

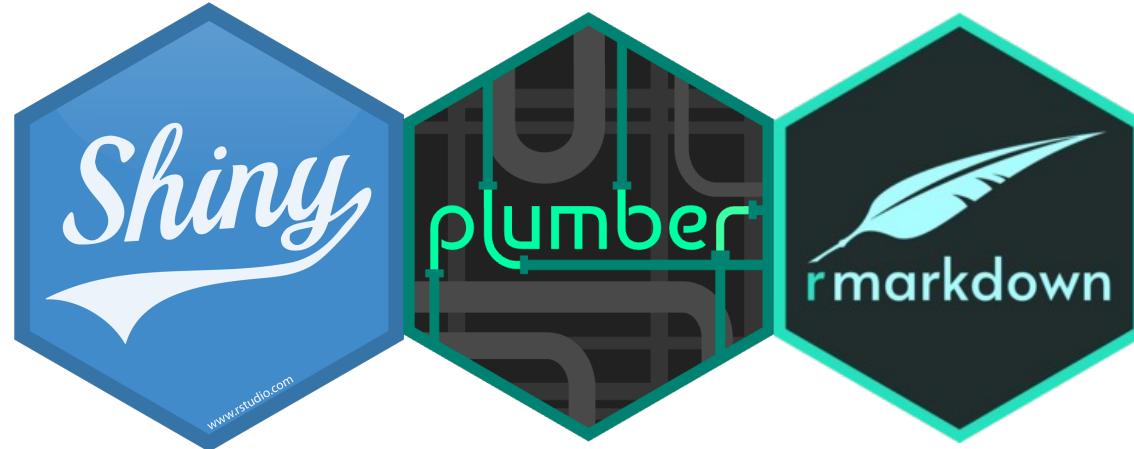
Why You Should Add Logging To Your Code

(and how to make it more helpful)

Daren Eiri
deiri@arrowheadgrp.com

posit::conf(2023)

In Production Today: Shiny Apps, Plumber APIs, and Scheduled Markdowns



All logs

Render ran 20 days ago iv5b3wtBQEY3QNDJ

Download Log

Find in log

Render ran 20 days ago

iv5b3wtBQEY3QNDJ on

prod01 for a few seconds

This process ended with an error. For more info about this error: "render-r-code-error" in the User Guide

```
2023/07/25 10:00:53 PM: $ message: logi TRUE
2023/07/25 10:00:53 PM:
2023/07/25 10:00:54 PM: Quitting from lines 184–250 (logpull.Rmd)
2023/07/25 10:00:54 PM: Error in value[[3L]](cond) :
2023/07/25 10:00:54 PM: Calls: local ... tryCatch -> tryCatchList -> tryCatchOne ->
2023/07/25 10:00:54 PM: In addition: Warning messages:
2023/07/25 10:00:54 PM: 1: In "data" %in% names(x) : restarting interrupted promise evaluation
2023/07/25 10:00:54 PM: 2: In "data" %in% names(x) : restarting interrupted promise evaluation
2023/07/25 10:00:54 PM: 3: In "data" %in% names(x) : restarting interrupted promise evaluation
2023/07/25 10:00:54 PM:
2023/07/25 10:00:54 PM: Execution halted
```





```
library(plumber)

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide
function(a = NULL, b = NULL, res) {

  as.numeric(a) / as.numeric(b)

}
```

```
library(plumber)

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide
function(a = NULL, b = NULL, res) {
  as.numeric(a) / as.numeric(b)
}
```

```
library(plumber)
```

```
##* Return the quotient of two numbers
##* @param a The numerator
##* @param b The denominator
##* @get /divide
function(a = NULL, b = NULL, res) {

  as.numeric(a) / as.numeric(b)

}
```

GET /divide Return the quotient of two numbers

Parameters

Name	Description
a string (query)	The numerator <input type="text" value="100"/>
b string (query)	The denominator <input type="text" value="4"/>

Code	Details
200	Response body [25]

