Best practices for administering RStudio in production

Nathan Stephens

RStudio

Overview

Solutions engineering

We help you integrate RStudio products into your systems

Our team

Where do we hang out?

- Community.rstudio.com
- Github.com/sol-eng
- Solutions.rstudio.com
- Support.rstudio.com
- Docs.rstudio.com

RStudio

Who is this webinar for?

R Admin – data scientists who want to do more

R Evangelists

IT/Ops

Anyone who wants to try RStudio professional products

RStudio

RStudio

RStudio empowers individuals to be productive with data science.

- Open source and reproducible research
- APIs and interoperability
- Usability and clear documentation
- Inclusive and collective success
- Creating lasting value for data science

RStudio

What we do

RStudio builds open source and professional software for data science

- Our professional features include things like
  - Security
  - Authentication
  - Load balancing
  - Support

RStudio professional products

- RStudio Server Pro
- RStudio Connect
- RStudio Package Manager

RStudio

What is the relationship between R and RStudio?

We don't own R, package R, or distribute R

R Core team: 20 members – Zero from RStudio

RStudio products "sit on top of R"

- You standardize on R first
- Install our products second

We assume you have chosen to invest in R

RStudio

Professional R tooling and integration

Legitimacy

- Recognize R as an analytic standard

Competencies*

- Understand and manage R tooling

Adoption

- Rely on integrated R based solutions

Webinar

RStudio

Administering RStudio professional products

People want to know if they are doing things the best way

- R is relatively unknown in most organizations
- No single place to get all the information you need
- Hard to see the forest through the trees

We see a lot of trial and error

- Organizational hurdles
- Resource limitations

RStudio

Outline

I want to share some best practices for managing RStudio in production

- Share product requirements
- Some tips
- A path for getting started

Goal is to give you a big picture view of what success looks like, assuming you are using RStudio professional products

5 Best practices for administering RStudio in production

RStudio

1. Keep your system up to date

Modern tools

- Operating system
- Browsers

C++11 compiler

- R packages on Linux must be compiled

Internet access

- R packages

2. Support multiple versions of R

Why do you want to run multiple versions of R?

- Manage upgrades of R
- Test code on a variety of R versions and distributions
- Support projects that depend on various versions of R
- All products support multiple versions of R

Upgrade yearly (version 3.1.0+)

Build R from source

- Multiple versions of R side by side requires you build R from source
- Not hard to do (i.e. config/make/make install)
- Most organizations have processes in place for building software
- Instructions

RStudio

3. Organize your R packages

R Packages rule the nest.

- Packages will drive your R version, Linux dependencies, and even your operating system
- Data scientists will want access to their most beloved packages

Managing packages for a single user is easy.

- Managing packages for an entire platform is hard

RStudio Package Manager solves several problems

- Disconnected, air-gapped environments
- Serving containers with Docker
- Curate packages into multiple repositories for security and control
- Share internal packages

RStudio

4. Use root privileges

The group in your organization that installs, configures, and manages R and RStudio will need root privileges

RStudio products

- Installs require root privileges
- Runs require root privileges
  - RStudio Server Pro runs as the root user in order to create new R sessions on behalf of its users
  - RStudio Connect runs as the root user in order to isolate applications and processes

R

- System-wide installations of R on Linux often involve root also

RStudio

5. Securely manage your users

R programmers - RStudio Server Pro

- They will need access to R, file shares, databases, and probably many other sensitive systems.
- R processes run as the user under a local account

End users - RStudio Connect

- End users consume apps and reports.
- R Processes typically run under a service account

RStudio

Authentication

Your organization

- Probably has strong opinions on how to authenticate users
- This space is only getting more fragmented not less
  - LDAP, Active Directory, PAM, OAuth, Okta, Duo, Auth0, etc.

