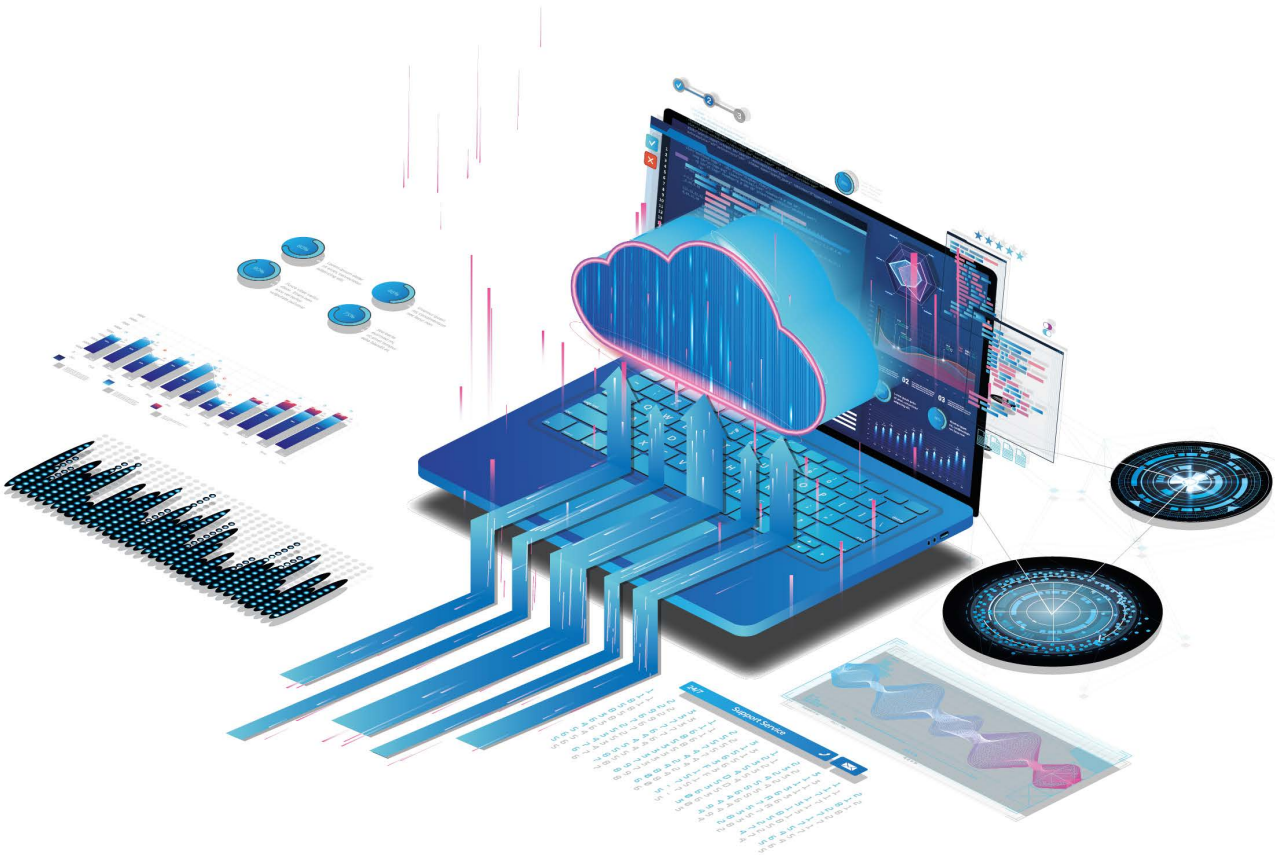


A PRACTITONER'S GUIDE TO
**MIGRATION FROM
TABLEAU SERVER
TO CLOUD**



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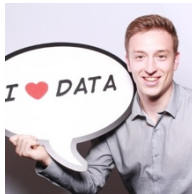
Acknowledgements

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STORM referenced in this book is created by USEReady as an enabler in the Tableau Cloud migration process. Downloading this book does not provide access to STORM. Please contact USEReady for any questions about STORM.

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Foreword



Scott Smith,
Product Manager
Tableau Cloud

Scott is responsible for Tableau cloud with a mission to make Analytics be available to everyone. He believes that analytics should be about you and your data, not infrastructure. He is helping Tableau build the next generation data experience with Natural Language and democratized data science in the cloud.

