on Failure
200 OK – The content is the requested file.		404 Not Found – When the specified report URI is not found in the repository.

The follow examples show various combinations of formats, arguments, and input controls:

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/FirstJasper.html` (all pages)

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/FirstJasper.html?page=5`

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/FirstJasper.pdf` (all pages)

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/FirstJasper.pdf?page=5`

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/chartthemes/ChartThemesReport.pdf?chartTheme=aegean`

`http://<host>:<port>/jrio/rest_v2/reports/samples/reports/Cascading_multi_select_report.html?Country_multi_select=USA&Cascading_state_multi_select=WA&Cascading_state_multi_select=CA`



JasperReports IO does not support exporting Highcharts charts with background images to PDF, ODT, DOCX, or RTF formats. When exporting or downloading reports with Highcharts that have background images to these formats, the background image is removed from the chart. The data in the chart is not affected.

CHAPTER 4 REST API REFERENCE - THE reportExecutions SERVICE

As described in [Chapter 3, “REST API Reference - The reports Service ,” on page 23](#), synchronous report execution blocks the client waiting for the response. When managing large reports that may take minutes to complete, or when running a large number of reports simultaneously, synchronous report execution slows down the client or uses many threads, each waiting for a report.

The `rest_v2/reportExecutions` service provides asynchronous report execution, so that the client does not need to wait for report output. Instead, the client obtains a request ID and periodically checks the status of the report to know when it is ready (also called polling). When the report is finished, the client can download the output. The client can also send an asynchronous request for other export formats (PDF, Excel, and others) of the same report. Again the client can check the status of the export and download the result when the export has completed.

4.1 Running a Report Asynchronously

In order to run a report asynchronously, the `reportExecutions` service provides a method to specify all the parameters needed to launch a report. Report parameters are all sent as a `reportExecutionRequest` object. The response from the server contains the request ID needed to track the execution until completion.

Method	URL	
POST	http://<host>:<port>/jrio/ rest_v2/reportExecutions	
Content-Type		Content
application/json		A complete <code>ReportExecutionRequest</code> in JSON format. See the example and table below for an explanation of its properties.
Return Value on Success		Typical Return Values on Failure
200 OK – The content contains a <code>ReportExecution</code> descriptor. See below for an example		404 Not Found – When the report URI specified in the request does not exist.

The following example shows the structure of the `ReportExecutionRequest`:

```

{
  "reportUnitUri":"/samples/reports/chartthemes/ChartThemesReport",
  "async":true,
  "interactive":true,
  "pages":"1-5",
  "attachmentsPrefix":"/jrio/rest_v2/reportExecutions/
    {reportExecutionId}/exports/{exportExecutionId}/attachments/",
  "baseUrl":"/jrio",
  "parameters":
  {
    "reportParameter":
    [
      {"name":"chartTheme","value":["aegean"]},
      {"name":"anotherParamName","value":["value 1","value 2"]}
    ]
  }
}

```

The following table describes the properties you can specify in the `ReportExecutionRequest`:

Property	Required or Default	Description
reportUnitUri	Required	Repository path (URI) of the report to run.
outputFormat	Required	Specifies the desired output format: <ul style="list-style-type: none"> Regular output: html, pdf, csv, docx, pptx, xls, xlsx, rtf, odt, ods, xml Metadata output: data_csv, data_xls, data_json
ignorePagination	Optional	When set to true, the report is generated as a single long page. This can be used with HTML output to avoid pagination. When omitted, the ignorePagination property on the JRXML, if any, is used.
pages	Optional	Specify a page range to generate a partial report. The format is: <startPageNumber>-<endPageNumber>
async	false	Determines whether reportExecution is synchronous or asynchronous. When set to true, the response is sent immediately and the client must poll the report status and later download the result when ready. By default, this property is false and the operation will wait until the report execution is complete, forcing the client to wait as well, but allowing the client to download the report immediately after the response.

Property	Required or Default	Description
attachmentsPrefix	attachments	For HTML output, this property specifies the URL path to use for downloading the attachment files (JavaScript and images). The full path of the default value is: <code>{contextPath}/rest_v2/reportExecutions/{reportExecutionId}/exports/{exportExecutionId}/attachments/</code> You can specify a different URL path using the placeholders <code>{contextPath}</code> , <code>{reportExecutionId}</code> , and <code>{exportExecutionId}</code> .
baseUrl	String	Specifies the base URL that the report will use to load static resources such as JavaScript files.
parameters	see example	A list of input control parameters and their values.

When successful, the reply from the server contains the `reportExecution` descriptor. This descriptor contains the request ID and status needed in order for the client to request the output. There are two statuses, one for the report execution itself, and one for the chosen output format.

The following descriptor shows that the report was placed in the report execution queue ("status": "queued"):

```
{
  "requestId": "9ecf5c6f-b70d-4170-8a3b-b305db4c2253",
  "reportURI": "/samples/reports/chartthemes/ChartThemesReport",
  "status": "queued"
}
```

The value of the `async` property in the request determines whether or not the report output is available when the response is received. Your client should implement either synchronous or asynchronous processing of the response depending on the value you set for the `async` property.

4.2 Polling Report Execution

When requesting reports asynchronously, use the following method to poll the status of the report execution. The request ID in the URL is the one returned in the `reportExecution` descriptor.

This service supports the extended status value that includes an appropriate message.

Method	URL
GET	<code>http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/status/</code>
Options	Sample Return Value
accept: application/json	<code>{ "value": "ready" }</code>

accept: application/status+json	{ "value": "failed", "errorDescriptor": { "message": "Input controls validation failure", "errorCode": "input.controls.validation.error", "parameters": ["Specify a valid value for type Integer."] } }
Return Value on Success	Typical Return Values on Failure
200 OK – The content contains the report status, as shown above. In the extended format, error reports contain error messages suitable for display.	404 Not Found – When the specified requestID does not exist.

4.3 Requesting Report Execution Details

Once the report is ready, your client must determine the names of the files to download by requesting the `reportExecution` descriptor again. Specify the requestID in the URL as follows:

Method	URL
GET	http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID
Options	
accept: application/json	
Return Value on Success	Typical Return Values on Failure
200 OK – The content contains a <code>ReportExecution</code> descriptor. See below for an example.	404 Not Found – When the request ID specified in the request does not exist.

The `reportExecution` descriptor now contains the list of exports for the report, including the report output itself and any other file attachments. File attachments such as images and JavaScript occur only with HTML export.

```
{
  "status": "ready",
  "totalPages": 47,
  "requestId": "b487a05a-4989-8b53-b2b9-b54752f998c4",
  "reportURI": "/reports/samples/AllAccounts",
  "exports": [{
    "id": "195a65cb-1762-450a-be2b-1196a02bb625",
    "options": {
      "outputFormat": "html",
      "attachmentsPrefix": "./images/",
      "allowInlineScripts": false
    }
  ]
}
```

```

    },
    "status": "ready",
    "outputResource": {
      "contentType": "text/html"
    },
    "attachments": [{
      "contentType": "image/png",
      "fileName": "img_0_46_0"
    },
    {
      "contentType": "image/png",
      "fileName": "img_0_0_0"
    },
    {
      "contentType": "image/jpeg",
      "fileName": "img_0_46_1"
    }
  ],
  {
    "id": "4bac4889-0e63-4f09-bbe8-9593674f0700",
    "options": {
      "outputFormat": "html",
      "attachmentsPrefix": "{contextPath}/rest_v2/reportExecutions/{reportExecutionId}/exports/{exportExecutionId}/attachments/",
      "baseUrl": "http://localhost:8080/jrio",
      "allowInlineScripts": true
    },
    "status": "ready",
    "outputResource": {
      "contentType": "text/html"
    },
    "attachments": [{
      "contentType": "image/png",
      "fileName": "img_0_0_0"
    }
  ]
}

```

4.4 Requesting Page Status

When requesting reports asynchronously, use the following method to poll the page status during the report execution. The `executionId` in the URL is the one returned in the `reportExecution` descriptor. This service returns a response containing `reportStatus`, `pageFinal`, and `pageTimestamp` attributes.

Method	URL	
GET	http://<host>:<port>/jrio/rest_v2/reportExecutions/{executionId}/pages/{pageNumber}/status	
Options		Sample Return Value
accept: application/json		{ "value": "ready" }

accept: application/status+json	<pre>{ "reportStatus": "ready", "pageTimestamp": "0", "pageFinal": "true" }</pre>	
Return Value on Success		Typical Return Values on Failure
200 OK – The content contains the page status, as shown above. In the extended format, error reports contain error messages suitable for display.		404 Not Found – When the request ID specified in the request does not exist.

4.5 Requesting Report Output

After requesting a report execution and waiting synchronously or asynchronously for it to finish, your client is ready to download the report output.

Every export format of the report has an ID that is used to retrieve it. For example, the HTML export in the previous example has the ID 195a65cb-1762-450a-be2b-1196a02bb625. To download the main report output, specify this export ID in the following method:

Method	URL	
GET	http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/exports/exportID/outputResource	
Response Header		Description
output-final		This value indicates whether the output is in its final form or not. When false, report items such as total page count are not finalized, but output is available early. You should reload the output resource again until this value is true.
Return Value on Success		Typical Return Values on Failure
200 OK – The content is the main output of the report, in the format specified by the <code>contentType</code> property of the <code>outputResource</code> descriptor, for example: <code>text/html</code>		404 Not Found – When the request ID specified in the request does not exist.

For example, to download the main HTML of the report execution response above, use the following URL:

GET `http://localhost:8080/jrio/rest_v2/reportExecutions/b487a05a-4989-8b53-b2b9-b54752f998c4/exports/195a65cb-1762-450a-be2b-1196a02bb625/outputResource`



JasperReports IO does not support exporting Highcharts charts with background images to PDF, ODT, DOCX, or RTF formats. When exporting or downloading reports with Highcharts that have background images to these formats, the background image is removed from the chart. The data in the chart is not affected.

To download file attachments for HTML output, use the following method. You must download all attachments to display the HTML content properly. The given URL is the default path, but it can be modified with the `attachmentsPrefix` property in the `reportExecutionRequest`, as described in [Chapter 4, “REST API Reference - The reportExecutions Service,” on page 25](#).

Method	URL
GET	<code>http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/exports/exportID/attachments/fileName</code>
Return Value on Success	Typical Return Values on Failure
200 OK – The content is the attachment in the format specified in the <code>contentType</code> property of the <code>attachment</code> descriptor, for example: image/png	404 Not Found – When the request ID specified in the request does not exist.

For example, to download the one of the images for the HTML report execution response above, use the following URL:

GET `http://localhost:8080/jrio/rest_v2/reportExecutions/912382875_1366638024956_2/exports/html/attachments/img_0_46_0`

4.6 Exporting a Report Asynchronously

After running a report and downloading its content in a given format, you can request the same report in other formats. As with exporting report formats through the user interface, the report does not run again because the export process is independent of the report.

Method	URL
POST	<code>http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/exports/</code>
Content-Type	Content
application/json	Send an <code>export</code> descriptor in JSON format to specify the format and details of your request. For example: <pre>{ "outputFormat": "html", "pages": "10-20", "attachmentsPrefix": "./images/" }</pre>
Options	
accept: application/json	

Return Value on Success	Typical Return Values on Failure
200 OK – The content contains an <code>exportExecution</code> descriptor. See below for an example.	404 Not Found – When the request ID specified in the request does not exist.

The following example shows the `exportExecution` descriptor that the server sends in response to the export request:

```
{
  "id": "6b7ce8fa-f1d7-4d53-9af6-4569edb05d1b",
  "status": "queued"
}
```

4.7 Modifying Report Parameters

You can update the report parameters, also known as input controls, through a separate method before running an existing report execution again. Use the following method to reexecute the report with a different set of parameter values:

Method	URL	
POST	http://<host>:<port>/jrio/ rest_v2/reportExecutions/requestID/parameters	
Media-Type	Content	
application/json	<pre>[{ "name": "someParameterName", "value": ["value 1", "value 2"] }, { "name": "someAnotherParameterName", "value": ["another value"] }]</pre>	
Return Value on Success		Typical Return Values on Failure
204 No Content – There is no content to return.		404 Not Found – When the request ID specified in the request does not exist.

4.8 Polling Export Execution

As with the execution of the main report, you can also poll the execution of the export process. This service supports the extended status value that includes an appropriate message.

Method	URL	
GET	http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/exports/exportID/status	
Options		Sample Return Value
accept: application/json		{ "value": "ready" }
accept: application/status+json		{ "value": "failed", "errorDescriptor": { "message": "Input controls validation failure", "errorCode": "input.controls.validation.error", "parameters": ["Specify a valid value for type Integer."] } }
Return Value on Success		Typical Return Values on Failure
200 OK – The content contains the export status, as shown above. In the extended format, error reports contain error messages suitable for display.		404 Not Found – When the specified request ID does not exist.

For example, to get the status of the HTML export in the previous example, use the following URL:

GET http://localhost:8080/jrio/rest_v2/reportExecutions/912382875_1366638024956_2/exports/195a65cb-1762-450a-be2b-1196a02bb625/status

When the status is "ready" your client can download the new export output and any attachments as described in [4.5, “Requesting Report Output,” on page 30](#). For example:

GET http://localhost:8080/jrio/rest_v2/reportExecutions/912382875_1366638024956_2/exports/195a65cb-1762-450a-be2b-1196a02bb625/outputResource

GET http://localhost:8080/jrio/rest_v2/reportExecutions/912382875_1366638024956_2/exports/195a65cb-1762-450a-be2b-1196a02bb625/images/img_0_46_0

4.9 Stopping Running Reports and Jobs

To stop a report that is running and cancel its output, use the PUT method and specify a status of "cancelled" in the body of the request.