Add the first trail marker (informational)

```
library(plumber)
library(glue)
library(log4r)

logger <- logger()

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide
function(a = NULL, b = NULL, res) {

    info(logger, glue("Attempting to divide {a} by {b}"))
    as.numeric(a) / as.numeric(b)
}
```

```
library(plumber)
```

```
library(glue)
```

```
library(log4r)
```

```
logger <- logger()
```

```
#* Return the quotient of two numbers
```

```
#* @param a The numerator
```

```
#* @param b The denominator
```

```
#* @get /divide
```

```
function(a = NULL, b = NULL, res) {
```

```
    info(logger, glue("Attempting to divide {a} by {b}"))
```

```
    as.numeric(a) / as.numeric(b)
```

```
}
```

Add the first trail marker (informational)

GET /divide Return the quotient of two numbers

Parameters

Name	Description
a string (query)	The numerator 100
b string (query)	The denominator 4

Console Terminal × Background Jobs × Workbench Jobs ×

R 4.3.1 · ~/scratch-pad/ ↗

```
> plumb(file='logging_example/plumber.R')$run()
Running plumber API at http://127.0.0.1:9244
Running swagger Docs at http://127.0.0.1:9244/_docs_/
INFO [2023-08-16 04:39:44] Attempting to divide 100 by 4
```



Add the second trail marker (warning)

```
library(plumber)
library(glue)
library(log4r)

logger <- logger()

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide
function(a = NULL, b = NULL, res) {
  if (missing(a) | missing(b)){
    err_msg <- "Must supply numerator and denominator"
    res$status <- 400
    warn(logger, err_msg)
    return(list(error = err_msg))
  } else {
    info(logger, glue("Attempting to divide {a} by {b}"))
    as.numeric(a) / as.numeric(b)
  }
}
```

Add the second trail marker (warning)

```
library(plumber)
```

```
library(glue)
```

```
library(log4r)
```

```
logger <- logger()
```

```
#* Return the quotient of two numbers
```

```
#* @param a The numerator
```

```
#* @param b The denominator
```

```
#* @get /divide
```

```
function(a = NULL, b = NULL, res) {
```

```
  if (missing(a) | missing(b)){
```

```
    err_msg <- "Must supply numerator and denominator"
```

```
    res$status <- 400
```

```
    warn(logger, err_msg)
```

```
    return(list(error = err_msg))
```

```
  } else {
```

```
    info(logger, glue("Attempting to divide {a} by {b}"))
```

```
    as.numeric(a) / as.numeric(b)
```

```
}
```

```
}
```

GET /divide Return the quotient of two numbers

Parameters

Name	Description
a string (query)	The numerator No input!
b string (query)	The denominator No input!

Code Details

Code	Details
400	Error: Bad Request Response body { "error": ["Must supply numerator and denominator"] }

Running swagger Docs at http://127.0.0.1:9244/_docs_/
WARN [2023-08-18 14:22:06] Must supply numerator and denominator



The image displays a map interface overlaid on a photograph of a forested mountain slope. The map shows a green area representing a valley floor with the Merced River flowing through it, and orange areas representing higher elevation terrain. Key locations labeled on the map include:

- Lower Yosemite Falls
- Sierra Point
- Upper Yosemite Falls Vista Point
- Yosemite Valley Visitor Center
- Yosemite Valley
- Northside Dr.
- Southside Dr.
- Merced River
- Glacier Point
- Sentinel Dome
- Washburn Point
- North Dome
- Half Dome
- Liberty Cap
- Nevada Fall
- Wadsworth

On the map, several blue icons representing messages are scattered across the green area, with one prominent message bubble from "Daren Eiri" dated "Mar 13, 2020" at 6:54 AM. The message reads: "To: Not Available Just checking in! [Do Not Reply] ▲ MORE ▲".

The map includes standard navigation controls like zoom (+/-), search, and a compass rose. A scale bar indicates "2000 ft". The bottom of the map shows credits: "Leaflet" and "Google".