For years Tableau customers have been asking for a trusted and proven migration path to our SaaS offering. I speak daily with customers who are anxious to leave infrastructure planning, management, and maintenance behind in search of a solution that will scale with their organization's analytics needs. After months of collaboration and focused effort, I'm very excited that USEReady has developed a solution to help customers reach these goals. STORM will help you reduce risk, minimize migration timelines, and jumpstart your journey into Tableau Cloud. USEReady's expert team will also guide you on your path to a richer data culture. They can help you identify opportunities to maximize a migration's impact and fully capture the value of a cloud-native Tableau solution. This e-book details their expertise on the migration experience and will be helpful for anyone who is considering modernizing their approach to scaling analytics at their organization

INTRODUCTION

1. Introduction

1.1 About the Book

If you are considering moving your Tableau Server from on the premise infrastructure to cloud, Tableau offers two options. Hosted on your cloud or Hosted on Tableau's cloud. Tableau hosted cloud product is called Tableau Cloud formerly known as Tableau Online. This book aims to address considerations to either option based on your choice. At USEReady, we have developed a framework "Plan-Migrate-Validate" to capture this migration process and created a platform called "STORM (Server To Online Report Migration)".

The book discusses different scenarios for the migration that you can choose as per your needs.

Scenario I – Migration within an enterprise to upgrade hardware or another data center

Scenario II – On-prem to Your Cloud migration

Scenario III – On-prem to Tableau Cloud migration

Each scenario is explained in detail starting from preparation for migration to post migration checklist along with useful code snippets.

1.2 When Should You consider Server Migration?

- a. Take advantage of new technology or better service or ensure that the operating system (OS) and the hardware beneath it stay up to date with current technology.
- b. Move from on-premises infrastructure to cloud for increased flexibility or scalability.
- c. Replace aging infrastructure.
- d. Any change in the organization's policy that is not met by present infrastructure.

1.3 Why move to Tableau cloud?

There are many reasons for a firm to move to Tableau Cloud. Before you decide to move to Tableau Cloud, you need to ask a few fundamental questions about your Cloud Readiness and Security Practices. Tableau has several helpful resources online for you to understand this process further.

Below are two case studies that may help your decision.

#1 Why Splunk migrated to Tableau Cloud –

“Eliminate server admin overhead and drive better dashboard performance”

Read more -

<https://www.tableau.com/solutions/customer/splunk-migrates-tableau-cloud-eliminates-server-admin-overhead>

#2 Why Jaguar Land Rover migrated to Tableau Cloud –

“Accelerate its digital transformation with Tableau”

Read more -

<https://www.tableau.com/solutions/customer/jaguar-land-rover-develops-pioneering-data-culture-accelerate-its-digital>

Whatever may be your firm's decision, migrating to Tableau Cloud needs a careful consideration of several factors. In the remaining chapters, you will read about various migration scenarios and USEReady's battle tested framework with an automated approach to migration.

Migration Scenarios

2. Different Scenarios for Server Migration

There are 3 different scenarios of Server Migration discussed in this book:

2.1 Migration within an Enterprise

2.1.1 Purpose

This procedure is used to migrate the tableau server from one hardware on premise to another.

There could be many reasons to migrate the tableau server from one computer to another. Whether it is upgrading the current hardware or any compliance and security issue with the current instance, moving tableau server to another server can be the solution. In this type, both the source and destination infrastructure are located on premise.

2.1.2 Approach

Migrating the entire tableau server to another computer includes moving all the content along with users and groups. In this section, we are defining two major processes widely used for migrating server:

- a) Backup and restore
- b) Site export and import.

2.2 On Prem to Your Cloud Migration

2.2.1 Purpose

This procedure is used to migrate the tableau server from one hardware on premise to tableau server hosted on cloud.

Some of the reasons to migrate to cloud are to increase flexibility and scalability, improve security and to reduce IT costs.

2.2.2 Approach

Migrating the entire tableau server to cloud includes moving all the content along with users and groups. In this section, we are defining two major processes widely used for migrating server:

- a) Backup and restore
- b) Site export and import.