Method	URL	
PUT	http://<host>:<port>/jrio/rest_v2/reportExecutions/requestID/status/	
Content-Type		Content
application/json		Send a status descriptor in JSON format with the value cancelled. For example: JSON: { "value": "cancelled" }

Options	
accept: application/json	
Return Value on Success	Typical Return Values on Failure
<p>200 OK – When the report execution was successfully stopped, the server replies with the same status: { "value": "cancelled" }</p> <p>204 No Content – When the report specified by the request ID is not running, either because it finished running, failed, or was stopped by another process.</p>	<p>404 Not Found – When the request ID specified in the request does not exist.</p>

4.10 Removing Report Execution

Use the DELETE method to remove a report execution from cache. If the report execution is still running, it will be stopped automatically and then removed.

Method	URL
DELETE	http://<host>:<port>/jrio/ rest_v2/reportExecutions / <executionID>
Options	
accept: application/json	
Return Value on Success	Typical Return Values on Failure
<p>200 No Content – There is no content to return.</p>	<p>204 No Content – When the specified execution ID is not found on the server.</p>

CHAPTER 5 JAVASCRIPT API REFERENCE - JRIO.JS

The JavaScript API exposed through jrio.js allows you to embed reports into your web pages and web applications. The embedded elements are fully interactive, either through the UI or programmatically. Users navigate their data in the context of your app, and you can dynamically compute, update, or render the jrio.js elements to create seamless interaction. You can use JavaScript frameworks for layout and control the look and feel of all elements through style sheets (CSS).

With the JavaScript API, you can invent new ways to merge data into your application, and make advanced business intelligence available to your users.

This chapter contains the following sections:

- **Loading the jrio.js Script**
- **Configuring the JasperReports IO Client**
- **Usage Patterns**
- **Testing Your JavaScript**
- **Changing the Look and Feel**

Each function of the JasperReports IO JavaScript API is then described in the following chapters:

- **JavaScript API Reference - report**
- **JavaScript API Reference - Errors**

The last chapters demonstrate more advanced usage of the JasperReports IO JavaScript API:

- **JavaScript API Usage - Report Events**
- **JavaScript API Usage - Hyperlinks**
- **JavaScript API Usage - Interactive Reports**

5.1 Loading the jrio.js Script

The script to include on your HTML page is named jrio.js. It is located on your running instance of the JasperReports IO JavaScript API distribution, which is available for download and can be deployed in your hosting web application. Later on your page, you also need a container element to display the report from the script.

```
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jrio-client/optimized-scripts/jrio.js"></script>
...
```

```
<!-- Provide a container for the report -->
<div id="reportContainer"></div>
```

The content of `jrio.js` is `type='text/javascript'`, but that is the default so you usually don't need to include it.

5.2 Configuring the JasperReports IO Client

Loading the `jrio.js` script as above gives you access to the JasperReports IO JavaScript API in your web page.

But this JasperReports IO client-side API needs to be configured to point to an existing JasperReports IO REST reporting service URL which delivers the actual reports output to be displayed on the current page, the location of the API scripts (either optimized or non-optimized) and UI theme.

This is achieved by calling the `config()` function on the `jrio` object made available globally on the page by the loading of the `jrio.js` script:

```
jrio.config({
  server : "http://bi.example.com:8080/jrio",
  scripts : "http://bi.example.com:8080/myapp/jriojsapi/optimized-scripts",
  theme: {
    href: "http://bi.example.com:8080/myapp/jriojsapi/themes/default"
  },
  locale: "en_US"
});
```

You can specify several parameters when requesting the script:

Parameter	Type or Value	Description
<code>server</code>	URL	The URL to the JasperReports IO service that responds to the report generating REST requests. This parameter is required.
<code>scripts</code>	URL	The URL to the folder containing the JasperReports IO JavaScript API files, either in optimized or non-optimized format. This parameter is required.
<code>theme</code>	URL	The URL to the folder containing the JasperReports IO JavaScript UI theme files.
<code>locale</code>	locale string	Specify the locale to use for display and running reports. It must be one of the locales supported by JasperReports IO. The default is the locale configured on the server. This parameter is required.
<code>logEnabled</code>	true false	Enable or disable logging. By default, it is disabled (false).
<code>logLevel</code>	debug info warn error	Set the logging level. By default the level is error.



The `server`, `scripts`, and `locale` parameters are required. The `jrio` object may produce errors if they are not set.

The scripts making up the JasperReports IO JavaScript API are available in two formats: optimized and non-optimized. They are placed in separate folders in the JasperReports IO JavaScript API distribution under /optimized-scripts and /scripts subfolders respectively.

If you notice undesirable side-effects when including the JasperReports IO JavaScript library, change the client configuration to use the optimized scripts to provide better protection, also known as encapsulation. For example, the JasperReports IO JavaScript API functions might interfere with collapse functions on your menus. Non-optimized scripts are preferred when you want to perform some runtime debugging for the JavaScript code.

If you want to use the optimized jrio.js script, use the following URL to load it: `<script src="http://bi.example.com:8080/myapp/jriojsapi/optimized-scripts/client/jrio.js"></script>`

If you want to use the non-optimized jrio.js script, you will have to use all of the following scripts:

```
<script src="http://bi.example.com:8080/myapp/jriojsapi/scripts/bower_components/requirejs/require.js"></script>
<script src="http://bi.example.com:8080/myapp/jriojsapi/scripts/require.config.js"></script>
<script src="http://bi.example.com:8080/myapp/jriojsapi/scripts/loader/jasper.js"></script>
<script src="http://bi.example.com:8080/myapp/jriojsapi/scripts/client/jrio.js"></script>
<script>
  require.config({
    baseUrl: "http://bi.example.com:8080/myapp/jriojsapi/scripts"
  });
</script>
```

5.3 Usage Patterns

After configuring the JasperReports IO client object, you write the callback that will execute inside this client provided by jrio.js.

```
jrio.config({
  server : "http://bi.example.com:8080/jrio",
  scripts : "http://bi.example.com:8080/myapp/jriojsapi/optimized-scripts",
  theme: {
    href: "http://bi.example.com:8080/myapp/jriojsapi/themes/default"
  },
  locale: "en_US"
});
jrio(function(jrioClient) {
  jrioClient.report({
    resource: "/samples/reports/highcharts/HighchartsChart",
    container: "#reportContainer",
    error: function(err) {
      alert(err);
    },
  });
});
```

5.4 Testing Your JavaScript

As you learn to use the JasperReports IO JavaScript API and write the JavaScript that embeds your reports into your web app, you should have a way to run and view the output of your script.

In order to load jrio.js, your HTML page containing your JavaScript must be accessed through a web server. Opening a static file with a web browser does not properly load the iframes needed by the script.

One popular way to view your JasperReports IO output, is to use the [jsFiddle](#) online service. You specify your HTML, JavaScript, and optional CSS in 3 separate frames, and the result displays in the fourth frame.

Another way to test your JavaScript is to use the app server bundled with JasperReports IO. If you deploy the server from the installer with the Jetty web application server, you can create an HTML file at the root of one of the web apps shipped with it by default, for example:

```
<jrio-install>/jrio/webapps/jrio-docs/testscript.html
```

Write your HTML and JavaScript in this file, and then you can run jrio.js by loading the file through the following URL:

```
http://mydomain.com:8081/jrio-docs/testscript.html
```

5.5 Changing the Look and Feel

When you create a web application that embeds JasperReports IO content, you determine the look and feel of your app through layout, styles, and CSS (Cascading Style Sheets). Most of the content that you embed consists of reports and dashboards that you create with JasperReports IO or Jaspersoft Studio, where you set the appearance of colors, fonts, and layout to match your intended usage.

But some JasperReports IO JavaScript API elements also contain UI widgets that are generated by the server in a default style, for example the labels, buttons, and selection boxes for the input controls of a report. In general, the default style is meant to be neutral and embeddable in a wide range of visual styles. If the default style of these UI widgets does not match your app, there are two approaches:

- **Customizing the UI with CSS** – You can change the appearance of the UI widgets through CSS in your app.
- **Customizing the UI with Themes** – You can redefine the default appearance of the UI widgets in themes on the server.

These two options are covered in the following subsections.

5.5.1 Customizing the UI with CSS

The UI widgets generated by the server have CSS classes and subclasses, also generated by the server, that you can redefine in your app to change their appearance. To change to appearance of the generated widgets, create CSS rules that you would add to CSS files in your own web app. To avoid the risk of unintended interference with other CSS rules, you should define your CSS rules with both a classname and a selector, for example:

```
#inputContainer .jr-mInput-boolean-label {  
    color: #218c00;  
}
```

#classname;

To change the style of specific elements in the server's generated widgets, you can find the corresponding CSS classes and redefine them. To find the CSS classes, write the JavaScript display the UI widgets, for example input controls, then test the page in a browser. Use your browser's code inspector to look at each element of the

generated widgets and locate the CSS rules that apply to it. The code inspector shows you the classes and often lets you modify values to preview the look and feel that you want to create.

5.5.2 Customizing the UI with Themes

You can redefine the default appearance of the UI widgets in themes on the server.

Themes are CSS in the JasperReports IO JavaScript API. The UI widgets in JasperReports IO elements are generated on the server and their look and feel is ultimately determined by themes.

CHAPTER 6 JAVASCRIPT API REFERENCE - REPORT

The `report` function runs reports on the JasperReports IO reporting service and displays the result in a container that you provide. This chapter describes how to render a report in using the JasperReports IO JavaScript API.

The report function also supports more advanced customizations of hyperlinks and interactivity that are described in subsequent chapters:

- **JavaScript API Usage - Hyperlinks**
- **JavaScript API Usage - Interactive Reports**

This chapter contains the following sections:

- **Report Properties**
- **Report Functions**
- **Report Structure**
- **Rendering a Report**
- **Setting Report Parameters**
- **JavaScript API Reference - report**
- **Rendering Multiple Reports**
- **Resizing a Report**
- **Setting Report Pagination**
- **Creating Pagination Controls (Next/Previous)**
- **Creating Pagination Controls (Range)**
- **Exporting From a Report**
- **Exporting Data From a Report**
- **Refreshing a Report**
- **Canceling Report Execution**
- **JavaScript API Reference - report**

6.1 Report Properties

The properties structure passed to the `report` function is defined as follows:

```
{
  "title": "Report Properties",
  "type": "object",
  "description": "A JSON Schema describing a Report Properties",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "properties": {
    "server": {
      "type": "string",
      "description": "URL of JRS instance."
    },
    "resource": {
      "type": "string",
      "description": "Report resource URI."
    },
    "container": {
      "oneOf": [
        {
          "type": "object",
          "additionalProperties": true,
          "description": "DOM element to render report to"
        },
        {
          "type": "string",
          "description": "CSS selector for container to render report to."
        }
      ]
    },
    "params": {
      "type": "object",
      "description": "Report's parameters values",
      "additionalProperties": {
        "type": "array"
      }
    },
    "pages": {
      "type": ["string", "integer", "object"],
      "description": "Range of report's pages or single report page",
      "pattern": "^[1-9]\\d*(\\-\\d+)?$",
      "properties": {
        "pages": {
          "type": ["string", "integer"],
          "description": "Range of report's pages or single report page",
          "pattern": "^[1-9]\\d*(\\-\\d+)?$",
          "minimum": 1
        },
        "anchor": {
          "type": ["string"],
          "description": "Report anchor"
        }
      }
    }
  }
}
```

```

    },
    "default": 1,
    "minimum": 1
  },
  "scale" : {
    "default": "container",
    "oneOf" : [
      {
        "type": "number",
        "minimum" : 0,
        "exclusiveMinimum": true,
        "description" : "Scale factor"
      },
      {
        "enum": ["container", "width", "height"],
        "default": "container",
        "description" : "Scale strategy"
      }
    ]
  },
  "defaultJiveUi": {
    "type": "object",
    "description": "Default JIVE UI options.",
    "properties": {
      "enabled": {
        "type": "boolean",
        "description": "Enable default JIVE UI.",
        "default": "true"
      },
      "floatingTableHeadersEnabled": {
        "type": "boolean",
        "description": "Enable table floating headers.",
        "default": "false"
      },
      "floatingCrosstabHeadersEnabled": {
        "type": "boolean",
        "description": "Enable crosstab floating header.",
        "default": "false"
      }
    }
  },
  "isolateDom": {
    "type": "boolean",
    "description": "Isolate report in iframe.",
    "default": "false"
  },
  "linkOptions": {
    "type": "object",
    "description": "Report's parameters values",
    "properties": {
      "beforeRender": {
        "type": "function",
        "description": "A function to process link - link element pairs."
      }
    }
  }
}

```

```
report loading overlay",
    "default": true
  },
  "scrollToTop": {
    "type": "boolean",
    "description": "Enable/disable scrolling to top after report rendering",
    "default": true
  },
  "showAdhocChartTitle": {
    "type": "boolean",
    "description": "Enable/disable showing Ad Hoc chart reports title",
    "default": true
  }
},
"required": ["server", "resource"]
}
```

6.2 Report Functions

The report function exposes the following functions:

```
define(function () {

  /**
   * @param {Object} properties - report properties * @constructor
   */
  function Report(properties){}

  /**
   * Setters and Getters are functions around
   * schema for bi component at ./schema/ReportSchema.json
   * Each setter returns pointer to 'this' to provide chainable API
   */

  /**
   * Get any result after invoking run action, 'null' by default * @returns any data which supported
   by this bi component
   */
  Report.prototype.data = function(){};

  /**
   * Attaches event handlers to some specific events.
   * New events overwrite old ones.
   * @param {Object} events - object containing event names as keys and event handlers as values *

