TABLEAU CONFERENCE
Tableau Server on Linux 2018 Update

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About Me
At Tableau

Attribution: lewing@isc.tamu.edu Larry Ewing and The GIMP
Why Linux?

Because you wanted it!
Orgs already using Linux for servers
Reduce Windows licensing costs
  Both on-prem and in public cloud
Easy to script & automate
About This Talk

Updated version of my TC17 talk
Overview of Server on Linux
Installing Tableau Server on Linux
  Understanding Tableau Services Manager (TSM) and security model
Changes from 10.5 to 2018.X & 2019.1 beta
This talk is not
  How to switch from Windows to Linux
  Deep dive on TSM
Server on Linux 10.5

Initial release
First release of TSM
Server on Linux 2018.1 Improvements

Major improvements to security model
#SudoersZero (no sudo!)

Minor improvements
Setting environment variables for TSM services
Server-specific locale (different from host)
Server on Linux 2018.2 Improvements

Amazon Linux 2 distro support

TSM web UI released

Server on Windows switches to TSM
Server on Linux 2018.3 Improvements

**Minor improvements**

Configure forward proxy with `initialize-tsm`

`tabcmd` Bash command completion
Server on Linux 2019.1 Beta Improvements

Install packages outside of /opt

Avoid su for TSM auth via directory service
Preparing for Linux
Linux Distro Support

RHEL–like
- Red Hat Enterprise Linux (RHEL) 7.3+
- CentOS 7.3+
- Oracle Linux 7.3+
- Amazon Linux 2

Debian–like
- Debian (planned)

New!

2018.2

SUSE (planned)
Resource Requirements 1

Generally the same as Windows

Bare minimum: 2 CPU cores, 8 GB
Recommended: 8 CPU cores, 32 GB

CPU cores

We count actual cores, not hyperthreads
Cloud note: some “vCPUs” (AWS & GCP) are hyperthreads
Resource Requirements 2

Disk space
Installation directory: binaries go here, ~3 GB per version
Data directory: all your data goes here, go large (> 50 GB)

Account password
Need to have a password set (see TSM authentication)
Cloud note: if logging in via ssh pubkey, you might not have a password!
To set one: `sudo passwd <username>`
Tableau Services Manager (TSM)

TSM is a client/server system for management
Separates server management from server itself

TSM is REST API endpoints with thin clients

Linux is TSM–only
Bye-bye classic tabadmin!
TSM & Tableau Server

**TSM**
- Controller
- Agent
- Tabsvc
- Zookeeper
- License Service

**Server**
- Backgrounder
- Vizportal
- VizQL Server
- Gateway
  
  […]
Differences for Windows Admins

Installation
  Major focus of this talk

Tableau Services Manager (TSM)

Data Connectivity Drivers
  Many drivers available on Linux (but not all)

Upgrades

Fonts

But many things remain the same
  Configuration keys
  Services
  Etc.
Differences for End Users

About Tableau Server

Tableau Server Version: 2018.3.0 (20183.18.0916.2208) 64-bit Linux

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Close
Installation
Installation Flow

1. Install package
2. Initialize TSM (Bash script run as root)
3. Initialize Server (Using tsm CLI)

Linux native package
Package Installation

Install package

Linux native package

Initialize TSM

Bash script run as root

Initialize Server

Using tsm CLI
Server Package Installation

We use distro-native packages

- RHEL-based distros: RPM
- Debian-based distros: deb

Depend on other packages

Automatically downloaded from standard distro repositories

Installing on RHEL-like distros

```
sudo yum install tableau-server-2018-2-0.x86_64.rpm
```

Installing on Debian-like distros

```
sudo gdebi -n tableau-server-2018-2-0_amd64.deb
```

We use `gdebi` (not `apt-get`) because it works better with local packages
Server Package Layout

Installation directory

/opt/tableau/tableau_server
Location not configurable (for now…)
Everything owned by root, read-only

Layout

manifests/
appzookeeper.20181.18.0807.1415.json
appzookeeper.20182.18.0627.2230.json
backgrounder.20181.18.0807.1415.json
backgrounder.20182.18.0627.2230.json
backuprestore.20181.18.0807.1415.json
backuprestore.20182.18.0627.2230.json
(...)

packages/
apache.20181.18.0807.1415
apache.20182.18.0627.2230
appzookeeper.20181.18.0807.1415
appzookeeper.20182.18.0627.2230
bin.20181.18.0807.1415
bin.20182.18.0627.2230
(...)

