BUILDING INTERACTIVE, R-POWERED WEB APPLICATIONS WITH SHINY

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About Me

Overview

- Motivation
- Shiny
- Reactive Programming
- Code Walkthroughs
  - Simple histogram
  - Advanced histogram
  - Reactive histogram
  - Custom outputs
- Hosting

Motivation

"R is great!"

"The Internet is great!"

TRESTLE TECHNOLOGY

Motivation

- Want to get R into web browsers
- Previous approaches
  - rApache
  - Rserve (Java, C++, C#, Python, Ruby, .NET)
  - deployR
  - Custom hacks
- Just make R accessible to server-side programming languages (PHP, Ruby, Java, etc.)

Shiny

- Open-Sourced by RStudio 11/2012 on CRAN
- New model for web-accessible R code
- Able to generate basic web UIs
- Uses web sockets
  - "The new HTTP"
- Built on a "Reactive Programming" model

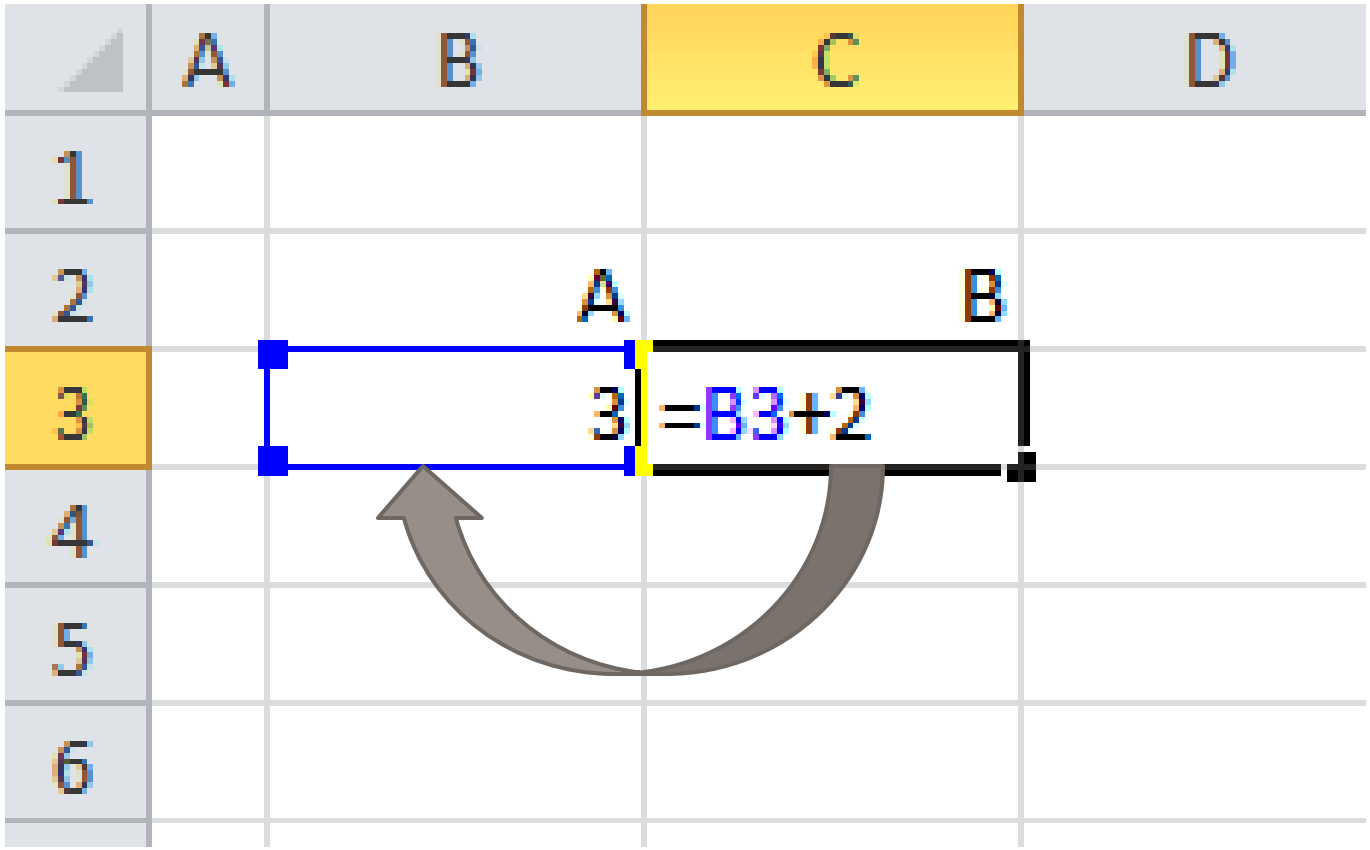
Reactive Programming

```
a <- 3

b <- a + 2

a <- 7

b == ?
```