```

```

@return {Report} report - current Report instance (allows chaining)
*/
Report.prototype.events = function(events){};

//Actions

/**
 * Perform main action for bi component
 * Callbacks will be attached to deferred object. *
 * @param {Function} callback - optional, invoked in case of successful run
 * @param {Function} errorback - optional, invoked in case of failed run
 * @param {Function} always - optional, invoked always
 * @return {Deferred} dfd
 */
Report.prototype.run = function(callback, errorback, always){};

/**
 * Render report to container, previously specified in property.
 * Clean up all content of container before adding Report's content
 * @param {Function} callback - optional, invoked in case successful export * @param {Function}
errorback - optional, invoked in case of failed export * @param {Function} always - optional,
optional, invoked always
 * @return {Deferred} dfd
 */
Report.prototype.render = function(callback, errorback, always){};

/**
 * Refresh report execution
 * @param {Function} callback - optional, invoked in case of successful refresh * @param {Func-
tion} errorback - optional, invoked in case of failed refresh
 * @param {Function} always - optional, invoked optional, invoked always
 * @return {Deferred} dfd
 */
Report.prototype.refresh = function(callback, errorback, always){};

/**
 * Cancel report execution
 * @param {Function} callback - optional, invoked in case of successful cancel * @param {Function}
errorback - optional, invoked in case of failed cancel
 * @param {Function} always - optional, invoked optional, invoked always
 * @return {Deferred} dfd
 */
Report.prototype.cancel = function(callback, errorback, always){};

/**
 * Update report's component
 * @param {Object} component - jive component to update, should have id field
 * @param {Function} callback - optional, invoked in case of successful update
 * @param {Function} errorback - optional, invoked in case of failed update
 * @param {Function} always - optional, invoked optional, invoked always

```

```

on) callback - optional, invoked in case of successful update * @param {Function} errorback -
optional, invoked in case of failed update
    * @param {Function} always - optional, invoked optional, invoked always
    * @return{Deferred} dfd
    */
    Report.prototype.save = function(callback, errorback, always){};

    /**
     * Save JIVE components state as new report
     * @param {Object} options - resource information (i.e. folderUri, label, description, overwrite
flag)
     * @param {Function} callback - optional, invoked in case of successful update * @param {Function}
errorback - optional, invoked in case of failed update
     * @param {Function} always - optional, invoked optional, invoked always
     * @return{Deferred} dfd
     */
    Report.prototype.save = function(options, callback, errorback, always){};

    /**
     * Undo previous JIVE component update
     * @param {Function} callback - optional, invoked in case of successful update * @param {Function}
errorback - optional, invoked in case of failed update
     * @param {Function} always - optional, invoked optional, invoked always
     * @return{Deferred} dfd
     */
    Report.prototype.undo = function(callback, errorback, always){};

    /**
     * Reset report to initial state
     * @param {Function} callback - optional, invoked in case of successful update * @param {Function}
errorback - optional, invoked in case of failed update
     * @param {Function} always - optional, invoked optional, invoked always
     * @return{Deferred} dfd
     */
    Report.prototype.undoAll = function(callback, errorback, always){};

    /**
     * Redo next JIVE component update
     * @param {Function} callback - optional, invoked in case of successful update * @param {Function}
errorback - optional, invoked in case of failed update
     * @param {Function} always - optional, invoked optional, invoked always
     * @return{Deferred} dfd
     */
    Report.prototype.redo = function(callback, errorback, always){};

    /**
     * Export report to specific format, execute only after report run action is finished * @param
{ExportOptions} exportOptions - export options
     * @param {Function} callback - optional, invoked with link object
     * @param {Function} errorback - optional, invoked in case of failed export
     * @param {Function} always - optional, invoked optional, invoked always
     * @return{Deferred} dfd
     */
    Report.prototype.export = function(exportOptions, callback, errorback, always){};

```

6.3 Report Structure

The Report Data structure represents the rendered report object manipulated by the report function. Even though it is named "data," it does not contain report data, but rather the data about the report. For example, it contains information about the pages and bookmarks in the report.

The report structure also contains other components described elsewhere:

- The definitions of hyperlinks and how to work with them is explained in **“Customizing Links” on page 70**
- Details of the Jaspersoft Interactive Viewer and Editor (JIVE UI) are explained in **“Interacting With JIVE UI Components” on page 75**.

```
{
  "title": "Report Data",
  "description": "A JSON Schema describing a Report Data",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "type": "object",
  "properties": {
    "totalPages": {
      "type": "number",
      "description": "Report's page total count"
    },
    "links": {
      "type": "array",
      "description": "Links extracted from markup, so their quantity depends on pages you have requested",
      "items": {
        "$ref": "#/definitions/jrLink"
      }
    },
    "bookmarks": {
      "type": "array",
      "description": "Report's bookmarks. Quantity depends on current page",
      "items": {
        "$ref": "#/definitions/bookmark"
      }
    },
    "reportParts": {
      "type": "array",
      "description": "Report's parts. Quantity depends on current page",
      "items": {
        "$ref": "#/definitions/reportPart"
      }
    },
    "components": {
      "type": "array",
      "description": "Components in report, their quantity depends on pages you have requested",
      "items": {
        "type": "object",
        "description": "JIVE components data"
      }
    }
  }
}
```

```
    },
    "definitions": {
      "bookmark": {
        "type": "object",
        "properties": {
          "page": "number",
          "anchor": "string",
          "bookmarks": {
            "type": "array",
            "items": {
              "$ref": "#/definitions/bookmark"
            }
          }
        }
      }
    },
    "reportPart": {
      "type": "object",
      "properties": {
        "page": "number",
        "name": "string"
      }
    },
    "jrLink": { // see chapter on hyperlinks
    }
  }
}
```

6.4 Rendering a Report

To run a report on the server and render it with JasperReports IO Javascript API, load the `jrio.js` script, configure the JasperReports IO client object to point to the JasperReports IO REST service and to the needed Javascript files and theme, and then call the report function providing the URI of the report to run, and the container where it should be rendered on your page.

The following code example shows how to display a report that the user selects from a list.

```
jrio.config({
  server : "http://bi.example.com:8080/jrio",
  scripts : "http://bi.example.com:8080/myapp/jriojsapi/optimized-scripts",
  theme: {
    href: "http://bi.example.com:8080/myapp/jriojsapi/themes/default"
  },
  locale: "en_US"
});
jrio(function(jrioClient) {
  var report,
      selector = document.getElementById("selected_resource");
  selector.addEventListener("change", function() {
    report = createReport(selector.value);
  });
  report = createReport(selector.value);
  function createReport(uri) {
    return jrioClient.report({
      resource: uri,
      container: "#reportContainer",
    });
  }
});
```



```

        error: failHandler
    });
}
function failHandler(err) {
    alert(err);
}
});

```

The HTML page that displays the report uses a static list of reports in a drop-down selector, but otherwise needs only a container element.

```

<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/optimized-scripts/client/jrio.js"></script>
<select id="selected_resource" name="report">
  <option value="/samples/reports/TableReport">Table Report</option>
  <option value="/samples/reports/highcharts/HighchartsChart">Highcharts</option>
</select>
<!--Provide container to render your visualization-->
<div id="reportContainer"/>

```

6.5 Setting Report Parameters

To set or change the parameter values, update the `params` object of the report properties and invoke the `run` function again.

```

// update report with new parameters
report
  .params({ "Country": ["USA"] })
  .run();
...
// later in code
console.log(report.params()); // console log output: {"Country": ["USA"]}

```

The example above is trivial, but the power of the JasperReports IO JavaScript API comes from this simple code. You can create any number of user interfaces, database lookups, or your own calculations to provide the values of parameters. Your parameters could be based on 3rd party API calls that get triggered from other parts of the page or other pages in your app. When your reports can respond to dynamic events, they are seamlessly embedded and much more relevant to the user.

Here are further guidelines for setting parameters:

- If a report has required parameters, you must set them in the report object of the initial call, otherwise you'll get an error. For more information, see [“Catching Report Errors” on page 62](#).
- Parameters are always sent as arrays of quoted string values, even if there is only one value, such as `["USA"]` in the example above. This is also the case even for single value input such as numerical, boolean, or date/time inputs. You must also use the array syntax for single-select values as well as multi-select parameters with only one selection. No matter what the type of input, always set its value to an array of quoted strings.
- The following values have special meanings:
 - `""` – An empty string, a valid value for text input and some selectors.
 - `"~NULL~"` – Indicates a NULL value (absence of any value), and matches a field that has a NULL value, for example if it has never been initialized.

- "~NOTHING~" – Indicates the lack of a selection. In multi-select parameters, this is equivalent to indicating that nothing is deselected, thus all are selected. In a single-select non-mandatory parameter, this corresponds to no selection (displayed as ---). In a single-select mandatory parameter, the lack of selection makes it revert to its default value.

6.6 Rendering Multiple Reports

JavaScript Example:

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
    var reportsToLoad = [
        "/samples/reports/TableReport",
        "/samples/reports/highcharts/HighchartsChart",
        "/samples/reports/cvc/Figures",
        "/samples/reports/OrdersTable"
    ];
    $.each(reportsToLoad, function (index, uri) {
        var container = "#container" + (index + 1);
        jrioClient(container).report({
            resource: uri,
            success: function () {
                console.log("loaded: " + (index + 1));
            },
            error: function (err) {
                alert(err.message);
            }
        });
    });
});
```

Associated HTML:

```
<script src="http://ajax.googleapis.com/ajax/libs/jquery/1.8.0/jquery.min.js"></script>
<script src="http://ajax.googleapis.com/ajax/libs/jqueryui/1.10.0/jquery-ui.min.js"></script>
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>
<table class="sample">
    <tr>
        <td id="container1"></td>
        <td id="container2"></td>
    </tr>
    <tr>
        <td id="container3"></td>
        <td id="container4"></td>
    </tr>
</table>
```

Associated CSS:

```
html, body {
}
table.sample {
```

```

    width: 100%;
  }
  td#c1, td#c2, td#c3, td#c4 {
    width: 50%;
  }

```

6.7 Resizing a Report

When rendering a report, by default it is scaled to fit in the container you specify. When users resize their window, reports will change so that they fit to the new size of the container. This section explains several ways to change the size of a rendered report.

To set a different scaling factor when rendering a report, specify its `scale` property:

- `container` – The report is scaled to fully fit within the container, both in width and height. If the container is a different aspect ratio, there will be white space in the dimension where the container is larger. This is the default scaling behavior when the `scale` property is not specified.
- `width` – The report is scaled to fit within the width of the container. If the report is taller than the container, users will need to scroll vertically to see the entire report.
- `height` – The report is scaled to fit within the height of the container. If the report is wider than the container, users will need to scroll horizontally to see the entire report.
- `Scale factor` – A decimal value greater than 0, with 1 being equivalent to 100%. A value between 0 and 1 reduces the report from its normal size, and a value greater than 1 enlarges it. If either or both dimensions of the scaled report are larger than the container, users will need to scroll to see the entire report.

In every case, the entire report is scaled in both directions by the same amount, you cannot change the aspect ratio of tables and crosstab elements.

For example, to initialize the report to half-size (50%), specify the following scale:

```

var report = jrioClient.report({
  resource: "/public/Sample",
  container: "#reportContainer",
  scale: 0.5
});

```

You can also change the scale after rendering, in this case to more than double size (250%):

```

report
  .scale(2.5)
  .run();

```

Alternatively, you can turn off the container resizing and modify the size of the container explicitly:

```

var report = jrioClient.report({
  resource: "/public/Sample",
  container: "#reportContainer",
  scale: "container",
  autoresize: false
});

$("#reportContainer").width(500).height(500);
report.resize();

```

6.8 Setting Report Pagination

To set or change the pages displayed in the report, update the `pages` object of the report properties and invoke the `run` function again.

```
report
  .pages(5)
  .run(); // re-render report with page 5 into the same container

report
  .pages("2") // string is also allowed
  .run();

report
  .pages("4-6") // a range of numbers as a string is also possible
  .run();

report
  .pages({ // alternative object notation
    pages: "4-6"
  })
  .run();
```

The `pages` object of the report properties also supports bookmarks by specifying the `anchor` property. You can also specify both pages and bookmarks as shown in the example below. For more information about bookmarks, see **“Providing Bookmarks in Reports” on page 94**.

```
report
  .pages({ // bookmark inside report to navigate to
    anchor: "summary"
  })
  .run();

report
  .pages({ // set bookmark to scroll report to in scope of provided pages
    pages: "2-5",
    anchor: "summary"
  })
  .run();
```

6.9 Creating Pagination Controls (Next/Previous)

Again, the power of the JasperReports IO JavaScript API comes from these simple controls that you can access programmatically. You can create any sort of mechanism or user interface to select the page. In this example, the HTML has buttons that allow the user to choose the next or previous pages.