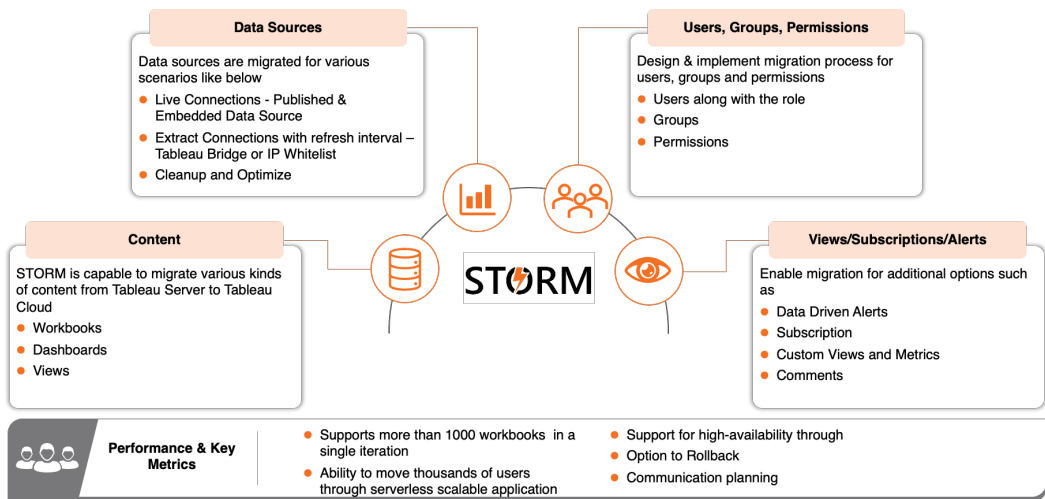
2.3 On-prem to Tableau Cloud

This scenario is more complex as the migration is not just a backup restore process but involves several considerations.

At USEReady, we noticed that quite often our customers have a broader set of components besides Content. These components are Data Sources, Users, Groups, Permissions, Views, Subscriptions, Alerts etc. Additionally, firms need a better framework to manage the migration process.

Hence, we developed a framework called “Plan-Migrate-Validate” to capture this migration process and created a platform called “STORM (Server To Online Report Migration)”.

Below is a diagram to outline comprehensive nature of STORM platform.



First, let us understand Tableau Content Migration Tool (CMT).

2.3.1 Purpose

Tableau Content Migration tool is available as a Server management add-on. It allows you to copy or move content between Tableau Server projects or sites. We can accomplish this between projects or sites on a single Tableau Server installation, or between projects or sites on distinct Tableau

Server installations if we have user-based licensing (for example, between a development instance of Tableau Server and a production installation).

Note: Mostly we use the term migration to describe moving content from one environment, site, or project to another. However, technically the Content Migration Tool copies content and does not automatically delete or archive the original or source content.

2.3.2 Benefits

- No code interface for migrating content
- Reduce the manual work
- Same "migration plan" can be used multiple times
- Migration plans are auditable and works via a batch process so any number of workbooks and data source can be migrated.

Now that we have a brief idea about each scenario of Server Migration, let us deep dive into each one of them.

Let's take up Server Migration for On Prem to On Prem and On Prem to Cloud first.

On Prem to On Prem/ Cloud Server Migration

3. On Prem to On Prem/ Cloud Server Migration:

It is seen that migration procedure is the same for both the server migration scenarios. The only difference is the infrastructure of target server i.e., whether the target server is going to be on-premises or hosted on cloud.

3.1 Steps in Server Migration

Three main steps are involved

- i. Preparation for Migration
- ii. Migration Process
- iii. Post Migration Checklist

Let's discuss each step-in detail.

3.1.1 Preparation for Migration

a) Assumptions

The process defined in this book is based on some assumptions.

- Tableau Server is already installed on the target machine with proper configuration
- All the necessary drivers that are in use in the source server are setup on target server
- The user performing the migration has admin privileges to both the machine where tableau server is installed
- You must have the credentials for one of the tableau server administrators on existing deployment

b) License Check

The target server must have proper licenses applied before proceeding with the migrations. This is done to ensure that the server functions smoothly and the features are not restricted due to licenses.

For instance, if any service is using add on license on the source server, the same license should be present on the new instance for smooth transition.

c) Know About Identity Store

Tableau server uses a repository known as identity store to manage user and group information. There are two types of identity stores: local and external. When you install Tableau Server, you must configure either a local identity store or an external identity store.