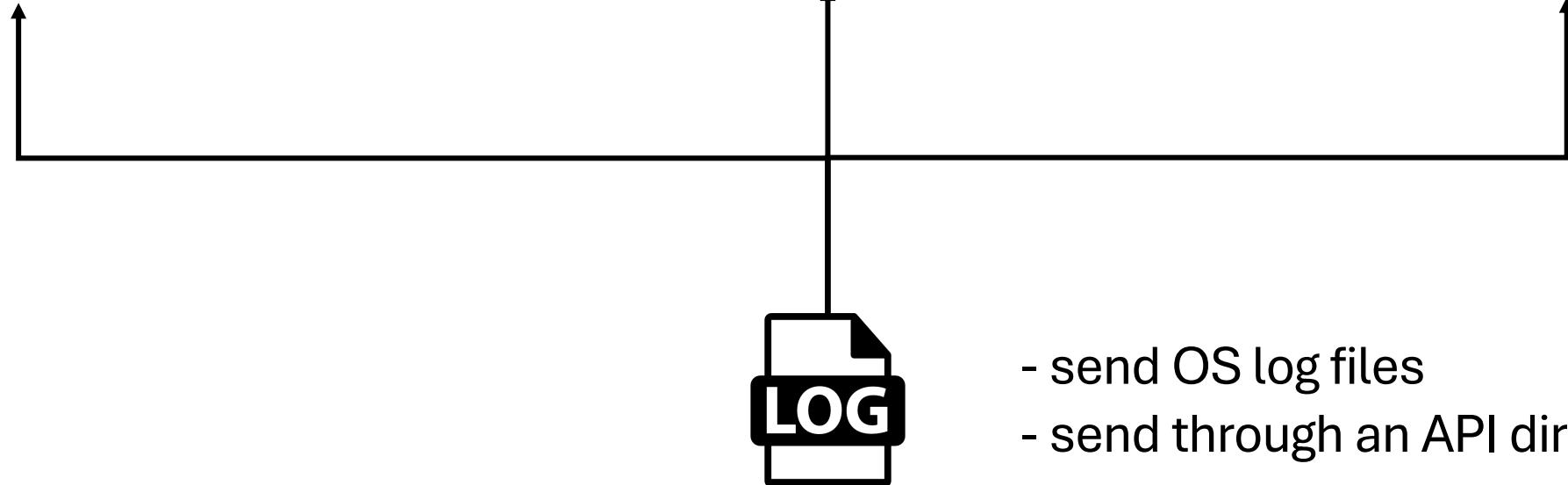
To the right of the map is a close-up view of a Garmin inReach MINI device. The screen shows a message: "inReach MINI" at the top, followed by "I have an emergency, and I ..." and "Rescue on the way. ETA 2 hrs." Below this is a "Reply" button. The device has a red faceplate and a black housing.

At the bottom right of the map, there is a small footer: "Map data ©2023 Google | Terms of Use | Report a map error".

Add satellite communicator capability



Azure Monitor



- send OS log files
- send through an API directly

Add satellite communicator capability

```
library(plumber)
library(glue)
library(rsyslog)
library(log4r)

logger <- logger	appenders = syslog_appender("division-calculator-api"))

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide
function(a = NULL, b = NULL, res) {
  if (missing(a) | missing(b)){
    err_msg <- "Must supply numerator and denominator"
    res$status <- 400
    warn(logger, err_msg)
    return(list(error = err_msg))
  } else {
    info(logger, glue("Attempting to divide {a} by {b}"))
    as.numeric(a) / as.numeric(b)
  }
}
```

What Is Syslog?

syslog = system's primary logging file (linux)

```
Prod01:~$ ls -al /var/log/syslog*
-rw-r----- 1 syslog adm 1482646 Sep  8 23:21 /var/log/syslog
-rw-r----- 1 syslog adm 1543834 Sep  8 00:00 /var/log/syslog.1
-rw-r----- 1 syslog adm 127840 Sep  7 00:00 /var/log/syslog.2.gz
-rw-r----- 1 syslog adm 119955 Sep  6 00:00 /var/log/syslog.3.gz
-rw-r----- 1 syslog adm 112998 Sep  5 00:00 /var/log/syslog.4.gz
-rw-r----- 1 syslog adm 104945 Sep  4 00:00 /var/log/syslog.5.gz
-rw-r----- 1 syslog adm 114156 Sep  3 00:00 /var/log/syslog.6.gz
-rw-r----- 1 syslog adm 125687 Sep  2 00:00 /var/log/syslog.7.gz
```