```
jrio.config({
  ...
});
jrio(function(jrioClient) {
  var report = jrioClient.report({
    resource: "/samples/reports/TableReport",
```

```

        container: "#reportContainer",
        error: function(err) { alert(err); },
    });

    $("#previousPage").click(function() {
        var currentPage = report.pages() || 1;

        report
            .pages(--currentPage)
            .run()
            .fail(function(err) { alert(err); });
    });

    $("#nextPage").click(function() {
        var currentPage = report.pages() || 1;

        report
            .pages(++currentPage)
            .run()
            .fail(function(err) { alert(err); });
    });
});

```

Associated HTML:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>

<button id="previousPage">Previous Page</button><button id="nextPage">Next Page</button>

<div id="reportContainer"></div>

```

6.10 Creating Pagination Controls (Range)

JavaScript Example:

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var report = jrioClient.report({
        resource: "/samples/reports/TableReport",
        container: "#reportContainer",
        error: function(err) { alert(err); },
    });
    $("#pageRange").change(function() {
        report
            .pages($(this).val())
            .run()
            .fail(function(err) { alert(err); });
    });
});

```

Associated HTML:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>

Page range: <input type="text" id="pageRange"></input>

<div id="reportContainer"></div>
```

6.11 Exporting From a Report

To export a report, invoke its export function and specify the `outputFormat` property. You **MUST** wait until the run action has completed before starting the export. The following export formats are supported:

"pdf", "xlsx", "docx", "pptx", "csv", "xls", "rtf", "odt", "ods", "html", "xml", "data_csv", "data_json", "data_xls"

The last three are for pure data output, also known as "metadata" exporters in the JR Library, and you can learn more about them in [Exporting Data From a Report](#).

```
report.run(exportToPdf);

function exportToPdf() {
    report
        .export({
            outputFormat: "pdf"
        })
        .done(function (link) {
            window.open(link.href); // open new window to download report
        })
        .fail(function (err) {
            alert(err.message);
        });
}
```

The following sample exports 10 pages of the report to a paginated Excel spreadsheet:

```
report.run(exportToPaginatedExcel);

function exportToPaginatedExcel() {
    report
        .export({
            outputFormat: "xls",
            pages: "1-10",
            paginated: true
        })
        .done(function(link){
            window.open(link.href); // open new window to download report
        })
        .fail(function(err){
            alert(err.message);
        });
}
```

The following sample exports the part of report associated with a named anchor:

```

report.run(exportPartialPDF);

function exportPartialPDF() {
    report
        .export({
            outputFormat: "pdf",
            pages: {
                anchor: "summary"
            }
        })
        .done(function(link) {
            window.open(link.href); //open new window to download report
        })
        .fail(function(err) {
            alert(err.message);
        });
}

```

The following example creates a user interface for exporting a report:

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var $select = buildControl("Export to: ",
        ["pdf", "xlsx", "docx", "ptx", "csv", "xls", "rtf", "odt", "ods", "html", "xml", "data_csv", "data_
json", "data_xls"]),
        $button = $("#button"),
        report = jrioClient.report({
            resource: "/samples/reports/OrdersTable",
            container: "#reportContainer",
            success: function () {
                button.removeAttribute("disabled");
            },
            error: function (error) {
                console.log(error);
            }
        });

    $button.click(function () {

        console.log($select.val());

        report.export({
            //export options here
            outputFormat: $select.val(),
            //exports all pages if not specified
            //pages: "1-2"
        }, function (link) {
            var url = link.href ? link.href : link;
            window.location.href = url;
        }, function (error) {
            console.log(error);
        });
    });
});

```

```
function buildControl(name, options) {

    function buildOptions(options) {
        var template = "<option>{value}</option>";
        return options.reduce(function (memo, option) {
            return memo + template.replace("{value}", option);
        }, "");
    }

    var template = "<label>{label}</label><select>{options}</select><br>",
        content = template.replace("{label}", name)
            .replace("{options}", buildOptions(options));

    var $control = $(content);
    $control.insertBefore($("#button"));
    //return select
    return $($control[1]);
}

});
```

Associated HTML:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>

<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>

<button id="button" disabled>Export</button>
<!-- Provide a container for the report -->
<div id="reportContainer"></div>
```

6.12 Exporting Data From a Report

You can also request the raw data of the report in CSV, XLS or JSON format.

The following example shows how to export pure data in CSV format using the metadata CSV exporter. CSV output is plain text that you must parse to extract the values that you need.

```
report.run(exportToCsv);

function exportToCsv() {
    report
        .export({
            outputFormat: "data_csv"
        })
        .done(function(link, request){
            request()
                .done(function(data) {
                    // use data here, data is CSV format in plain text
                })
                .fail(function(err){
                    //handle errors here
                });
        })
        .fail(function(err){
```



```

        alert(err.message);
    });
}

```

The following example shows how to export data in JSON format. By its nature, JSON format can be used directly as data within your JavaScript.

```

report.run(exportToJson);

function exportToJson() {
    report
        .export({
            outputFormat: "data_json"
        })
        .done(function(link, request){
            request({
                dataType: "json"
            })
            .done(function(data) {
                // use JSON data as objects here
            })
            .fail(function(err){
                //handle errors here
            });
        })
        .fail(function(err){
            alert(err.message);
        });
}

```

6.13 Refreshing a Report

JavaScript Example:

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var alwaysRefresh = false;

    var report = jrioClient.report({
        //skip report running during initialization
        runImmediately: !alwaysRefresh,
        resource: "/samples/reports/FirstJasper",
        container: "#reportContainer",
    });

    if (alwaysRefresh){
        report.refresh();
    }

    $("button").click(function() {
        report

```

```
        .refresh()
        .done(function() {console.log("Report Refreshed!");})
        .fail(function() {alert("Report Refresh Failed!");});
    });

});
});
```

Associated HTML:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>
<button>Refresh</button>
<div id="reportContainer"></div>
```

6.14 Canceling Report Execution

To stop a running report, call its `cancel` function:

```
...
report
.cancel()
.done(function() {
    alert("Report Canceled");
})
.fail(function() {
    alert("Report Failed");
});
```

The following example is more complete and creates a UI for a cancel button for a long-running report.

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
    var button = $("button");

    var report = jrioClient.report({
        resource: "/samples/reports/SlowReport",
        container: "#reportContainer",
        events: {
            changeTotalPages : function() {
                button.remove();
            }
        }
    });

    button.click(function () {
        report
            .cancel()
            .then(function () {
                button.remove();
                alert("Report Canceled!");
            })
    });
});
```

```
        .fail(function () {  
            alert("Can't Cancel Report");  
        });  
    });  
});
```

Associated HTML:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>  
<script src="http://bi.example.com:8080/jriosjapi/client/jrio.js"></script>  
<button>Cancel</button>  
<div id="reportContainer"></div>
```


CHAPTER 7 JAVASCRIPT API REFERENCE - ERRORS

This chapter describes common errors and explains how to handle them with the JasperReports IO Javascript API.

- **Error Properties**
- **Common Errors**
- **Catching Report Errors**

7.1 Error Properties

The properties structure for `Generic Errors` is defined as follows:

```
{
  "title": "Generic Errors",
  "description": "A JSON Schema describing Visualize Generic Errors",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "type": "object",
  "properties": {
    "errorCode": {
      "type": "string"
    },
    "message": {
      "type": "string"
    },
    "parameters": {
      "type": "array"
    }
  },
  "required": ["errorCode", "message"]
}
```

7.2 Common Errors

The following table lists common errors, their messages, and causes.

Error	Message - Description
Page or app not responding	<i>{no_message}</i> - If your page or web application has stopped working without notification or errors, check that the server providing JasperReports IO JavaScript API is accessible and returning scripts.
unexpected.error	<i>An unexpected error has occurred</i> - In most of cases this is either a JavaScript exception or an HTTP 500 (Internal Server Error) response from server.
schema.validation.error	<i>JSON schema validation failed: {error_message}</i> - Validation against schema has failed. Check the <code>validationError</code> property in object for more details.
unsupported.configuration.error	<i>{unspecified_message}</i> - This error happens only when <code>isolateDom = true</code> and <code>defaultJiveUi.enabled = true</code> . These properties are mutually exclusive.
container.not.found.error	<i>Container was not found in DOM</i> - The specified container was not found in the DOM:error.
report.execution.failed	<i>Report execution failed</i> - The report failed to run on the server.
report.execution.cancelled	<i>Report execution was canceled</i> - Report execution was canceled.
report.export.failed	<i>Report export failed</i> - The report failed to export on the server.
licence.not.found	<i>JRIO missing appropriate license</i> - The server's license was not found.
licence.expired	<i>JRIO missing appropriate license</i> - The server's license has expired
resource.not.found	<i>Resource not found in Repository</i> - Either the resource doesn't exist in the repository or the user doesn't have permissions to read it.
export.pages.out.range	<i>Requested pages {0} out of range</i> - The user requested pages that don't exist in the current export.

7.3 Catching Report Errors

To catch and handle errors when running reports, define the contents of the `err` function as shown in the following sample:

```

jrio.config({
  ...
});
jrio(function(jrioClient) {

  var report = jrioClient.report({
    error: function(err) {
      // invoked once report is initialized and has run
    }
  });
});

```

```
report
  .run()
  .fail(function(err){
    // handle errors here
  });
)
```


CHAPTER 8 JAVASCRIPT API USAGE - REPORT EVENTS

Depending on the size of your data, the `report` function can run for several seconds or minutes. You can listen for events that give the status of running reports and display pages sooner.

This chapter contains the following sections:

- **Tracking Completion Status**
- **JavaScript API Usage - Report Events**
- **Customizing a Report's DOM Before Rendering**

8.1 Tracking Completion Status

By listening to the `reportCompleted` event, you can give information or take action when a report finishes rendering.

```
jrio.config({
  ...
});
jrio(function(jrioClient) {
  var report = jrioClient.report({
    // run example with a very long report
    resource: "/samples/reports/SlowReport",
    container: "#reportContainer",
    events: {
      reportCompleted: function(status) {
        alert("Report status: "+ status + "!");
      }
    },
    error: function(error) {
      alert(error);
    },
  });
});
```

8.2 Listening to Page Totals

By listening to the `changeTotalPages` event, you can track the filling of the report.

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
    var report = jrioClient.report({
        // run example with a very long report
        resource: "/samples/reports/SlowReport",
        container: "#reportContainer",
        events: {
            changeTotalPages: function(totalPages) {
                alert("Total Pages:" + totalPages);
            }
        },
        error: function(error) {
            alert(error);
        },
    });
});
```

8.3 Customizing a Report's DOM Before Rendering

By listening to the `beforeRender` event, you can access the Document Object Model (DOM) of the report to view or modify it before it is displayed. In the example the listener finds `span` elements and adds a color style and an attribute `my-attr="test"` to each one.

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
    // enable report chooser
    $(':disabled').prop('disabled', false);

    //render report from provided resource
    startReport();

    $("#selected_resource").change(startReport);

    function startReport () {
        // clean container
        $("#reportContainer").html("");
        // render report from another resource
        jrioClient("#reportContainer").report({
            resource: $("#selected_resource").val(),
            events:{
                beforeRender: function(el){
                    // find all spans
                    $(el).find(".jrPage td.jrcolHeader span")
                        .each(function(i, e){
                            // make them red
                            $(e).css("color", "red")
                                .attr("data-my-attr", "test");
                        });
                    console.log($(el).find(".jrPage").html());
                }
            }
        });
    }
});
```

```
    });  
  };  
});
```

The HTML page that displays the report uses a static list of reports in a drop-down selector, but otherwise needs only a container element. This is similar to the basic report example in [“Rendering a Report” on page 48](#), except that the JavaScript above will change the report before it's displayed.

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>  
  
<!-- Provide the URL to jrio.js -->  
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>  
<select id="selected_resource" disabled="true" name="report">  
  <option value="/samples/reports/TableReport">Table Report</option>  
  <option value="/samples/reports/OrdersTable">Orders Table</option>  
</select>  
<!-- Provide a container to render your visualization -->  
<div id="reportContainer"></div>
```


CHAPTER 9 JAVASCRIPT API USAGE - HYPERLINKS

Both reports and dashboards include hyperlinks (URLs) that link to websites or other reports. The JasperReports IO JavaScript API gives you access to the links so that you can customize them or open them differently. For links generated in the report, you can customize both the appearance and the container where they are displayed.

This chapter contains the following sections:

- **Structure of Hyperlinks**
- **Customizing Links**
- **Drill-Down in Separate Containers**
- **Accessing Data in Links**

9.1 Structure of Hyperlinks

The following JSON schema describes all the parameters on links, although not all are present in all cases.

```
"jrLink": {
  "title": "JR Hyperlink",
  "description": "A JSON Schema describing JR hyperlink",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "type": "object",
  "properties": {
    "id": {
      "type": "string",
      "description": "Hyperlink id, reflected in corresponding attribute in DOM. Is not used for AdHocExecution hyperlink type."
    },
    "type": {
      "type": "string",
      "description": "Hyperlink type. Default types are LocalPage, LocalAnchor, RemotePage, RemoteAnchor, Reference, ReportExecution, AdHocExecution. Custom hyperlink types are possible"
    },
    "target": {
      "type": "string",
      "description": "Hyperlink target. Default targets are Self, Blank, Top, Parent. Custom hyperlink targets are possible"
    }
  }
}
```

```
    },
    "tooltip": {
      "type": "string",
      "description": "Hyperlink tooltip"
    },
    "href": {
      "type": "string",
      "description": "Hyperlink reference. Is an empty string for LocalPage, LocalAnchor and ReportExecution hyperlink types"
    },
    "parameters": {
      "type": "object",
      "description": "Hyperlink parameters. Any additional parameters for hyperlink"
    },
    "resource": {
      "type": "string",
      "description": "Repository resource URI of resource mentioned in hyperlink. For LocalPage and LocalAnchor points to current report, for ReportExecution - to _report parameter"
    },
    "pages": {
      "type": ["integer", "string"],
      "description": "Page to which hyperlink points to. Is actual for LocalPage, RemotePage and ReportExecution hyperlink types"
    },
    "anchor": {
      "type": "string",
      "description": "Anchor to which hyperlink points to. Is actual for LocalAnchor, RemoteAnchor and ReportExecution hyperlink types"
    }
  },
  "required": ["type", "id"]
}
```

9.2 Customizing Links

You can customize the appearance of link elements in a generated report in two ways:

- The `linkOptions` exposes the `beforeRender` event to which you can add a listener with access to the links in the document as element pairs.
- The normal click event lets you add a listener that can access to a link when it's clicked.