Imperative: b = 5

Reactive: b = 9

Reactive Programming Example



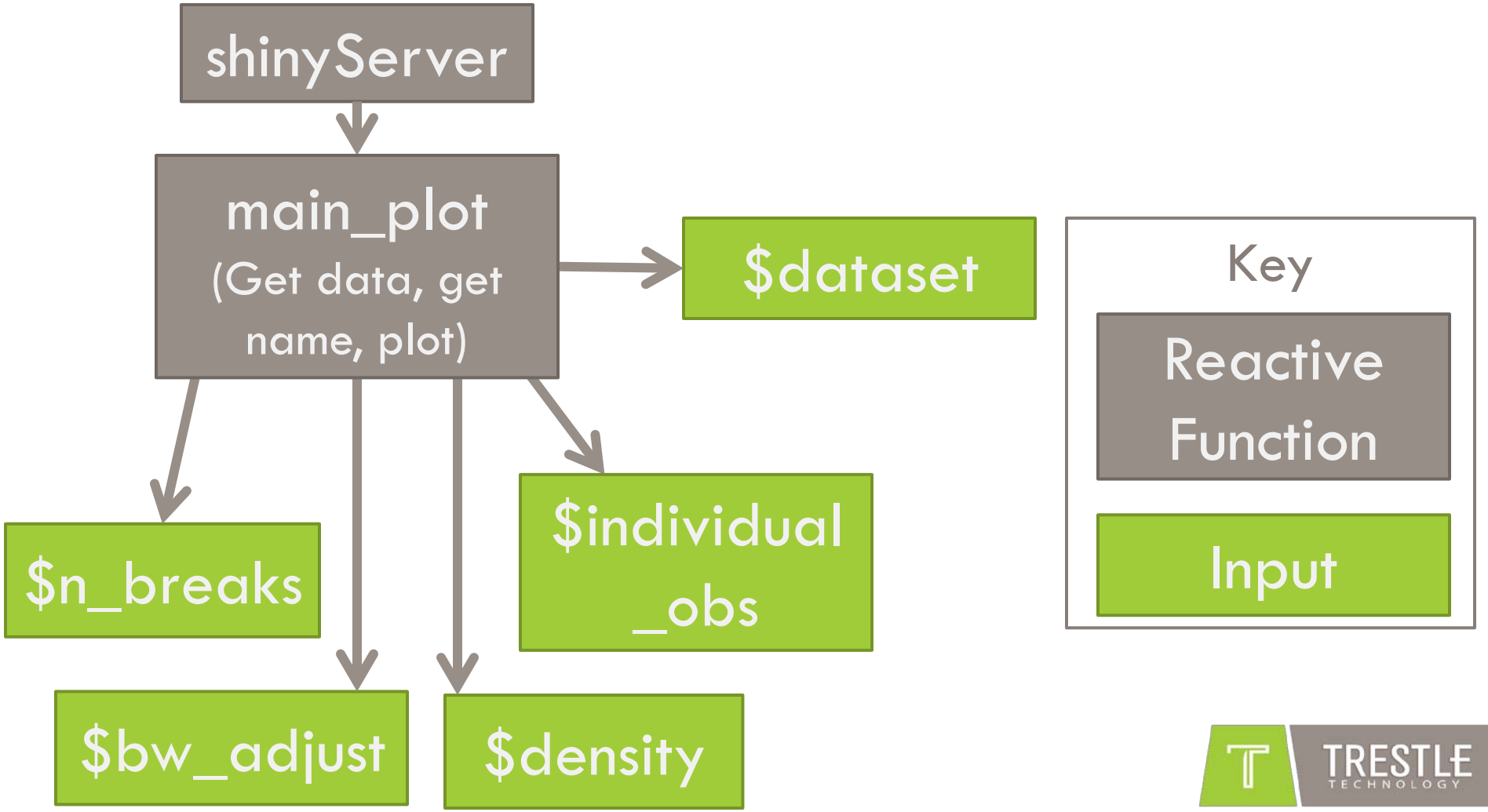
Basic Shiny Example

Basic Shiny UI and Server

Intermediate Shiny Example

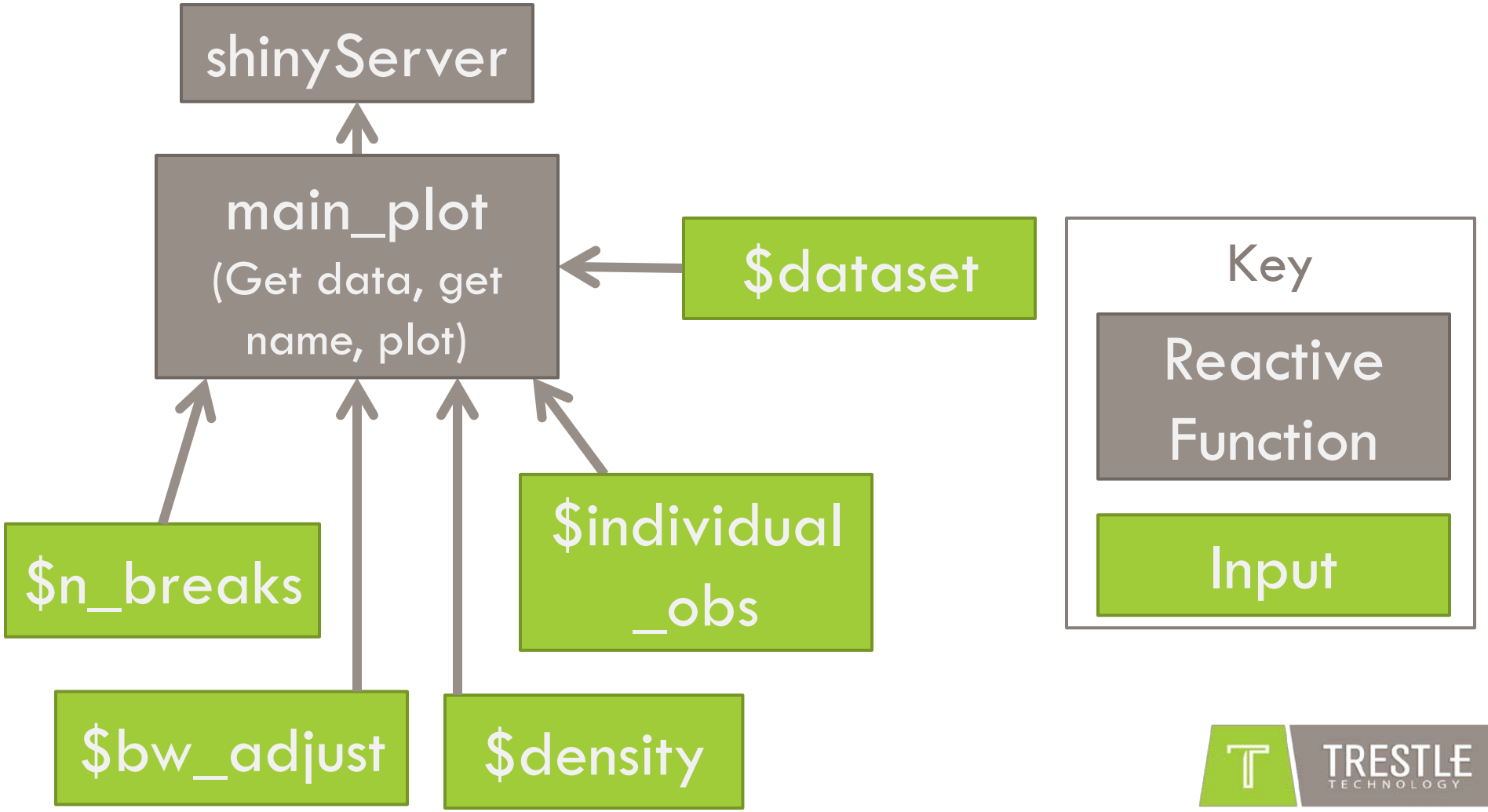
Additional UI Features