- **Local Identity Store**

When tableau server is configured with local identity store, all the users and groups information are stored and managed by tableau server repository

- **External Identity Store**

In case you configure tableau server with external identity store, all the users and groups information are stored and managed by an external directory service. Even if you are using external identity store, tableau server must be in sync with the external directory so that local copy of user and group information is present in tableau server.

d) Perform Backup and Restore

There are broadly two types of data to back up in tableau server. It is recommended to take both backup for the purpose of restoring the server in case of any disaster.

- **Data managed by tableau server:** This consists of Tableau PostgreSQL database or repository and File Store, which contains workbook and user metadata, data extract files, and site configuration data. When a backup is created using tsm maintenance backup command, all this data is stored in a single file with .tsbak extension.

- **Configuration and Topology data:** This includes most of the server configuration information required to fully recover a server. SMTP, alerting, some authentication assets, are all examples of configuration data that are exportable for backup. Topology data defines how your Tableau Server processes are configured in both single-server and multiple node deployments. Such backup is created using tsm settings export command.

i) Platform Compatibility

- You can use a backup created with Tableau Server on Linux to restore Tableau Server on Windows version 2018.2 and later.
- You cannot use a backup created with Tableau Server on Linux to restore earlier versions of Tableau Server on Windows (version 2018.1 and earlier).
- You can use a backup created with Tableau Server on Windows (version 2018.2 and earlier) to restore Tableau Server on Linux.

ii) Backup Strategies

The backup strategy depends on your recovery plan. The snapshot backup process may or may not be sufficient as it only creates a backup of the file store and repository data. There are other configurations and settings that you might need to do a full recovery. Some of the scenarios where snapshot backup may not serve the purpose are as follows:

- You maintain a standby tableau server to use in case your production Server is down. In this scenario, creating a snapshot backup and restoring it to your standby server on a regular schedule might be sufficient. Your backup schedule should be according to your recovery point objective.
- You plan to use a new tableau server installation in case of a disaster, but don't necessarily need to use the configurations and settings from your existing Tableau Server installation. In this case, you can install a new Tableau Server, and use the snapshot to restore the data.
- You don't have a standby Tableau Server but want to be able to create a new Tableau Server installation using the configurations and settings from your existing Tableau Server and restore the data.

In this scenario, you would need more than the snapshot backup to install a new Tableau Server.


To do a full backup including all the configurations and settings, follow these instructions:

1. Export topology and configuration data. This exports the majority of Tableau Server and topology.
2. Create a snapshot of the network share to create a backup of the File Store and Repository data.
3. Document the settings that are not included in the export. These are settings like system user accounts, coordination serviced deployment configuration, customized settings, and such.

iii) Storage Requirements for backup process

The free disk space required to create a backup varies depending on the amount of data in the Tableau Server repository and file store services, and their collocation with the tabadmincontroller service. During backups, the background tasks for cleaning up old extracts are temporarily paused. This means that, for the duration of the backup, extract refreshes will leave extra files in place, adding to disk space usage. If your backup takes a long time, or if your organization uses many extracts that are regularly updated, this can result in a significant amount of temporary disk space usage. These temporary files will be removed after the backup is complete.

The following table lists the disk space requirements for backup based on whether the node hosts the repository, file store, controller, or some combination of them.

Repository	File Store	Controller	Disk Space Required
			<p>3x repository data + 250 MB</p> <p>To obtain an estimate of the repository data, check the size of <data directory>/pgsql/data/base directory.</p> <p>To obtain the exact size of the repository data, open the backup file and use the size of the workgroup.pg_dump file.</p>

	✓		1.5x file store data To obtain an estimate of file store data (extracts, flows, etc.), check the size of <data directory>/dataengine directory.
		✓	3x repository data + 250 MB + 2.5x file store data
✓	✓		3x repository data + 250 MB + 1.5x file store data
	✓	✓	3x repository data + 250 MB + 1.5x file store data
✓		✓	3x repository data + 250 MB + 2.5x file store data
✓	✓	✓	3x repository data + 250 MB + 1.5x file store data

iv) Storage Requirements for Restore

You must have adequate disk space for the database restore process to run successfully.