```
jrio.config({
  ...
});
jrio(function(jrioClient) {
  jrioClient("#reportContainer").report({
    resource: "/samples/reports/TableReport",
    linkOptions: {
      beforeRender: function (linkToElemPairs) {
        linkToElemPairs.forEach(function (pair) {
          var el = pair.element;
          el.style.backgroundColor = "red";
        });
      },
      events: {
```

```

        "click": function(ev, link){
            if (confirm("Change color of link id " + link.id + " to green?")){
                ev.currentTarget.style.backgroundColor = "green";
                ev.target.style.color = "#FF0";
            }
        }
    },
    error: function (err) {
        alert(err.message);
    }
});
});

```

9.3 Drill-Down in Separate Containers

By using the method of listing for clicks on hyperlinks, you can write a JasperReports IO JavaScript API script that sets the destination of drill-down report links to another container. This way, you can create display layouts or overlays for viewing drill-down links embedded in your reports. This sample code also changes the cursor for the embedded links, so they are more visible to users.

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    jrioClient("#main").report({
        resource: "/samples/reports/TableReport",
        linkOptions: {
            beforeRender: function (linkToElemPairs) {
                linkToElemPairs.forEach(showCursor);
            },
            events: {
                "click": function(ev, link){
                    if (link.type == "ReportExecution"){
                        jrioClient("#drill-down").report({
                            resource: link.parameters._report,
                            params: {
                                latitude: [link.parameters.latitude],
                                longitude: [link.parameters.longitude],
                                zoom: [link.parameters.zoom]
                            },
                        });
                    }
                    console.log(link);
                }
            }
        },
        error: function (err) {
            alert(err.message);
        }
    });

    function showCursor(pair){
        var el = pair.element;
        el.style.cursor = "pointer";
    }
}

```

```
    }  
  });
```

Associated HTML:

```
<script src="http://underscorejs.org/underscore.js"></script>  
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>  
  
<!-- Provide the URL to jrio.js -->  
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>  
<!-- Provide a container for the main report and one for the drill-down -->  
<div>  
  <div id="main"></div>  
  <div id="drill-down"></div>  
</div>
```

Associated CSS:

```
#main{  
  float: left;  
}  
  
#drill-down{  
  float: left;  
}
```

9.4 Accessing Data in Links

In this example, we access the hyperlinks through the `data.links` structure after the report has successfully rendered. From this structure, we can read the tooltips that were set in the JRXML of the report. The script uses the information in the tooltips of all links in the report to create a drop-down selector of city name options.

By using link tooltips, your JRXML can create reports that pass runtime information to the display logic in your JavaScripts.

```
jrio.config({  
  ...  
});  
jrio(function(jrioClient) {  
  
  var $select = $("#selectCity"),  
      report = jrioClient.report({  
    resource: "/samples/reports/TableReport",  
    container: "#main",  
    success: refreshSelect,  
    error: showError  
  });  
  function refreshSelect(data) {  
    console.log(data);  
    $.each(data.links, function (i, item) {  
      $select.append($('<option>', {  
        value: item.id,  
        text : item.tooltip  
      }));  
    });  
  }  
});
```



```

    });
}

$("#previousPage").click(function() {
    var currentPage = report.pages() || 1;
    goToPage(--currentPage);
});

$("#nextPage").click(function() {
    var currentPage = report.pages() || 1;
    goToPage(++currentPage);
});

function goToPage(number) {
    report
        .pages(number)
        .run()
        .done(refreshSelect)
        .fail(showError);
}

function showError(err) {
    alert(err.message);
}

});

```

Associated HTML:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>
<select id="selectCity"></select>
<button id="previousPage">Previous Page</button>
<button id="nextPage">Next Page</button>
<!-- Provide a container for the main report -->
<div>
    <div ></div>
    <div id="main"></div>
</div>

```

Associated CSS:

```

#main{
    float: left;
}

```


CHAPTER 10 JAVASCRIPT API USAGE - INTERACTIVE REPORTS

Most reports rendered by the JasperReports IO service have interactive abilities such as column sorting provided by a feature called JIVE: Jaspersoft Interactive Viewer and Editor. The JIVE UI is the interface of the report viewer which can be implemented in client applications using the JasperReports IO JavaScript API.

Not only does the JIVE UI allow users to sort and filter regular reports, it also provides many opportunities for you to further customize the appearance and behavior of your reports through the JasperReports IO JavaScript API.

This chapter contains the following sections:

- **Interacting With JIVE UI Components**
- **Using Floating Headers**
- **Changing the Chart Type**
- **Changing the Chart Properties**
- **Undo and Redo Actions**
- **Sorting Table Columns**
- **Filtering Table Columns**
- **Formatting Table Columns**
- **Conditional Formatting on Table Columns**
- **Sorting Crosstab Columns**
- **Sorting Crosstab Rows**
- **Implementing Search in Reports**
- **Providing Bookmarks in Reports**
- **Disabling the JIVE UI**

10.1 Interacting With JIVE UI Components

The JasperReports IO report interface exposes the `updateComponent` function that gives your script access to the JIVE UI. Using the `updateComponent` function, you can programmatically interact with the JIVE UI to do such things as set the sort order on a specified column, add a filter, and change the chart type. In addition, the `undoAll` function acts as a reset.

For the API reference of the JasperReports IO report interface, see **“Report Functions” on page 44**.

First, your script must enable the default JIVE UI to make its components available after running a report:

```
var report = jrioClient.report({
  resource: "/samples/reports/TableReport",
  defaultJiveUi : {
    enabled: true
  }
});
...
var components = report.data().components;
```

The components that can be modified are columns and charts. These components of the JIVE UI have an ID, but it may change from execution to execution. To refer to these components, create your report in JRXML and use the `net.sf.jasperreports.components.name` property to name them. In the case of a column, this property should be set on the column definition in the table model. In Jaspersoft Studio, you can select the column in the Outline View, then go to **Properties > Advanced**, and under **Misc > Properties** you can define custom properties.

Then you can reference the component by this name, for example a column named `sales`, and use the `updateComponent` function to modify it.

```
report.updateComponent("sales", {
  sort : {
    order : "asc"
  }
});
```

Or:

```
report.updateComponent({
  name: "sales",
  sort : {
    order : "asc"
  }
});
```

We can also get an object that represents the named component of the JIVE UI:

```
var salesColumn = report
  .data()
  .components
  .filter(function(c){ return c.name === "sales"})
  .pop();
```

This example assumes you have a report whose components already have names, in this case, columns named `ORDERID` and `SHIPNAME`:

```
jrio.config({
  ...
});
jrio(function(jrioClient) {
  //render report from provided resource
  var report = jrioClient.report({
```

```

        resource: "/samples/reports/OrdersTable",
        container: "#reportContainer",
        success: printComponentsNames,
        error: handleError
    });

    $("#resetAll").on("click", function() {
        report.undoAll();
    });

    $("#changeOrders").on("click", function() {
        report.updateComponent("ORDERID", {
            sort: {
                order: "asc"
            },
            filter: {
                operator: "greater_or_equal",
                value: 10900
            }
        }).fail(handleError);
    });

    $("#sortCustomers").on("click", function() {
        report.updateComponent("SHIPNAME", {
            sort: {
                order: "desc"
            }
        }).fail(handleError);
    });

    //show error

    function handleError(err) {
        alert(err.message);
    }

    function printComponentsNames(data) {
        data.components.forEach(function(c) {
            console.log("Component Name: " + c.name, "Component Label: " + c.label);
        });
    }
});

```

The associated HTML has buttons that will invoke the JavaScript actions on the JIVE UI:

```

<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>
<button id="resetAll">Reset All</button>
<button id="changeOrders">View Top Orders</button>
<button id="sortCustomers">Sort Customers</button>
<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.2 Using Floating Headers

One feature of the JIVE UI for tables and crosstabs is the floating header. When you turn on floating headers, the header rows of a table or crosstab float at the top of the container when you scroll down. The report container must allow scrolling for this to take effect. This means that CSS property `overflow` with values like `scroll` or `auto` must be specifically set for the report container.

To turn on floating headers for your interactive reports, set the following parameters when you enable the JIVE UI:

```
var report = jrioClient.report({
  resource: "/samples/reports/TableReport",
  defaultJiveUi : {
    floatingTableHeadersEnabled: true,
    floatingCrosstabHeadersEnabled: true
  }
});
```

10.3 Changing the Chart Type

If you have the name of a chart component, you can easily set a new chart type and redraw the chart.

```
var mySalesChart = report
    .data()
    .components
    .filter(function(c){ return c.name === "salesChart"})
    .pop();

mySalesChart.chartType = "Bar";

report
    .updateComponent(mySalesChart)
    .done(function(){
        alert("Chart type changed!");
    })
    .fail(function(err){
        alert(err.message);
    });
```

Or:

```
report
    .updateComponent("salesChart", {
        chartType: "Bar"
    })
    .done(function(){
        alert("Chart type changed!");
    })
    .fail(function(err){
        alert(err.message);
    });
```

The following example creates a drop-down menu that lets users change the chart type. You could also set the chart type according to other states in your client.

This code also relies on the `report.chart.types` interface described in **“JavaScript API Reference - report”** on page 41.

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    //persisted chart name
    var chartName = "chartOne",
        $select = buildControl("Chart types: ", jrioClient.report.chart.types),
        report = jrioClient.report({
            resource: "/samples/reports/highcharts/HighchartsChart",
            container: "#reportContainer",
            success: selectDefaultChartType
        });

    $select.on("change", function () {
        report.updateComponent(chartName, {
            chartType: $(this).val()
        })
        .done(function (component) {
            chartComponent = component;
        })
        .fail(function (error) {
            alert(error);
        });
    });

    function selectDefaultChartType(data) {
        var component = data.components
            .filter(function (c) {
                return c.name === chartName;
            })
            .pop();
        if (component) {
            $select.find("option[value='" + component.chartType + "']")
                .attr("selected", "selected");
        }
    }

    function buildControl(name, options) {

        function buildOptions(options) {
            var template = "<option>{value}</option>";
            return options.reduce(function (memo, option) {
                return memo + template.replace("{value}", option);
            }, "")
        }

        console.log(options);

        if (!options.length) {
            console.log(options);
        }

        var template = "<label>{label}</label><select>{options}</select><br>",
            content = template.replace("{label}", name)
    }
}

```

```
        .replace("{options}", buildOptions(options));

    var $control = $(content);
    $control.insertBefore($("#reportContainer"));
    return $control;
}
});
```

As shown in the following HTML, the control for the chart type is created dynamically by the JavaScript:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>
<!--Provide a container for the report -->
<div id="reportContainer"></div>
```

10.4 Changing the Chart Properties

Those chart components that are based on Highcharts have a lot of interactivity such as built-in zooming and animation. The built-in zooming lets users select data, for example columns in a chart, but it can also interfere with touch interfaces. With the JasperReports IO JavaScript API, you have full control over these features and you can choose to allow your users access to them or not. For example, animation can be slow on mobile devices, so you could turn off both zooming and animation. Alternatively, if your users have a range of mobile devices, tablets, and desktop computers, then you could give users the choice of turning on or off these properties themselves.

The following example creates buttons to toggle several chart properties and demonstrates how to control them programmatically. First the HTML to create the buttons:

```
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<button id="disableAnimation">disable animation</button>
<button id="enableAnimation">enable animation</button>
<button id="resetAnimation">reset animation to initial state</button>

<button id="disableZoom">disable zoom</button>
<button id="zoomX">set zoom to 'x' type</button>
<button id="zoomY">set zoom to 'y' type</button>
<button id="zoomXY">set zoom to 'xy' type</button>
<button id="resetZoom">reset zoom to initial state</button>

<div id="reportContainer"></div>
```

Here are the API calls to set the various chart properties:

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
```



```

var report = jrioClient.report({
  resource: "/samples/reports/highcharts/HighchartsChart",
  container: "#reportContainer",
  error: function(e) {
    alert(e);
  }
});
function changeChartProperty(prop, value) {
  var chartProps = report.chart();

  if (typeof value === "undefined") {
    delete chartProps[prop];
  } else {
    chartProps[prop] = value;
  }

  report.chart(chartProps).run().fail(function(e) { alert(e); });
}

$("#disableAnimation").on("click", function() {
  changeChartProperty("animation", false);
});
$("#enableAnimation").on("click", function() {
  changeChartProperty("animation", true);
});

$("#resetAnimation").on("click", function() {
  changeChartProperty("animation");
});

$("#disableZoom").on("click", function() {
  changeChartProperty("zoom", false);
});

$("#zoomX").on("click", function() {
  changeChartProperty("zoom", "x");
});

$("#zoomY").on("click", function() {
  changeChartProperty("zoom", "y");
});

$("#zoomXY").on("click", function() {
  changeChartProperty("zoom", "xy");
});

$("#resetZoom").on("click", function() {
  changeChartProperty("zoom");
});
});

```

10.5 Undo and Redo Actions

The JIVE UI supports undo and redo actions that you can access programmatically with the JasperReports IO JavaScript API. As in many applications, undo and redo actions act like a stack, and the `canUndo` and `canRedo`

events notify your page you are at either end of the stack.