Dependency Graph – Naïve



TRESTLE TECHNOLOGY

“Data Flow”– Naïve

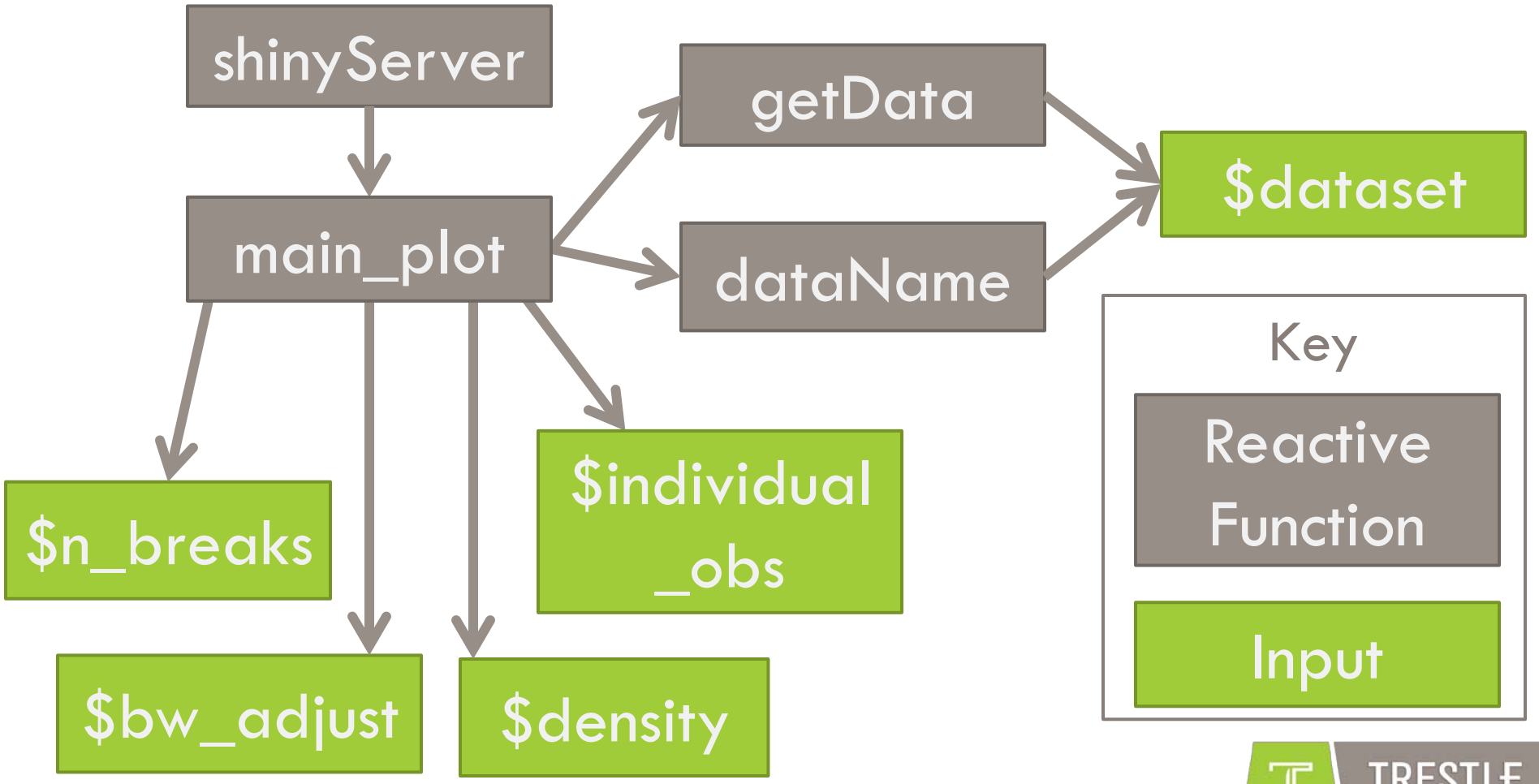


TRESTLE TECHNOLOGY

Reactive Shiny Example

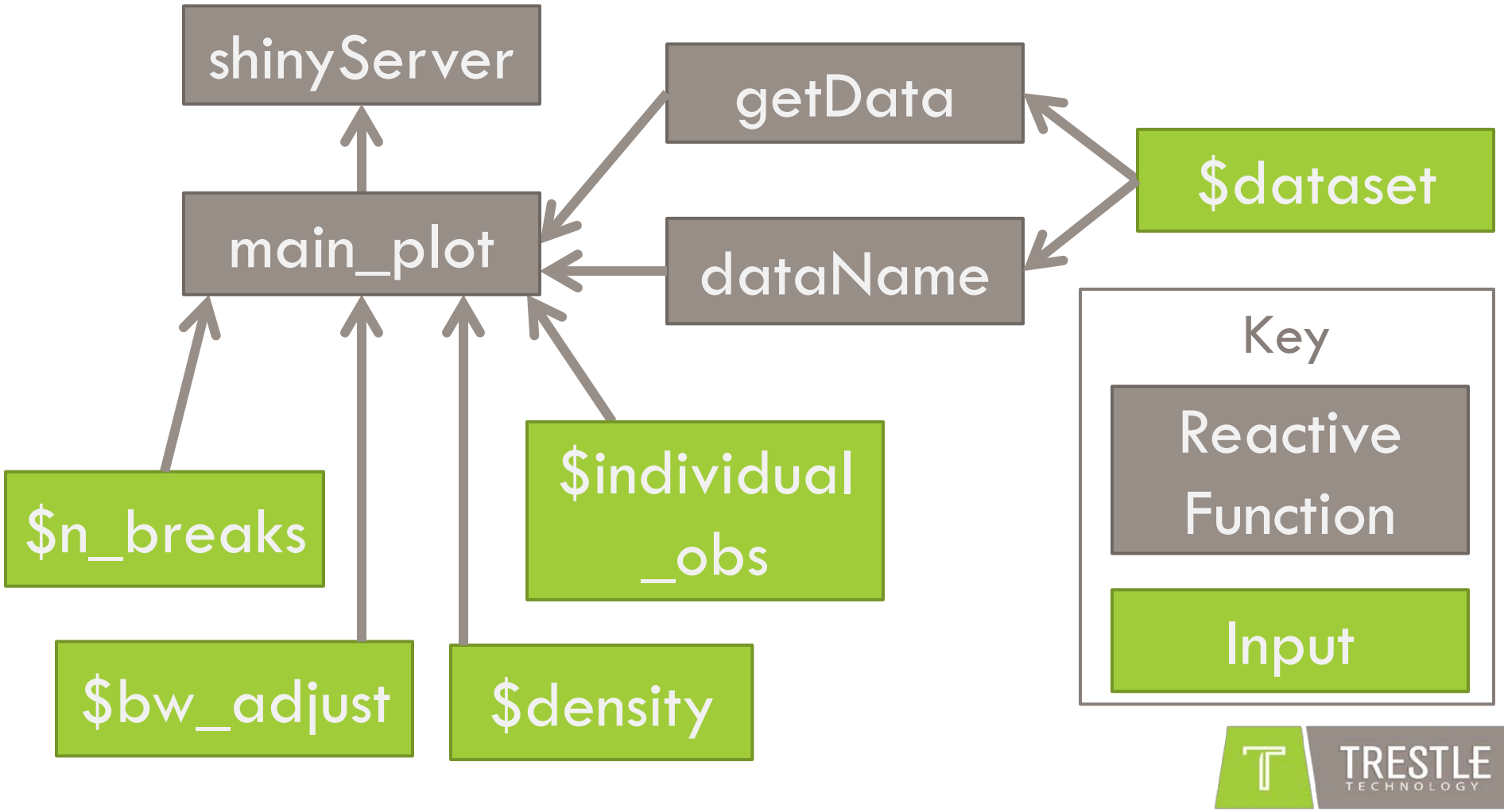
Optimized Reactive Server

Dependency Graph – Reactive



TRESTLE TECHNOLOGY

“Data Flow” – Reactive



TRESTLE TECHNOLOGY

D3.JS Shiny Example

http://trestletechnology.net:3838/grn/

RGL Shiny Example

http://trestletechnology.net:3838/rgl/

Hosting

- RStudio offers “Glimmer”
  - Free (for now) managed hosting platform for Shiny
- RStudio‘s Shiny-Server
  - Open sourced 1/22/2013
  - Written in Node.js
  - Same software that powers Glimmer
  - “Some assembly required”
  - Hacks to support older IEs
- Amazon Machine Image on EC2