What Is Syslog?

```
Sep 8 22:15:30 Prod01 systemd[1]: Starting Time & Date Service...
Sep 8 22:15:36 Prod01 dbus-daemon[736]: [system] Successfully activated service 'org.freedesktop.timedate1'
Sep 8 22:15:36 Prod01 systemd[1]: Started Time & Date Service.
Sep 8 22:15:37 Prod01
Sep 8 22:15:37 Prod01
Sep 8 22:15:37 Prod01
Sep 8 22:15:38 Prod01
Sep 8 22:15:41 Prod01
Sep 8 22:15:42 Prod01
Sep 8 22:16:06 Prod01
Sep 8 22:17:01 Prod01
Sep 8 22:18:27 Prod01 division-calculator-api: Must supply numerator and denominator
Sep 8 22:19:48 Prod01 systemd[1]: Starting Time & Date Service...
Sep 8 22:19:48 Prod01 dbus-daemon[736]: [system] Successfully activated service 'org.freedesktop.timedate1'
Sep 8 22:19:48 Prod01 systemd[1]: Started Time & Date Service.
Sep 8 22:19:49 Prod01
Sep 8 22:19:49 Prod01
Sep 8 22:19:50 Prod01
Sep 8 22:19:50 Prod01 division-calculator-api: Attempting to divide 3 by 1
Sep 8 22:19:53 Prod01
Sep 8 22:19:53 Prod01
Sep 8 22:19:53 Prod01
Sep 8 22:19:54 Prod01
```

What Is Syslog?

```
Sep 8 22:15:30 Prod01 systemd[1]: Starting Time & Date Service...
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```



What Is Syslog?

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Sep 8 22:19:54 Prod01
```



```

library(plumber)
library(glue)
library(rsyslog)
library(log4r)

logger <- logger	appenders = syslog_appender("division-calculator-api"))

#* Return the quotient of two numbers
#* @param a The numerator
#* @param b The denominator
#* @get /divide

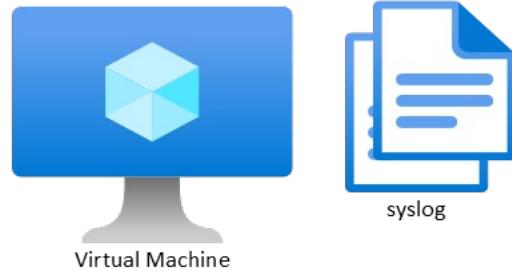
function(a = NULL, b = NULL, res) {
  if (missing(a) | missing(b)){
    err_msg <- "Must supply numerator and denominator"
    res$status <- 400
    warn(logger, err_msg)
    return(list(error = err_msg))
  } else {
    info(logger, glue("Attempting to divide {a} by {b}"))
    as.numeric(a) / as.numeric(b)
  }
}

```

Add satellite communicator capability Send syslog to Azure Monitor



↓
syslog_appender()
writes to syslog



Virtual Machine

syslog

```

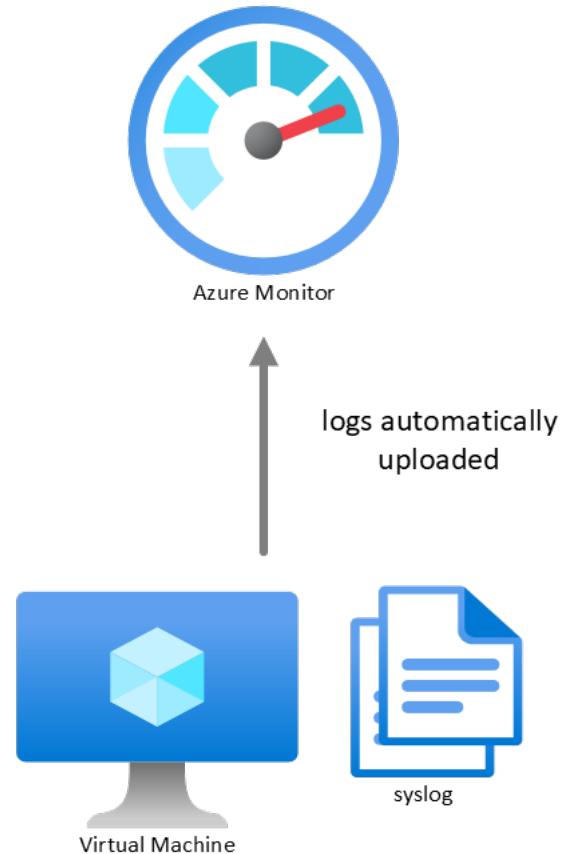
library(plumber)
library(glue)
library(rsyslog)
library(log4r)

logger <- logger	appenders = syslog_appender("division-calculator-api"))

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    warn(logger, err_msg)
    return(list(error = err_msg))
  } else {
    info(logger, glue("Attempting to divide {a} by {b}"))
    as.numeric(a) / as.numeric(b)
  }
}