```
jrio.config({
    ...
});
jrio(function(jrioClient) {
    var chartComponent,
        report = jrioClient.report({
            resource: "/samples/reports/highcharts/HighchartsChart",
            container: "#reportContainer",
            events: {
                canUndo: function(canUndo) {
                    if (canUndo) {
                        $("#undo, #undoAll").removeAttr("disabled");
                    } else {
                        $("#undo, #undoAll").attr("disabled", "disabled");
                    }
                },
                canRedo: function(canRedo) {
                    if (canRedo) {
                        $("#redo").removeAttr("disabled");
                    } else {
                        $("#redo").attr("disabled", "disabled");
                    }
                }
            },
            success: function(data) {
                chartComponent = data.components.pop();
                $("option[value='" + chartComponent.chartType + "']").attr("selected", "selected");
            }
        });
    var chartTypeSelect = buildChartTypeSelect(jrioClient.report);
    chartTypeSelect.on("change", function() {

        report.updateComponent(chartComponent.id, {
            chartType: $(this).val()
        })
        .done(function(component) {
            chartComponent = component;
            console.log("ttttt:" + $(this).val());
        })
        .fail(function(error) {
            console.log(error);
            alert(error);
        });
    });

    $("#undo").on("click", function() {
        report.undo().fail(function(err) {
            alert(err);
        });
    });

    $("#redo").on("click", function() {
        report.redo().fail(function(err) {
            alert(err);
        });
    });
});
```

```

});

$("#undoAll").on("click", function () {
    report.undoAll().fail(function (err) {
        alert(err);
    });
});

});
function buildChartTypeSelect(report) {
    chartTypeSelect = $("#chartType");
    var chartTypes = report.chart.types;
    chartTypeSelect = $("#chartType");
    $.each(chartTypes, function (index, type) {
        chartTypeSelect.append("<option value=\"" + type + "\">" + type + "</option>");
    });
    return chartTypeSelect;
}

```

Associated HTML:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<select id="chartType"></select>
<button id="undo" disabled="disabled">Undo</button>
<button id="redo" disabled="disabled">Redo</button>
<button id="undoAll" disabled="disabled">Undo All</button>
<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.6 Sorting Table Columns

This code example shows how to set the three possible sorting orders on a column in the JIVE UI: ascending, descending, and no sorting.

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var report = jrioClient.report({
        resource: "/samples/reports/TableReport",
        container: "#reportContainer",
        error: showError
    });

    $("#sortAsc").on("click", function () {
        report.updateComponent("name", {
            sort: {
                order: "asc"
            }
        })
        .fail(showError);
    });

```

```

});

$("#sortDesc").on("click", function () {
    report.updateComponent("name", {
        sort: {
            order: "desc"
        }
    })
    .fail(showError);
});

$("#sortNone").on("click", function () {
    report.updateComponent("name", {
        sort: {}
    }).fail(showError);
});

function showError(err) {
    alert(err);
}
});

```

Associated HTML:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<button id="sortAsc">Sort NAME column ASCENDING</button>
<button id="sortDesc">Sort NAME column DESCENDING</button>
<button id="sortNone">Reset NAME column</button>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.7 Filtering Table Columns

This code example shows how to define filters on columns of various data types (dates, strings, numeric) in the JIVE UI. It also shows several filter operator such as equal, greater, between, contain (for string matching), and before (for times and dates).

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var report = jrioClient.report({
        resource: "/samples/reports/OrdersTable",
        container: "#reportContainer",
        error: function(err) {
            alert(err);
        }
    });
});

```

```

    }
  });

$("#setTimestampRange").on("click", function() {
  report.updateComponent("ORDERDATE", {
    filter: {
      operator: "between",
      value: ($("#betweenDates1").val(), ($("#betweenDates2").val()))
    }
  }).fail(handleError);
});

$("#resetTimestampFilter").on("click", function() {
  report.updateComponent("ORDERDATE", {
    filter: {}
  }).fail(handleError);
});

$("#setStringContains").on("click", function() {
  report.updateComponent("SHIPNAME", {
    filter: {
      operator: "contain",
      value: ($("#stringContains").val())
    }
  }).fail(handleError);
});

$("#resetString").on("click", function() {
  report.updateComponent("SHIPNAME", {
    filter: {}
  }).fail(handleError);
});

$("#setNumericGreater").on("click", function() {
  report.updateComponent("ORDERID", {
    filter: {
      operator: "greater",
      value: parseFloat($("#numericGreater").val(), 10)
    }
  }).fail(handleError);
});

$("#resetNumeric").on("click", function() {
  report.updateComponent("ORDERID", {
    filter: {}
  }).fail(handleError);
});

function handleError(err) {
  console.log(err);
  alert(err);
}

```

Associated HTML:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
```

```

<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<input type="text" value="1997-01-10T00:00:00" id="betweenDates1"/> -
<input type="text" id="betweenDates2" value="1997-10-24T00:00:00"/>
<button id="setTimestampRange">Set timestamp range</button>
<button id="resetTimestampFilter">Reset timestamp filter</button>
<br/><br/>
<input type="text" value="ctu" id="stringContains"/>
<button id="setStringContains">Set string column contains</button>
<button id="resetString">Reset string filter</button>
<br/><br/>
<input type="text" value="10500" id="numericGreater"/>
<button id="setNumericGreater">Set numeric column greater than</button>
<button id="resetNumeric">Reset numeric filter</button>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.8 Formatting Table Columns

The JIVE UI allows you to format columns by setting the alignment, color, font, size, and background of text in both headings and cells. You can also set the numeric format of cells, such as the precision, negative indicator, and currency.

```

jrio.config({
  ...
});
jrio(function(jrioClient) {
  var columns,
  report = jrioClient.report({
    resource: "/samples/reports/TableReport",
    container: "#reportContainer",
    events: {
      reportCompleted: function(status, error) {
        if (status === "ready") {
          columns = _.filter(report.data().components, function(component) {
            return component.componentType == "tableColumn";
          });
          var column4 = columns[4];
          $("#label").val(column4.label);
          $("#headingFormatAlign").val(column4.headingFormat.align);
          $("#headingFormatBgColor").val(column4.headingFormat.backgroundColor);
          $("#headingFormatFontSize").val(column4.headingFormat.font.size);
          $("#headingFormatFontColor").val(column4.headingFormat.font.color);
          $("#headingFormatFontName").val(column4.headingFormat.font.name);

          if (column4.headingFormat.font.bold) {
            $("#headingFormatFontBold").attr("checked", "checked");
          } else {
            $("#headingFormatFontBold").removeAttr("checked");
          }
        }
      }
    }
  });

```

```

    }
    if (column4.headingFormat.font.italic) {
        $("#headingFormatFontItalic").attr("checked", "checked");
    } else {
        $("#headingFormatFontItalic").removeAttr("checked");
    }
    if (column4.headingFormat.font.underline) {
        $("#headingFormatFontUnderline").attr("checked", "checked");
    } else {
        $("#headingFormatFontUnderline").removeAttr("checked");
    }
    $("#detailsRowFormatAlign").val(column4.detailsRowFormat.align);
    $("#detailsRowFormatBgColor").val(column4.detailsRowFormat.backgroundColor);
    $("#detailsRowFormatFontSize").val(column4.detailsRowFormat.font.size);
    $("#detailsRowFormatFontColor").val(column4.detailsRowFormat.font.color);
    $("#detailsRowFormatFontName").val(column4.detailsRowFormat.font.name);
    if (column4.detailsRowFormat.font.bold) {
        $("#detailsRowFormatFontBold").attr("checked", "checked");
    } else {
        $("#detailsRowFormatFontBold").removeAttr("checked");
    }
    if (column4.detailsRowFormat.font.italic) {
        $("#detailsRowFormatFontItalic").attr("checked", "checked");
    } else {
        $("#detailsRowFormatFontItalic").removeAttr("checked");
    }
    if (column4.detailsRowFormat.font.underline) {
        $("#detailsRowFormatFontUnderline").attr("checked", "checked");
    } else {
        $("#detailsRowFormatFontUnderline").removeAttr("checked");
    }
    }
    },
    error: function(err) {
        alert(err);
    }
});
$("#changeHeadingFormat").on("click", function() {
    report.updateComponent(columns[4].id, {
        headingFormat: {
            align: $("#headingFormatAlign").val(),
            backgroundColor: $("#headingFormatBgColor").val(),
            font: {
                size: parseFloat($("#headingFormatFontSize").val()),
                color: $("#headingFormatFontColor").val(),
                underline: $("#headingFormatFontUnderline").is(":checked"),
                bold: $("#headingFormatFontBold").is(":checked"),
                italic: $("#headingFormatFontItalic").is(":checked"),
                name: $("#headingFormatFontName").val()
            }
        }
    });

}).fail(function(e) {
    alert(e);
});

```

```

});

$("#changeDetailsRowFormat").on("click", function() {
  report.updateComponent(columns[4].id, {
    detailsRowFormat: {
      align: $("#detailsRowFormatAlign").val(),
      backgroundColor: $("#detailsRowFormatBgColor").val(),
      font: {
        size: parseFloat($("#detailsRowFormatFontSize").val()),
        color: $("#detailsRowFormatFontColor").val(),
        underline: ($("#detailsRowFormatFontUnderline").is(":checked")),
        bold: ($("#detailsRowFormatFontBold").is(":checked")),
        italic: ($("#detailsRowFormatFontItalic").is(":checked")),
        name: ($("#detailsRowFormatFontName").val())
      }
    }
  }).fail(function(e) {
    alert(e);
  });
});

$("#changeLabel").on("click", function() {
  report.updateComponent(columns[4].id, {
    label: $("#label").val()
  }).fail(function(e) {
    alert(e);
  });
});
});

```

The associated HTML has static controls for selecting all the formatting options that the script above can modify in the report.

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrjio.js -->
<script src="http://bi.example.com:8080/jrjiojsapi/client/jrjio.js"></script>

<div >
  <h3>Heading format for 5th column</h3>
  Align: <select id="headingFormatAlign">
    <option value="left">left</option>
    <option value="center">center</option>
    <option value="right">right</option></select>

  <br/>
  Background color: <input type="text" id="headingFormatBgColor" value=""/>
  <br/>
  Font size: <input type="text" id="headingFormatFontSize" value=""/>
  <br/>
  Font color: <input type="text" id="headingFormatFontColor" value=""/>
  <br/>
  Font name: <input type="text" id="headingFormatFontName" value=""/>
  <br/>
  Bold: <input type="checkbox" id="headingFormatFontBold" value="true"/>

```



```

    <br/>
    Italic: <input type="checkbox" id="headingFormatFontItalic" value="true"/>
    <br/>
    Underline: <input type="checkbox" id="headingFormatFontUnderline" value="true"/>
    <br/><br/>
    <button id="changeHeadingFormat">Change heading format</button>
</div>
<div >
    <h3>Details row format for 5th column</h3>
    Align: <select id="detailsRowFormatAlign">
        <option value="left">left</option>
        <option value="center">center</option>
        <option value="right">right</option></select>
    <br/>
    Background color: <input type="text" id="detailsRowFormatBgColor" value=""/>
    <br/>
    Font size: <input type="text" id="detailsRowFormatFontSize" value=""/>
    <br/>
    Font color: <input type="text" id="detailsRowFormatFontColor" value=""/>
    <br/>
    Font name: <input type="text" id="detailsRowFormatFontName" value=""/>
    <br/>
    Bold: <input type="checkbox" id="detailsRowFormatFontBold" value="true"/>
    <br/>
    Italic: <input type="checkbox" id="detailsRowFormatFontItalic" value="true"/>
    <br/>
    Underline: <input type="checkbox" id="detailsRowFormatFontUnderline" value="true"/>
    <br/><br/>
    <button id="changeDetailsRowFormat">Change details row format</button>
</div>
<div >
    <h3>Change label of 5th column</h3>
    <br/>
    Label <input type="text" id="label"/>
    <br/>
    <button id="changeLabel">Change label</button>
</div>
</div>
<div ></div>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.9 Conditional Formatting on Table Columns

The JIVE UI also supports conditional formatting so that you can change the appearance of a cell's contents based on its value. This example highlights cells in a given column that have a certain value by changing their text color and the cell background color. Note that the column name must be known ahead of time, for example by looking at your JRXML.