Side by side versions!
Install Server Anywhere (2019.1 beta)

Install packages in arbitrary locations

Install package dependencies manually

```
sudo rpm -i --prefix /foo/bar/baz
tableau-server-2019-1-0-beta.18.1020.1234.x86_64.rpm
```

Everything else just works as normal

Only available on RHEL-like distros

Equivalent functionality not available deb package format 😞
Driver Package Installation

Drivers distributed separately
Some directly from Tableau
Others downloaded from vendor

Installation directory
/opt/tableau/tableau_driver
Configuration file: /etc/odbcinst.ini

Layout
essbase
freedts
jdbc
oracle
postgresql-odbc

Required to display Site Status dashboards
Package Installation

Install package

Linux native package

Initialize TSM

Bash script run as root

Initialize Server

Using tsm CLI
TSM Background
TSM Security Model (10.5.X)

Privilege separation
TSM Agent runs as *privileged* user
  Default username: `tsmagent`
Everything else runs as *unprivileged* user
  Default username: `tableau`

Privilege provided by *sudo*
TSM initialization installs `sudo` file
Enumerates commands we need to run as root

File access via shared group
Group read/write access on files
Shared group must be their primary group
  Default name: `tableau`

User & group names are configurable
TSM Security Model (10.5.X→2018.1+)

Privilege separation
TSM Agent runs as privileged user
Default username: tsmagent
Everything else runs as unprivileged user
Default username: tableau

Privilege provided by sudo
TSM initialization installs sudoers file
Enumerates commands we need to run as root

File access via shared group
Group read/write access on files
Shared group must be their primary group
Default name: tableau

User & group names are configurable

#SudoersZero
TSM Security Model (2018.1+)

Tableau Server w/o privileges
Everything runs as unprivileged user
Default username: tableau

Certain actions require privilege
Installing & initializing
Upgrading

Files owned by unpriv user’s group
TSM admins added as convenience
Default name: tableau

User & group names are configurable
TSM Access Control

TSM delegates access control to underlying OS
On Linux, ruled by PAM configuration
Benefits from any PAM policies like auditing, throttling, etc.
Uses whatever directory service is configured (if any)

Authentication by username & password
Uses `su` command to verify credentials
Works however PAM is configured

Authorization by group membership
To log in, users must belong to TSM authorized group
Default name: `tsmadmin`
TSM User & Groups Overview

**User**
- Unprivileged User
  - Runs: everything
    - (tableau)

**Groups**
- File Group
  - Shared file access
    - (tableau)
- TSM Auth. Group
  - TSM access
    - (tsmadmin)
Initializing TSM

Install package

Linux native package

Initialize TSM

Bash script run as root

Initialize Server

Using tsm CLI
Initializing TSM

Why a separate step?
   Package installation doesn’t allow configuration parameters
   E.g. picking the data directory

initialize-tsm
   Bash script, must be run as root
   Lots of configuration options: data directory, user & group names, etc.
   Defaults should work for many customers
Live Demo

Let’s initialize TSM
Initializing TSM: A One Time Operation

initialize-tsm runs once
- Only needed the first time you initialize TSM
- Not part of upgrading to a new version

Most options can’t be changed after init
- User & group names
- Data directory path
- Choose wisely
Initializing TSM

Install package

Linux native package

Initialize TSM

Bash script run as root

Initialize Server

Using tsm CLI
Initializing Tableau Server

- Install package
- Linux native package
- Initialize TSM
  - Bash script run as root
- Initialize Server
  - Using tsm CLI
Interacting with TSM: web UI (2018.2)
Interacting with TSM: CLI

TSM command line interface: `tsm`
- REST API client
- Prompts for username & password
- All communication is TLS-secured

Oodles of commands
- For the full list: `tsm help commands`
- All your favorites: backup, restore, ziplogs, start, stop
- Now organized into categories and subcategories
  - authentication
    - kerberos
      - configure
      - disable
      - enable
    - list
  - mutual-ssl
    - [...]


Live Demo

Let’s initialize Tableau Server
Adding “Worker” Nodes

No distinction between nodes
  Just initial node with TSM controller, and additional nodes
  Same install package for additional nodes

Obtain bootstrap file from controller node
  tsm topology nodes get-bootstrap-file --file bootstrap.json

Additional parameters for initialize-tsm
  Bootstrap file from first node
  Username/password for TSM
  sudo ./initialize-tsm --accepteula -b bootstrap.json -u thomasa
The Easy Life: Automated Installer

Install package

Linux native package

Initialize TSM

Bash script run as root

Initialize Server

Using tsm CLI
What is the Automated Installer?

Bash script
Installs package, initializes TSM, initializes server
Fully customizable

Parameters Galore
All initialize-tsm parameters
Additional parameters: config, license key, etc.

Automatable
Passwords can be provided in secrets file
Tableau uses it extensively for internal testing

Example invocation

```
sudo ./automated-installer -s secrets -r registration.json -f config.json
--accepteula -v -k SUPER-KOOL-LICENSE-KEY tableau-server-2018-2-0.x86_64.rpm
```
How Do I Get It?