To restore Tableau Server:

- On controller nodes, you need free space equal to at least the size of the backup archive.
- On repository nodes, you need free space equal to at least three times the size of the repository data in the backup archive, plus 250 MB, plus the size of the postgres data directory.
- On file store nodes, you need free space equal to at least twice the size of the data engine folder in the backup archive.

v) Back up Tableau Server with local file store

To begin with the backup process, check the following permissions are configured correctly:

- For Tableau Server installed on non-default drive: In such scenario, you’ll need to configure the permissions to network drive and run as service account manually.
- When backing up Tableau Server on Windows to a network drive, the Machine account must have write access to the network share where the backup files are written (this is not normally the case and you are responsible for configuring this if you want to back the server up to a network share).

Following steps explains the process to take both types of backups explained above:

- Backup configuration and topology data – The data is exported as JSON file using the command

```
tsm settings export -f <filename>.json
```

This backup contains topology and configuration data.

- Backup Data managed by tableau server – Following command backs up the repository data for tableau server 2018.2 and later:

```
tsm maintenance backup -f <filename>.tsbak -d
```

The backup file is assembled in a temporary location in the data directory and then written to the directory defined in the TSM basefilepath.backupstore variable. By default:

```
C:\ProgramData\Tableau\TableauServer\data\tabsvc\files\backups\<filename>.tsbak
```

Even if the default location is changed, the backup process will still use temporary location in data directory to assemble the backup file.

- For tableau server version 2018.1 or earlier,
 - Navigate to the bin directory for example: `cd "C:\Program Files\Tableau\Tableau Server\10.4\bin"`
 - Run the following command:
`tabadmin backup tabserver -v -d`
Include the -v flag to verify the integrity of the backup. Include the -d flag to include the date in the file name. In the example, tabserver will be used as the base file name of the resulting backup file. The date of the backup will be appended to the file name, for example, `tabserver-2017-12-20.tsbak`.

Note: If the file store is configured outside tableau server, the tsm maintenance backup command cannot be used to back up the data. Then next section will take you through the process of backing up tableau server if you are using external file store.

vi) Restore Tableau Server with Local File Store

This section explains the steps to re-store the tableau server using the backup files generated previously. Keep the following files ready before proceeding with the next steps:

- **Topology and configuration data:** This is the json file that is generated by the tsm settings export command.
- **Repository backup file:** This is the file with .tsbak extension that is generated by the tsm maintenance backup command.

The backup files can only be restored on server with the same type of identity store as the running server. For example, a backup from a server using local authentication can be restored to a Tableau Server initialized with local authentication, but a backup from a server using Active Directory authentication cannot be restored to a server initialized with local authentication.

When you use tsm maintenance restore to restore your Tableau data, data extract files and the contents of the PostgreSQL database are overwritten with the content in the backup file (.tsbak). If you are running a distributed installation of Tableau Server, perform the restore on the node running the TSM Controller (this is usually the initial node).

- **Backup assets:** These assets include the list of documented configurations as noted in the previous section.

Use the tsm maintenance restore command to restore your Tableau Server data. Follow the below steps to restore the tableau server from the backup files:

1. Copy the .tsbak file to the default file location.

The restore command expects a backup file in the directory defined in the TSM `basefilepath.backuprestore` variable.

By default:

```
C:\ProgramData\Tableau\Tableau
Server\data\tabsvc\files\backups\
```

2. Stop the server. At a command prompt, type:

```
tsm stop
```

3. Restore from a backup file. At a command prompt, type:

```
tsm maintenance restore --file
<file_name>
```

In the above line, replace <file_name> with the name of the backup file you want to restore from.

4. Restart the server:

```
tsm start
```

vii) Backup and Restore with External File Store

The backup and restore process is different if the tableau server is configured with an external file store.

- Tableau Server with External File Store

When tableau server is configured with external file store, tsm maintenance backup command does not create its backup.

When you have Tableau Server that is configured with External File Store but is using a local repository, Tableau Server backup operations include a backup of the Repository.

The following steps explains creating snapshot backup:

1. Prepare for snapshot backup: The following command created repository backup file and stores it temporarily in network share.

```
tsm maintenance snapshot-backup prepare
```

This process does not stop the tableau server. Once the process is complete you should see a message "Preparation for snapshot backup succeeded".

2. Create a snapshot of the network share: This snapshot will include both file store data and repository files which was created in previous step.
3. Complete the backup process: Run the following command to complete the backup process:

```
tsm maintenance snapshot-backup complete
```

This should remove the temporary repository backup from network share.

The following steps explains restoring from snapshot created on above step:

1. Stop the tableau server: Run the following command to stop the tableau server:

```
tsm stop
```