```

jrio.config({
    ...
});

```

```

jrio(function(jrioClient) {
  // column name from JRXML (field name by default)
  var report = jrioClient.report({
    resource: "/samples/reports/OrdersTable",
    container: "#reportContainer",
    error: showError
  });

  $("#changeConditions").on("click", function() {
    report.updateComponent("ORDERID", {
      conditions: [
        {
          operator: "greater",
          value: 10500,
          backgroundColor: null,
          font: {
            color: "FF0000",
            bold: true,
            underline: true,
            italic: true
          }
        },
        {
          operator: "between",
          value: [10900, 11000],
          backgroundColor: "00FF00",
          font: {
            color: "0000FF"
          }
        }
      ]
    })
    .then(printConditions)
    .fail(showError);
  });

  function printConditions(component) {
    console.log("Conditions: " + component.conditions);
  }

  function showError(err) {
    alert(err);
  }
});

```

This example has a single button that allows the user to apply the conditional formatting when the report is loaded:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<button id="changeConditions">Change conditions for numeric column</button>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.10 Sorting Crosstab Columns

Crosstabs are more complex and do not have as many formatting options. This example shows how to sort the values in a given column of a crosstab (the rows are rearranged). Note that the code is slightly different than **“Sorting Table Columns” on page 83**.

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    var column2,
    report = jrioClient.report({
        resource: "/samples/reports/crosstabs/OrdersReport",
        container: "#reportContainer",
        events: {
            reportCompleted: function(status, error) {
                if (status === "ready") {
                    var columns = _.filter(report.data().components, function(component) {
                        return component.componentType == "crosstabDataColumn";
                    });

                    column2 = columns[1];
                    console.log(columns);
                }
            },
            error: function(err) {
                alert(err);
            }
        }
    });

    $("#sortAsc").on("click", function () {
        report.updateComponent(column2.id, {
            sort: {
                order: "asc"
            }
        }).fail(function(e) {
            alert(e);
        });
    });

    $("#sortDesc").on("click", function() {
        report.updateComponent(column2.id, {
            sort: {
                order: "desc"
            }
        }).fail(function(e) {
            alert(e);
        });
    });

    $("#sortNone").on("click", function() {
        report.updateComponent(column2.id, {
            sort: {}
        }).fail(function(e) {
            alert(e);
        });
    });
});

```

The associated HTML has the buttons to trigger the sorting:

```
<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<button id="sortAsc">Sort 2nd column ascending</button>
<button id="sortDesc">Sort 2nd column descending</button>
<button id="sortNone">Do not sort on 2nd column</button>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>
```

10.11 Sorting Crosstab Rows

This example shows how to sort the values in a given row of a crosstab (the columns are rearranged).

```
jrio.config({
  ...
});
jrio(function(jrioClient) {
  var row,
  report = jrioClient.report({
    resource: "/samples/reports/crosstabs/OrdersReport",
    container: "#reportContainer",
    events: {
      reportCompleted: function(status, error) {
        if (status === "ready") {
          row = _.filter(report.data().components, function(component) {
            return component.componentType == "crosstabRowGroup";
          })[0];
        }
      },
      error: function(err) {
        alert(err);
      }
    }
  });

  $("#sortAsc").on("click", function() {
    report.updateComponent(row.id, {
      sort: {
        order: "asc"
      }
    }).fail(function(e) {
      alert(e);
    });
  });

  $("#sortDesc").on("click", function() {
    report.updateComponent(row.id, {
      sort: {
        order: "desc"
      }
    });
  });
});
```

```

        }).fail(function (e) {
            alert(e);
        });
    });

    $("#sortNone").on("click", function () {
        report.updateComponent(row.id, {
            sort: {}
        }).fail(function(e) {
            alert(e);
        });
    });
});
});

```

The associated HTML has the buttons to trigger the sorting:

```

<script src="http://code.jquery.com/jquery-2.1.0.js"></script>
<script src="http://underscorejs.org/underscore-min.js"></script>
<!-- Provide the URL to jrio.js -->
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>

<button id="sortAsc">Sort rows ascending</button>
<button id="sortDesc">Sort rows descending</button>
<button id="sortNone">Do not sort rows</button>

<!-- Provide a container for the report -->
<div id="reportContainer"></div>

```

10.12 Implementing Search in Reports

The JIVE UI supports a search capability within the report. The following example relies on a page with a simple search input.

```

<input id="search-query" type="input" />
<button id="search-button">Search</button>
<!--Provide container to render your visualization-->
<div id="reportContainer"></div>

```

Then you can use the search function to return a list of matches in the report. In this example, the search button triggers the function and passes the search term. It uses the console to display the results, but you can use them to locate the search term in a paginated report.

```

jrio.config({
    ...
});
jrio(function(jrioClient) {

    //render report from provided resource
    var report = jrioClient.report({
        resource: "/samples/reports/TableReport",
        error: handleError,
        container: "#reportContainer"
    });

```

```
});

$("#search-button").click(function(){
    report
    .search($("#search-query").val())
    .done(function(results){
        !results.length && console.log("The search did not return any results!");
        for (var i = 0; i < results.length; i++) {
            console.log("found " + results[i].hitCount + " results on page: #" +
                results[i].page);
        }
    })
    .fail(handleError);
});

//show error
function handleError(err){
    alert(err.message);
}

});
```

The search function supports several arguments to refine the search:

```
$("#search-button").click(function(){
    report
    .search({
        text: $("#search-query").val(),
        caseSensitive: true,
        wholeWordsOnly: true
    })
    ...
});
```

10.13 Providing Bookmarks in Reports

The JIVE UI also supports bookmarks that are embedded within the report. You must create your report with bookmarks, but then the JasperReports IO JavaScript API can make them available on your page. The following example has a container for the bookmarks and one for the report:

```
<div>
  <h4>Bookmarks</h4>
  <div id="bookmarksContainer"></div>
</div>
<!--Provide container to render your visualization-->
<div id="reportContainer"></div>
```

Then you need a function to read the bookmarks in the report and place them in the container. A handler then responds to clicks on the bookmarks.

```
jrio.config({
```

```

    ...
});
jrio(function(jrioClient) {
    //render report from provided resource
    var report = jrioClient.report({
        resource: "/samples/reports/TableReport",
        error: handleError,
        container: "#reportContainer",
        events: {
            bookmarksReady: handleBookmarks
        }
    });

    //show error
    function handleError(err){
        alert(err.message);
    }

    $("#bookmarksContainer").on("click", ".jr_bookmark", function(evt) {
        report.pages({
            anchor: $(this).data("anchor")
        }).run();
    });

    // handle bookmarks
    function handleBookmarks(bookmarks, container) {
        var li, ul = $("

<span class='jr_bookmark' title='Anchor: " + bookmark.anchor + ", page: " +
bookmark.page + "' data-anchor='" + bookmark.anchor + "' data-page='" + bookmark.page + "'>" + book-
mark.anchor + "</span></li>");
            bookmark.bookmarks && handleBookmarks(bookmark.bookmarks, li);
            ul.append(li);
        });

        container.append(ul);
    }
});

```

10.14 Disabling the JIVE UI

The JIVE UI is enabled by default on all reports that support it. When the JIVE UI is disabled, the report is static and neither users nor your script can interact with the report elements. You can disable it in your `jrioClient.report` call as shown in the following example:

```

jrio.config({
    ...
});
jrio(function(jrioClient) {
    jrioClient.report({
        resource: "/samples/reports/TableReport",
        container: "#reportContainer",

```

```
    defaultJiveUi: { enabled: false },  
    error: function (err) {  
        alert(err.message);  
    }  
  });  
});
```

Associated HTML:

```
<script src="http://bi.example.com:8080/jriojsapi/client/jrio.js"></script>  
<p>JIVE UI is disabled on this report:</p>  
<div id="reportContainer">Loading...</div>
```


GLOSSARY

Ad Hoc Editor

The interactive data explorer in JasperReports Server Professional and Enterprise editions. Starting from a predefined collection of fields, the Ad Hoc Editor lets you drag and drop fields, dimensions, and measures to explore data and create tables, charts, and crosstabs. These Ad Hoc views can be saved as reports.

Ad Hoc Report

In previous versions of JasperReports Server, a report created through the Ad Hoc Editor. Such reports could be added to dashboards and be scheduled, but when edited in Jaspersoft Studio, lost their grouping and sorting. In the current version, the Ad Hoc Editor is used to explore views which in turn can be saved as reports. Such reports can be edited in Jaspersoft Studio without loss, and can be scheduled and added to dashboards.

Ad Hoc View

A view of data that is based on a Domain, Topic, or OLAP client connection. An Ad Hoc view can be a table, chart, or crosstab and is the entry point to analysis operations such as slice and dice, drill down, and drill through. [Compare OLAP View](#). You can save an Ad Hoc view as a report in order to edit it in the interactive viewer, schedule it, or add it to a dashboard.

Aggregate Function

An aggregate function is one that is computed using a group of values; for example, Sum or Average. Aggregate functions can be used to create calculated fields in Ad Hoc views. Calculated fields containing aggregate functions cannot be used as fields or added to groups in an Ad Hoc view and should not be used as filters. Aggregate functions allow you to set a level, which specifies the scope of the calculation; level values include Current (not available for PercentOf), ColumnGroup, ColumnTotal, RowGroup, RowTotal, Total.

Amazon Web Services (AWS)

Cloud platform, used to provide and host a family of services, such as RDS, S3, and EC2.

Analysis View

[See OLAP View](#).

Audit Archiving

To prevent audit logs from growing too large to be easily accessed, the installer configures JasperReports Server to move current audit logs to an archive after a certain number of days, and to delete logs in the archive after a certain age. The archive is another table in the JasperReports Server's repository database.

Audit Domains

A Domain that accesses audit data in the repository and lets administrators create Ad Hoc reports of server activity. There is one Domain for current audit logs and one for archived logs.

Audit Logging

When auditing is enabled, audit logging is the active recording of who used JasperReports Server to do what when. The system installer can configure what activities to log, the amount of detail gathered, and when to archive the data. Audit logs are stored in the same private database that JasperReports Server uses to store the repository, but the data is only accessible through the audit Domains.

Auditing

A feature of JasperReports Server Enterprise edition that records all server activity and allows administrators to view the data.

Calculated Field

In an Ad Hoc view or a Domain, a field whose value is calculated from a user-defined formula that may include any number of fields, operators, and constants. For Domains, a calculated field becomes one of the items to which the Domain's security file and locale bundles can apply. There are more functions available for Ad Hoc view calculations than for Domains.

CloudFormation (CF)

Amazon Web Services CloudFormation gives developers and systems administrators an easy way to create and manage a collection of related AWS resources, provisioning, and updating them in an orderly and predictable fashion.

CRM

Customer Relationship Management. The practice of managing every facet of a company's interactions with its clientele. CRM applications help businesses track and support their customers.

CrossJoin

An MDX function that combines two or more dimensions into a single axis (column or row).

Cube

The basis of most OLAP applications, a cube is a data structure that contains three or more dimensions that categorize the cube's quantitative data. When you navigate the data displayed in an OLAP view, you are exploring a cube.

Custom Field

In the Ad Hoc Editor, a field that is created through menu items as a simple function of one or two available fields, including other custom fields. When a custom field becomes too complex or needs to be used in many reports, it is best to define it as a calculated field in a Domain.

Dashboard

A collection of reports, input controls, graphics, labels, and web content displayed in a single, integrated view. Dashboards often present a high level view of your data, but input controls can parametrize the data to display. For example, you can narrow down the data to a specific date range. Embedded web content, such as other web-based applications or maps, make dashboards more interactive and functional.

Dashlet

An element in a dashboard. Dashlets are defined by editable properties that vary depending on the dashlet type. Types of dashlet include reports, text elements, filters, and external web content.

Data Island

A single join tree or a table without joins in a Domain. A Domain may contain several data islands, but when creating an Ad Hoc view from a Domain, you can only select one of them to be available in the view.

Data Policy

In JasperReports Server, a setting that determines how the server processes and caches data used by Ad Hoc reports. Select your data policies by clicking **Manage > Server > Settings Ad Hoc Settings**. By default, this setting is only available to the superuser account.

Data Source

Defines the connection properties that JasperReports Server needs to access data. The server transmits queries to data sources and obtains datasets in return for use in filling reports and previewing Ad Hoc reports. JasperReports Server supports JDBC, JNDI, and Bean data sources; custom data sources can be defined as well.

Dataset

A collection of data arranged in columns and rows. Datasets are equivalent to relational results sets and the `JRDataSource` type in the JasperReports Library.

Datatype

In JasperReports Server, a datatype is used to characterize a value entered through an input control. A datatype must be of type text, number, date, or date-time. It can include constraints on the value of the input, for example maximum and minimum values. As such, a datatype in JasperReports Server is more structured than a datatype in most programming languages.

Denormalize

A process for creating table joins that speeds up data retrieval at the cost of having duplicate row values between some columns.

Derived Table

In a Domain, a derived table is defined by an additional query whose result becomes another set of items available in the Domain. For example, with a JDBC data source, you can write an SQL query that includes complex functions for selecting data. You can use the items in a derived table for other operations on the Domain, such as joining tables, defining a calculated field, or filtering. The items in a derived table can also be referenced in the Domain's security file and locale bundles.

Dice

An OLAP operation to select columns.

Dimension

A categorization of the data in a cube. For example, a cube that stores data about sales figures might include dimensions such as time, product, region, and customer's industry.

Domain

A virtual view of a data source that presents the data in business terms, allows for localization, and provides data-level security. A Domain is not a view of the database in relational terms, but it implements the same functionality within JasperReports Server. The design of a Domain specifies tables in the database, join clauses, calculated fields, display names, and default properties, all of which define items and sets of items for creating Ad Hoc reports.

Domain Topic

A Topic that is created from a Domain by the Data Chooser. A Domain Topic is based on the data source and items in a Domain, but it allows further filtering, user input, and selection of items. Unlike a JRXML-based Topic, a Domain Topic can be edited in JasperReports Server by users with the appropriate permissions.

Drill

To click on an element of an OLAP view to change the data that is displayed:

- Drill down. An OLAP operation that exposes more detailed information down the hierarchy levels by delving deeper into the hierarchy and updating the contents of the navigation table.
- Drill through. An OLAP operation that displays detailed transactional data for a given aggregate measure. Click a fact to open a new table beneath the main navigation table; the new table displays the low-level data that constitutes the data that was clicked.
- Drill up. An OLAP operation for returning the parent hierarchy level to view to summary information.

Eclipse

An open source Integrated Development Environment (IDE) for Java and other programming languages, such as C/C++.

ETL

Extract, Transform, Load. A process that retrieves data from transactional systems, and filters and aggregates the data to create a multidimensional database. Generally, ETL prepares the database that your reports will access. The Jaspersoft ETL product lets you define and schedule ETL processes.

Fact

The specific value or aggregate value of a measure for a particular member of a dimension. Facts are typically numeric.

Field

A field is equivalent to a column in the relational database model. Fields originate in the structure of the data source, but you may define calculated fields in a Domain or custom fields in the Ad Hoc Editor. Any type of field, along with its display name and default formatting properties, is called an item and may be used in the Ad Hoc Editor.

Frame

In Jaspersoft Studio, a frame is a rectangular element that can contain other elements and optionally draw a border around them. Elements inside a frame are positioned relative to the frame, not to the band, and when you move a frame, all the elements contained in the frame move together. A frame automatically stretches to fit its contents.