```

Add satellite communicator capability Send syslog to Azure Monitor





Home > Monitor

Monitor | Logs

Microsoft

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SQL (preview)

Azure Cosmos DB

Key Vaults

New Query 1*

+

Feedback

Queries

642wusRConnectP... Select scope

Run

Time range : Last 24 hours

Save

Share

+ New alert rule

Export

Pin to

...

```
1 Syslog
2 | where ProcessName == "division-calculator-api"
3
4
```

Results

Chart

EventTime [Local Time]	SeverityLevel	SyslogMessage	ProcessName
> 9/8/2023, 3:18:27.987 PM	warning	Must supply numerator and denominator	division-calculator-api
> 9/8/2023, 3:19:50.199 PM	info	Attempting to divide 3 by 1	division-calculator-api
> 9/8/2023, 3:19:57.076 PM	info	Attempting to divide 10 by 5	division-calculator-api
> 9/8/2023, 3:20:01.841 PM	info	Attempting to divide 100 by 25	division-calculator-api
> 9/8/2023, 3:20:08.587 PM	info	Attempting to divide 1000 by 1000	division-calculator-api
> 9/8/2023, 3:20:10.679 PM	info	Attempting to divide 1000 by 0	division-calculator-api
> 9/8/2023, 3:20:15.420 PM	info	Attempting to divide 1000 by 20	division-calculator-api
> 9/8/2023, 3:20:20.816 PM	warning	Must supply numerator and denominator	division-calculator-api
> 9/8/2023, 3:41:53.752 PM	warning	Must supply numerator and denominator	division-calculator-api
> 9/8/2023, 3:55:22.401 PM	warning	Must supply numerator and denominator	division-calculator-api

5s 467ms | Display time (UTC-07:00) ▾

Query details | 1 - 10 of 10

A Monitor - Microsoft Azure

portal.azure.com/?feature.msals=true#view/Microsoft_

Microsoft Azure

Search resources, services, and docs (G+)

deiri@arrowheadgrp.com BROWN & BROWN, INC.

Home > Monitor

Monitor | Logs

Search

New Query 1*

642wusRConnectP... Select scope Run Time range : Last 24 hours Save Share New alert rule Export Pin to ...

Syslog
| where ProcessName == "division-calculator-api"
| where SeverityLevel != "info"

Results Chart

EventTime [Local Time]	SeverityLevel	SyslogMessage	ProcessName
9/8/2023, 3:18:27.987 PM	warning	Must supply numerator and denominator	division-calculator-api
9/8/2023, 3:20:20.816 PM	warning	Must supply numerator and denominator	division-calculator-api
9/8/2023, 3:41:53.752 PM	warning	Must supply numerator and denominator	division-calculator-api
9/8/2023, 3:55:22.401 PM	warning	Must supply numerator and denominator	division-calculator-api

Schema and Filter Columns

4s 246ms Display time (UTC-07:00) ▾

Query details 1 - 4 of 4

A Posit - Division API Warning - X +

portal.azure.com/#@bbins.com/resource/subscriptions/

Microsoft Azure Search resources, services, and docs (G+/)

deiri@arrowheadgrp.com BROWN & BROWN, INC. (BBINS....)

Home > Posit - Division API Warning

Posit - Division API Warning | History

Log search alert rule

Search Search Time range : Last 7 days

Timeline

0 - Critical 1 - Error 2 - Warning 3 - Informational 4 - Verbose No alerts

12:00 Sep 04 12:00 Sep 05 12:00 Sep 06 12:00 Sep 07 12:00 Sep 08 12:00 Sep 09 12:00 Sep 10