Chicken & egg problem
It installs server package, so can’t be inside the package

Distributed as separate package
Find it on GitHub:
https://github.com/tableau/server-install-script-samples/tree/master/linux/automated-installer
Install via **yum** or **gdebi**
Versioned along with Tableau Server

Installation location
/opt/tableau/tableau_server_automated_installer/automated-installer.<vers>
When Not to Use Automated Installer

First time installs
   Easier to correct any issues and then move to the next step

Parameter validation
   Setting up authentication, like AD binding
   Changing topology

Installing outside of /opt (2019.1 beta)
   Roll your own automation
Upgrades
Violating Linux Packaging Norms

Upgrading a normal package

```
sudo yum update acme-normal-package
```

Server upgrades require more TLC than `yum/apt` provides

Tableau Server package names include version

```
$ rpm -qpi tableau-server-2018-1-4.x86_64.rpm
Name : tableau-server-20181.18.0807.1415
...

$ rpm -qpi tableau-server-2018-2-0.x86_64.rpm
Name : tableau-server-20182.18.0627.2230
...
```

Upgrade by installing a new package, not updating old package
Tableau Server Upgrade Paradigm

Install new package version
All install bits are versioned
Multiple versions live side-by-side
Installing a new package version is harmless!
For clusters, install package on all nodes

Update data directory to new version and start server
upgrade-tsm script on controller node

Delete old packages at your leisure
Reclaims disk space, nothing more

Never need to upgrade a package
sudo yum update tableau-server-20182.18.0627.2230.x86_64
Safe, but does nothing
Upgrade Example: 2018.1.4 to 2018.2

Running version 20181.18.0807.1415 (2018.1.4)

Install new package version

```
sudo yum install tableau-server-2018-2-0.x86_64.rpm
```
You can do this whenever, since it doesn’t take down your server

Back up your server

Upgrade data dir to new version and start server

```
sudo /opt/tableau/tableau_server/packages/scripts.20182.18.0627.2230/upgrade-
tsm --accepteula -u username
```
Always run the new upgrade-tsm!

Make sure server is running OK

Sometime later, remove old package

```
sudo yum erase tableau-server-2018-1-4
```
Upgrade Don’ts

Don’t uninstall the running version!
  But if you do, you can recover
  Reinstall same package
  Rerun `initialize-tsm`
    Will just restart the TSM services

Don’t run `initialize-tsm` from new version
  Stick with `upgrade-tsm`
Server Lifecycle

Install package

Initialize TSM

Initialize Server

Install New Package

New Version!

Uninstall Old Package

Upgrade TSM
Obliterate Script

Sometimes you want to start from scratch

Removes (almost) all traces of Tableau Server
  Will **delete** all your workbooks, extracts, users, everything!
  Will remove all server packages
Not something you will use often

`tableau-server-obliterate`
Lives in `/opt/tableau/tableau_server/packages/scripts.<version>`

What if I removed the package before obliterating?
  We stash a copy in `/var/tmp` when uninstalling a package
Logs for Install Scripts (2018.1+)

Install scripts now write logs to /var/tmp

Helpful for debugging
Not grabbed by ziplogs or anything

Examples

-rw-r--r--. 1 root  root  13266 Feb 27 20:37 migrate-to-single-user-18.0227.2037.06.log
-rw-r--r--. 1 root  root   946 Mar  7 22:52 tableau-server-package-before-install-18.0307.2252.23OURCE.log
-rw-r--r--. 1 root  root   4057 Feb 27 20:47 upgrade-tsm-18.0227.2037.37.log
Using a Forward Proxy (2018.3+)

Want to send all outbound traffic to a proxy?
Now easy to configure a forward proxy

New parameters for initialize-tsm
---http_proxy=<value>
---https_proxy=<value>

Example invocation
sudo initialize-tsm --http_proxy=http://example.com:3128/
Setting Environment Variables (2018.1+)

Want to change the environment of TSM services?

They run via systemd, so can’t set env vars by normal means

Now easy to set via config directory

Drop file in:
/var/opt/tableau/tableau_server/.config/systemd/tableau_server.conf.d/

Restart TSM services
Setting Locale for Server (2018.1+)

Want Server to use a different locale from your OS?
Linux OS = fr_CA, but Tableau Server = en_US

Set desired Server locale before initialize-tsm

$ export LANG=en_US.UTF-8
$ sudo initialize-tsm

Actually uses env var directory from last slide!

$ cat /var/opt/tableau/tableau_server/.config/systemd/tableau_server.conf.d/10-lang.conf
LANG=en_US.utf8
Closing
Recap

Preparing for Linux

Installation & Initialization

Upgrades

Tidbits
RELATED SESSIONS

Linux Meetup
Wed | 1:45-2:45 PM | L2 - R01

Tableau Server and Containers
Tableau Labs | Wed & Thu | Data Village

Server Documentation Feedback
Tableau Labs | By Appointment | Data Village

Introducing Tableau Services Manager
Tue | 2:15-3:15 PM | L3 - 333
Please complete the session survey from the My Evaluations menu in your TC18 app.
Ready For More?

Haven’t tried Server on Linux yet?
Download a trial: https://www.tableau.com/support/releases/server

Want to check out our betas?
Sign up for beta access: https://www.tableau.com/getbeta
Download the 2019.1 beta 1 and try it out: https://prerelease.tableau.com/key/beta

Questions?
Thank you!
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