Frame can also refer to an element in a legacy dashboard; it's the equivalent of a dashlet.

Group

In a report, a group is a set of data rows that have an identical value in a designated field.

- In a table, the value appears in a header and footer around the rows of the group, while the other fields appear as columns.
- In a chart, the field chosen to define the group becomes the independent variable on the X axis, while the other fields of each group are used to compute the dependent value on the Y axis.

Hierarchy Level

In an OLAP cube, a member of a dimension containing a group of members.

Input Control

A button, check box, drop-down list, text field, or calendar icon that allows users to enter a value when running a report or viewing a dashboard that accepts input parameters. For JRXML reports, input controls and their associated datatypes must be defined as repository objects and explicitly associated with the report. For Domain-based reports that prompt for filter values, the input controls are defined internally. When either type of report is used in a dashboard, its input controls are available to be added as special content.

Item

When designing a Domain or creating a Topic based on a Domain, an item is the representation of a database field or a calculated field along with its display name and formatting properties defined in the Domain. Items can be grouped in sets and are available for use in the creation of Ad Hoc reports.

JasperReport

A combination of a report template and data that produces a complex document for viewing, printing, or archiving information. In the server, a JasperReport references other resources in the repository:

- The report template (in the form of a JRXML file)
- Information about the data source that supplies data for the report
- Any additional resources, such as images, fonts, and resource bundles referenced by the report template.

The collection of all the resources that are referenced in a JasperReport is sometimes called a report unit. End users usually see and interact with a JasperReport as a single resource in the repository, but report creators must define all of the components in the report unit.

JasperReports IO

An HTTP-based reporting service for JasperReports Library that provides an interface to the JasperReports Library reporting engine through the use of a REST API and a JavaScript API. The REST API provides services for running, exporting, and interacting with reports while the JavaScript API allows you to embed reports and their input controls into your web pages and web applications.

JasperReports Library

An embeddable, open source, Java API for generating a report, filling it with current data, drawing charts and tables, and exporting to any standard format (HTML, PDF, Excel, CSV, and others). JasperReports processes reports defined in JRXML, an open XML format that allows the report to contain expressions and logic to control report output based on run-time data.

JasperReports Server

A commercial open source, server-based application that calls the JasperReports Library to generate and share reports securely. JasperReports Server authenticates users and lets them upload, run, view, schedule, and send reports from a web browser. Commercial versions provide metadata layers, interactive report and dashboard creation, and enterprise features such as organizations and auditing.

Jaspersoft Studio

A commercial open source tool for graphically designing reports that leverage all features of the JasperReports Library. Jaspersoft Studio lets you drag and drop fields, charts, and sub-reports onto a canvas, and also define parameters or expressions for each object to create pixel-perfect reports. You can generate the JRXML of the report directly in Jaspersoft Studio, or upload it to JasperReports Server. Jaspersoft Studio is implemented in Eclipse.

Jaspersoft ETL

A graphical tool for designing and implementing your data extraction, transforming, and loading (ETL) tasks. It provides hundreds of data source connectors to extract data from many relational and non-relational systems.

Then, it schedules and performs data aggregation and integration into data marts or data warehouses that you use for reporting.

Jaspersoft OLAP

A relational OLAP server integrated into JasperReports Server that performs data analysis with MDX queries. The product includes query builders and visualization clients that help users explore and make sense of multidimensional data. Jaspersoft OLAP also supports XML/A connections to remote servers.

Jaspersoft Studio

An open source tool for graphically designing reports that leverage all features of the JasperReports Library. Jaspersoft Studio lets you drag and drop fields, charts, and sub-reports onto a canvas, and also define parameters or expressions for each object to create pixel-perfect reports. You can generate the JRXML of the report directly in Jaspersoft Studio, or upload it to JasperReports Server. Jaspersoft Studio is implemented in Eclipse.

JavaBean

A reusable Java component that can be dropped into an application container to provide standard functionality.

JDBC

Java Database Connectivity. A standard interface that Java applications use to access databases.

JNDI

Java Naming and Directory Interface. A standard interface that Java applications use to access naming and directory services.

Join Tree

In Domains, a collection of joined tables from the actual data source. A join is the relational operation that associates the rows of one table with the rows of another table based on a common value in given field of each table. Only the fields in a same join tree or calculated from the fields in a same join tree may appear together in a report.

JPivot

An open source graphical user interface for OLAP operations. For more information, visit <http://jpivot.sourceforge.net/>.

JRXML

An XML file format for saving and sharing reports created for the JasperReports Library and the applications that use it, such as Jaspersoft Studio and JasperReports Server. JRXML is an open format that uses the XML standard to define precisely all the structure and configuration of a report.

Level

Specifies the scope of an aggregate function in an Ad Hoc view. Level values include Current (not available for PercentOf), ColumnGroup, ColumnTotal, RowGroup, RowTotal, Total.

MDX

Multidimensional Expression Language. A language for querying multidimensional objects, such as OLAP (On Line Analytical Processing) cubes, and returning cube data for analytical processing. An MDX query is the query that determines the data displayed in an OLAP view.

Measure

Depending on the context:

- In a report, a formula that calculates the values displayed in a table's columns, a crosstab's data values, or a chart's dependent variable (such as the slices in a pie).

- In an OLAP view, a formula that calculates the facts that constitute the quantitative data in a cube.

Mondrian

A Java-based, open source multidimensional database application.

Mondrian Connection

An OLAP client connection that consists of an OLAP schema and a data source. OLAP client connections populate OLAP views.

Mondrian Schema Editor

An open source Eclipse plug-in for creating Mondrian OLAP schemas.

Mondrian XML/A Source

A server-side XML/A source definition of a remote client-side XML/A connection used to populate an OLAP view using the XML/A standard.

MySQL

An open source relational database management system. For information, visit <http://www.mysql.com/>.

Navigation Table

The main table in an OLAP view that displays measures and dimensions as columns and rows.

ODBO Connect

Jaspersoft ODBO Connect enables Microsoft Excel 2003 and 2007 Pivot Tables to work with Jaspersoft OLAP and other OLAP servers that support the XML/A protocol. After setting up the Jaspersoft ODBO data source, business analysts can use Excel Pivot Tables as a front-end for OLAP analysis.

OLAP

On Line Analytical Processing. Provides multidimensional views of data that help users analyze current and past performance and model future scenarios.

OLAP Client Connection

A definition for retrieving data to populate an OLAP view. An OLAP client connection is either a direct Java connection (Mondrian connection) or an XML-based API connection (XML/A connection).

OLAP Schema

A metadata definition of a multidimensional database. In Jaspersoft OLAP, schemas are stored in the repository as XML file resources.

OLAP View

Also called an analysis view. A view of multidimensional data that is based on an OLAP client connection and an MDX query. Unlike Ad Hoc views, you can directly edit an OLAP view's MDX query to change the data and the way they are displayed. An OLAP view is the entry point for advanced analysis users who want to write their own queries. [Compare Ad Hoc View.](#)

Organization

A set of users that share folders and resources in the repository. An organization has its own user accounts, roles, and root folder in the repository to securely isolate it from other organizations that may be hosted on the same instance of JasperReports Server.

Organization Admin

Also called the organization administrator. A user in an organization with the privileges to manage the organization's user accounts and roles, repository permissions, and repository content. An organization admin can also create suborganizations and manage all of their accounts, roles, and repository objects. The default organization admin in each organization is the `jasperadmin` account.


Outlier

A fact that seems incongruous when compared to other member's facts. For example, a very low sales figure or a very high number of help desk tickets. Such outliers may indicate a problem (or an important achievement) in your business. The analysis features of Jaspersoft OLAP excel at revealing outliers.

Parameter

Named values that are passed to the engine at report-filling time to control the data returned or the appearance and formatting of the report. A report parameter is defined by its name and type. In JasperReports Server, parameters can be mapped to input controls that users can interact with.

Pivot

To rotate a crosstab such that its row groups become column groups and its column groups become rows. In the Ad Hoc Editor, pivot a crosstab by clicking .

Pivot Table

A table with two physical dimensions (for example, X and Y axis) for organizing information containing more than two logical dimensions (for example, PRODUCT, CUSTOMER, TIME, and LOCATION), such that each physical dimension is capable of representing one or more logical dimensions, where the values described by the dimensions are aggregated using a function such as SUM. Pivot tables are used in Jaspersoft OLAP.

Properties

Settings associated with an object. The settings determine certain features of the object, such as its color and label. Properties are normally editable. In Java, properties can be set in files listing objects and their settings.

Report

In casual usage, *report* may refer to:

- A JasperReport. [See JasperReport.](#)
- The main JRXML in a JasperReport.
- The file generated when a JasperReport is scheduled. Such files are also called content resources or output files.
- The file generated when a JasperReport is run and then exported.
- In previous JasperReports Server versions, a report created in the Ad Hoc Editor. [See Ad Hoc Report.](#)

Report Run

An execution of a report, Ad Hoc view, or dashboard, or a view or dashboard designer session, it measures and limits usage of Freemium instances of JasperReports Server. The executions apply to resources no matter how they are run (either in the web interface or through the various APIs, such as REST web services). Users of our Community Project and our full-use commercial licenses are not affected by the limit. For more information, please contact sales@jaspersoft.com.

Repository

In JasperReports Server, the repository is the tree structure of folders that contain all saved reports, dashboards, OLAP views, and resources. Users access the repository through the JasperReports Server web interface or

through Jaspersoft Studio. Applications can access the repository through the web service API. Administrators use the import and export utilities to back up the repository contents. In JasperReports IO, the repository is a folder-based structure where all the resources needed to create and run reports are stored. The repository can be stored on the host computer or in an S3 bucket hosted by Amazon Web Services. Users access the repository through a file browser if the files are stored on a host machine or the AWS console if the files are stored in an S3 bucket.

Resource

In JasperReports Server, anything residing in the repository, such as an image, file, font, data source, Topic, Domain, report element, saved report, report output, dashboard, or OLAP view. Resources also include the folders in the repository. Administrators set user and role-based access permissions on repository resources to establish a security policy.

Role

A security feature of JasperReports Server. Administrators create named roles, assign them to user accounts, and then set access permissions to repository objects based on those roles. Certain roles also determine what functionality and menu options are displayed to users in the JasperReports Server interface.

S3 Bucket

Cloud storage system for Amazon Web Services. JasperReports IO can use an S3 bucket to store files for its repository.

Schema

A logical model that determines how data is stored. For example, the schema in a relational database is a description of the relationships between tables, views, and indexes. In Jaspersoft OLAP, an OLAP schema is the logical model of the data that appears in an OLAP view; they are uploaded to the repository as resources. For Domains, schemas are represented in XML design files.

Schema Workbench

A graphical tool for easily designing OLAP schemas, data security schemas, and MDX queries. The resulting cube and query definitions can then be used in Jaspersoft OLAP to perform simple but powerful analysis of large quantities of multi-dimensional data stored in standard RDBMS systems.

Set

In Domains and Domain Topics, a named collection of items grouped together for ease of use in the Ad Hoc Editor. A set can be based on the fields in a table or entirely defined by the Domain creator, but all items in a set must originate in the same join tree. The order of items in a set is preserved.

Slice

An OLAP operation for filtering data rows.

SQL

Structured Query Language. A standard language used to access and manipulate data and schemas in a relational database.

Stack

A collection of Amazon Web Services resources you create and delete as a single unit.

System Admin

Also called the system administrator. A user who has unlimited access to manage all organizations, users, roles, repository permissions, and repository objects across the entire JasperReports Server instance. The system admin

can create root-level organizations and manage all server settings. The default system admin is the `superuser` account.

Topic

A JRXML file created externally and uploaded to JasperReports Server as a basis for Ad Hoc reports. Topics are created by business analysts to specify a data source and a list of fields with which business users can create reports in the Ad Hoc Editor. Topics are stored in the Ad Hoc Components folder of the repository and displayed when a user launches the Ad Hoc Editor.

Transactional Data

Data that describe measurable aspects of an event, such as a retail transaction, relevant to your business. Transactional data are often stored in relational databases, with one row for each event and a table column or field for each measure.

User

Depending on the context:

- A person who interacts with JasperReports Server through the web interface. There are generally three categories of users: administrators who install and configure JasperReports Server, database experts or business analysts who create data sources and Domains, and business users who create and view reports and dashboards.
- A user account that has an ID and password to enforce authentication. Both people and API calls accessing the server must provide the ID and password of a valid user account. Roles are assigned to user accounts to determine access to objects in the repository.

View

Several meanings pertain to JasperReports Server:

- An Ad Hoc view. [See Ad Hoc View.](#)
- An OLAP view. [See OLAP View.](#)
- A database view. See http://en.wikipedia.org/wiki/View_%28database%29.

Virtual Data Source

A virtual data source allows you to combine data residing in multiple JDBC and/or JNDI data sources into a single data source that can query the combined data. Once you have created a virtual data source, you create Domains that join tables across the data sources to define the relationships between the data sources.

WCF

Web Component Framework. A low-level GUI component of JPivot. For more information, see <http://jpivot.sourceforge.net/wcf/index.html>.

Web Services

A SOAP (Simple Object Access Protocol) API that enables applications to access certain features of JasperReports Server. The features include repository, scheduling and user administration tasks.

XML

eXtensible Markup language. A standard for defining, transferring, and interpreting data for use across any number of XML-enabled applications.

XML/A

XML for Analysis. An XML standard that uses Simple Object Access protocol (SOAP) to access remote data sources. For more information, see <http://www.xmla.org/>.

XML/A Connection

A type of OLAP client connection that consists of Simple Object Access Protocol (SOAP) definitions used to access data on a remote server. OLAP client connections populate OLAP views.

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