Proxied authentication

- If we don’t support your specific system, then you can use our proxied authentication
- With proxied auth, users do not log in through RStudio but through a proxy that you set up

RStudio

Supported Auth Methods

RStudio Server Pro

- PAM (LDAP and Active Directory)
- OAuth 2.0 using Google Apps
- *Proxied authentication*

RStudio Connect

- LDAP and Active Directory
- OAuth 2.0 using Google Apps
- PAM
- SAML [Beta]
- *Proxied authentication*

RStudio

Recommendations (your Happy path)

1. Keep your operating systems and browsers up to date
2. Plan to support multiple versions of R by building R from source
3. Organize your R packages for reliability and consistency
4. Use root privileges to install and run RStudio products
5. Securely manage your R programmers and end users

Summary

RStudio

Getting Started

RStudio

Tooling

RStudio makes software tools that are designed to work together

- Our R packages and products work together
- There are many ways to assemble our tools
- But it will be up to you to decide how to do it
- Your configuration depends on what does data science means to your organization

Our goal is to make it easy to install and configure all of our products

Solutions

Data science lab

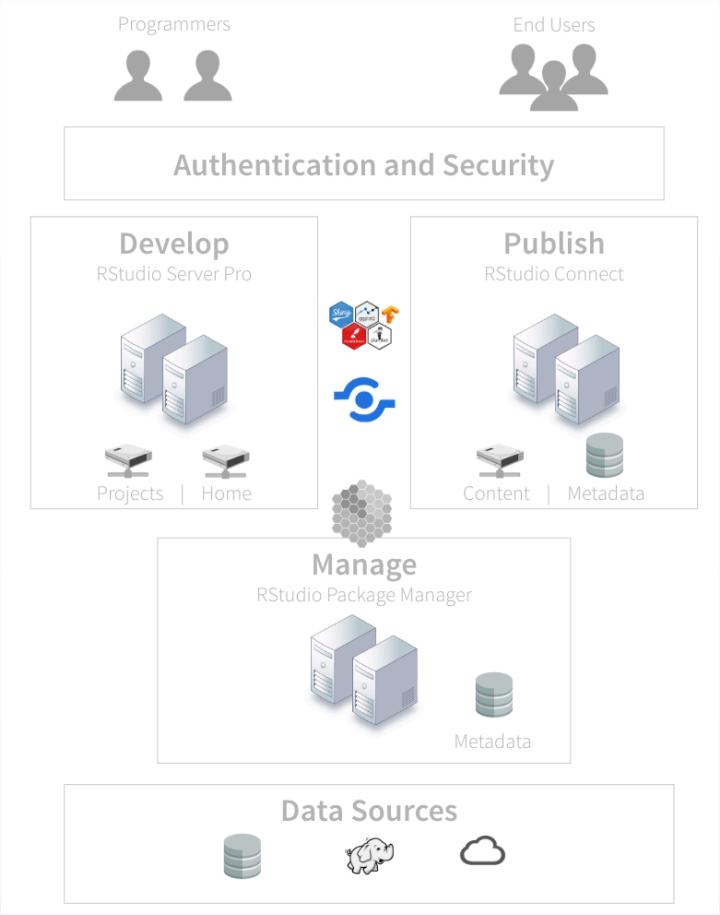
Application factories (Dev/Test/Prod)