History

Overview Activity log Access control (IAM) Tags

Fired time Alert condition Affected resource

09/08/2023, 04:00 PM Fired prod01

Dimensions

None

09/08/2023, 04:00 PM

Posit - Division API Warning

Monitor service Log Alerts V2 Alert condition Fired Severity 2 - Warning

Value (when alert fired) 1

View details

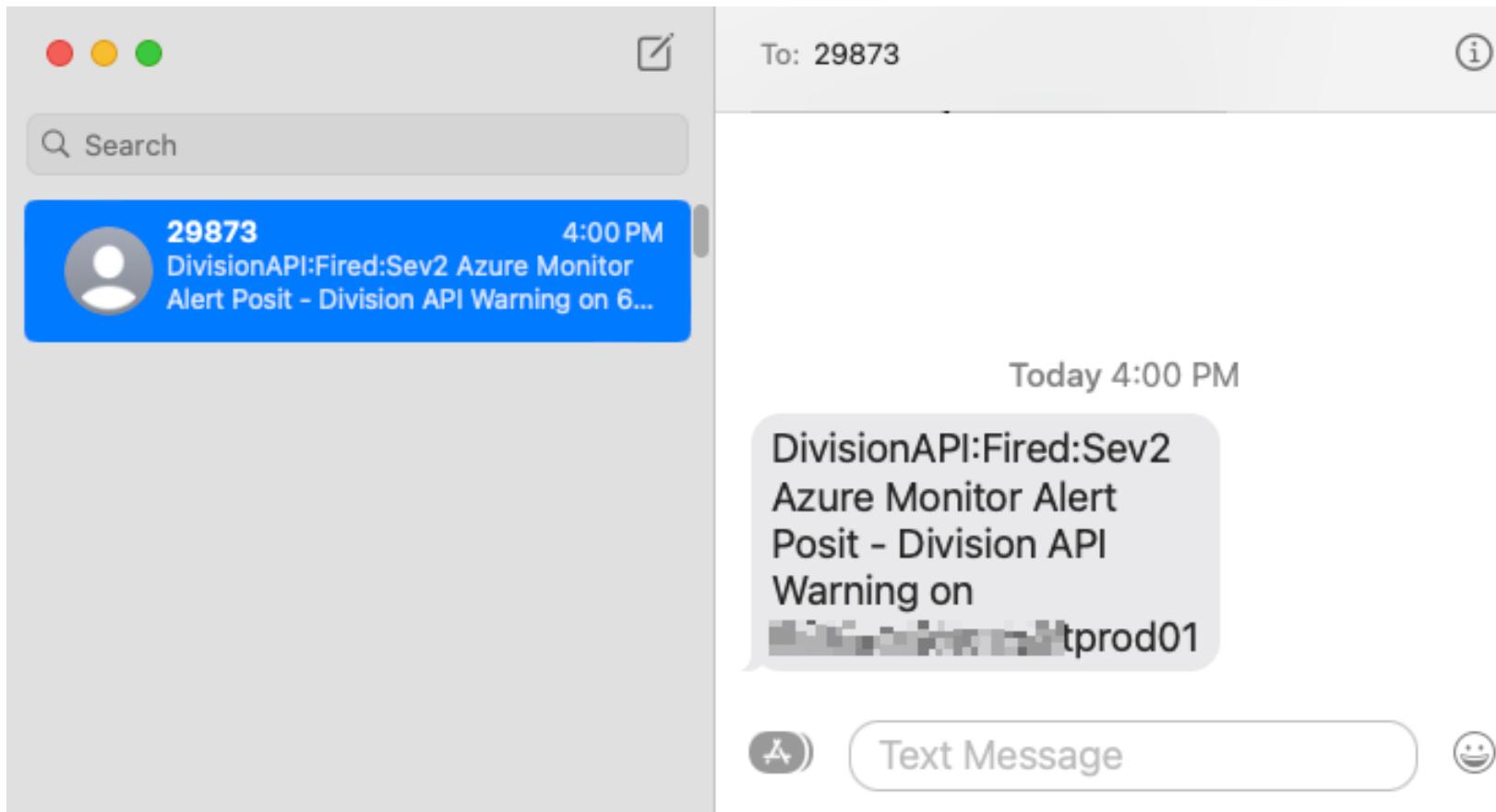
Locks Identity (preview)

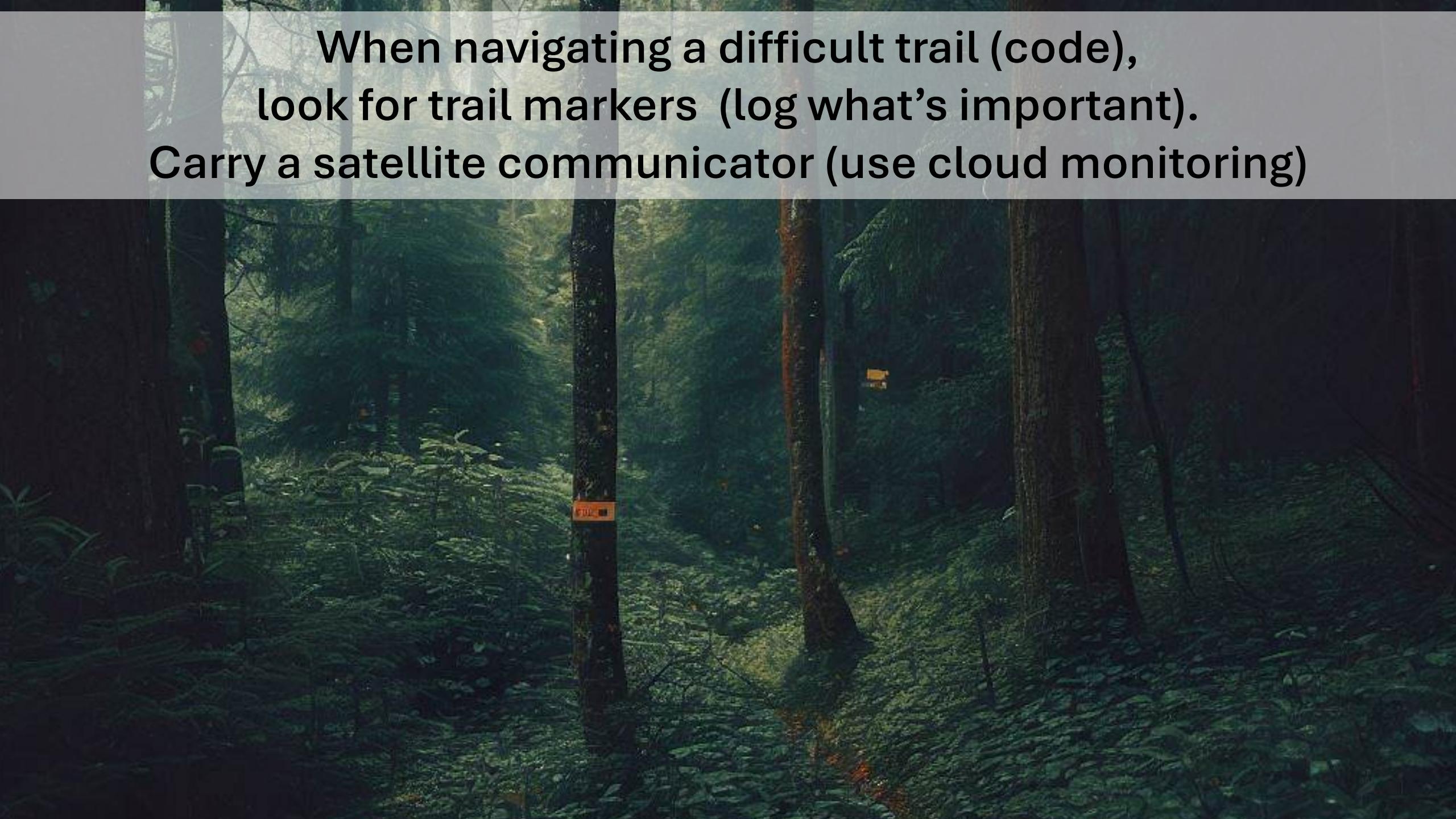
Tasks (preview) Export template

New Support Request

Add satellite communicator capability

Receive Text Alerts





When navigating a difficult trail (code),
look for trail markers (log what's important).
Carry a satellite communicator (use cloud monitoring)

Let's Connect!

PhD dropout. Studied honey bee behavior

On call 24/7 for California - San Diego County Search and Rescue Team

Dad to a 2-year-old daughter

Additional Resources

Visit the URL or use the QR code to learn more about logging in R



bit.ly/deiri-posit2023