On premises, cloud, hybrid cloud

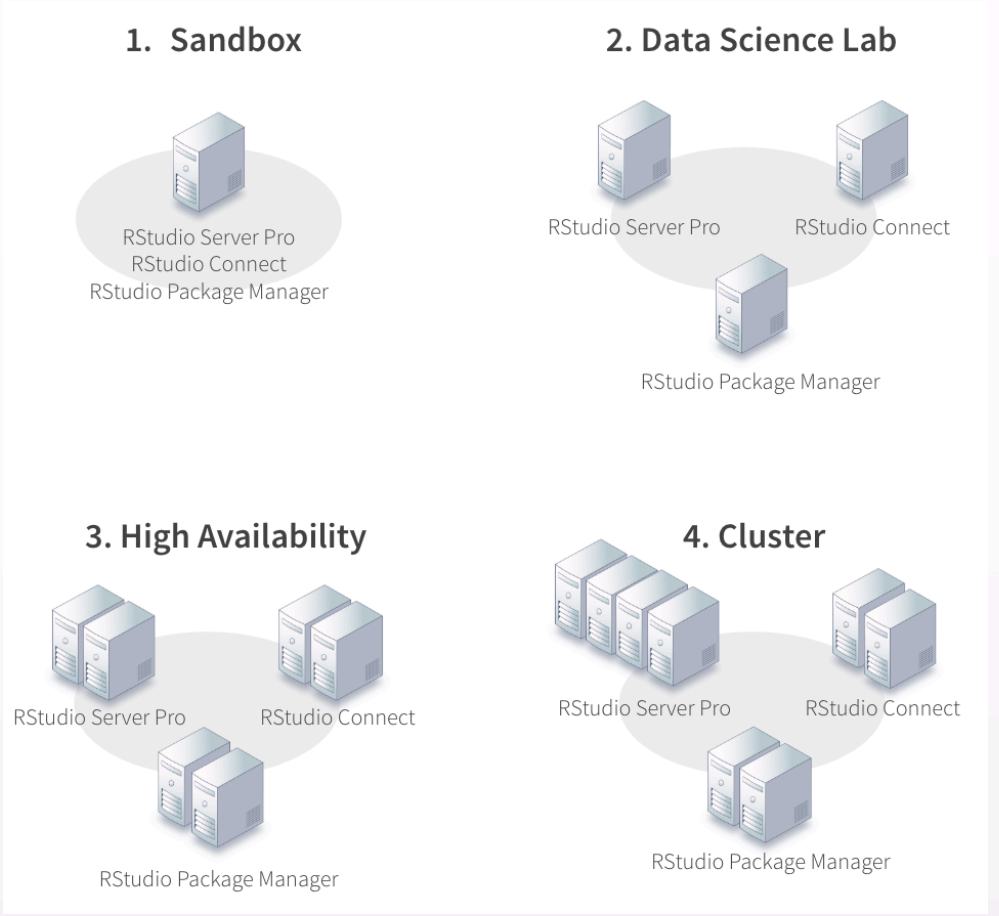
Single server or a multi-departmental deployment

Crawl, walk, run strategies

Architecture



Server Setup



Recipes

Overview

- List of ingredients that make up your platform
- Helps you organize and automate your work
- And are unique to your organization

Structure

- Most of your code will be for Linux, R, and R packages
- A small part of your code will be for installation
- If you've installed R properly, installation is usually easy
- The rest will be configuration

Example checklist

RStudio

Infrastructure as code

Organize your recipes so that can manage your platform

- Configuration management tools for the R admin
- Ansible, Chef, Puppet, CodeDeploy, SaltStack, etc.
- Sandbox

What if I've never used these products?

RStudio Quickstart

Overview

- A virtual machine that runs on your desktop
- Includes all our professional products
- And includes pre built assets for you to explore and demonstrate to others

Motivation

- Experience RStudio professional products
- Free and easy

Demo

RStudio

Summary

The happy path

- Keep your operating system and browser up to date
- Support multiple versions of R by building R from source
- Make sure you have easy access to R packages
- Install products as root
- Use a supported authentication system

How to get started

- Recipes and checklists
- Crawl/Walk/Run strategies
- Using a sandbox
- RStudio QuickStart

RStudio

Summary

Connecting with solutions engineering

- Community.rstudio.com
- Github.com/sol-eng
- Solutions.rstudio.com
- Support.rstudio.com
- Docs.rstudio.com

RStudio

References

Administration of Pro Products

Professional R Tooling and Integration

The R Admin is Rad

R Admin Community

RStudio Docs

RStudio Professional Product Requirements

RStudio Server Pro Example Checklist

R for the Enterprise

Configuration Management Tools for the R Admin

RStudio