

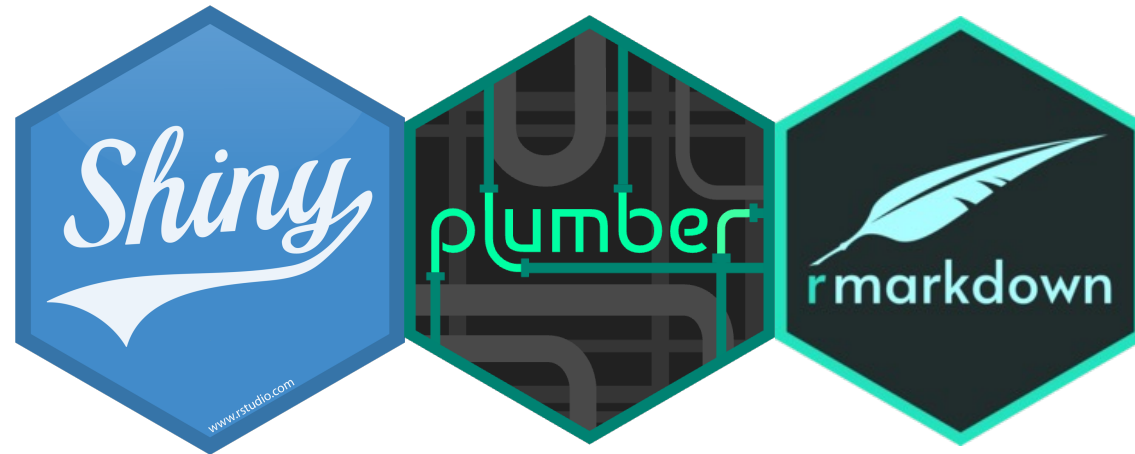
Why You Should Add Logging To Your Code

(and how to make it more helpful)

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posit::conf(2023)

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



All logs ▾


Render ran 20 days agoiv5b3wtBC ▾

 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)
```

```
}
```

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
```

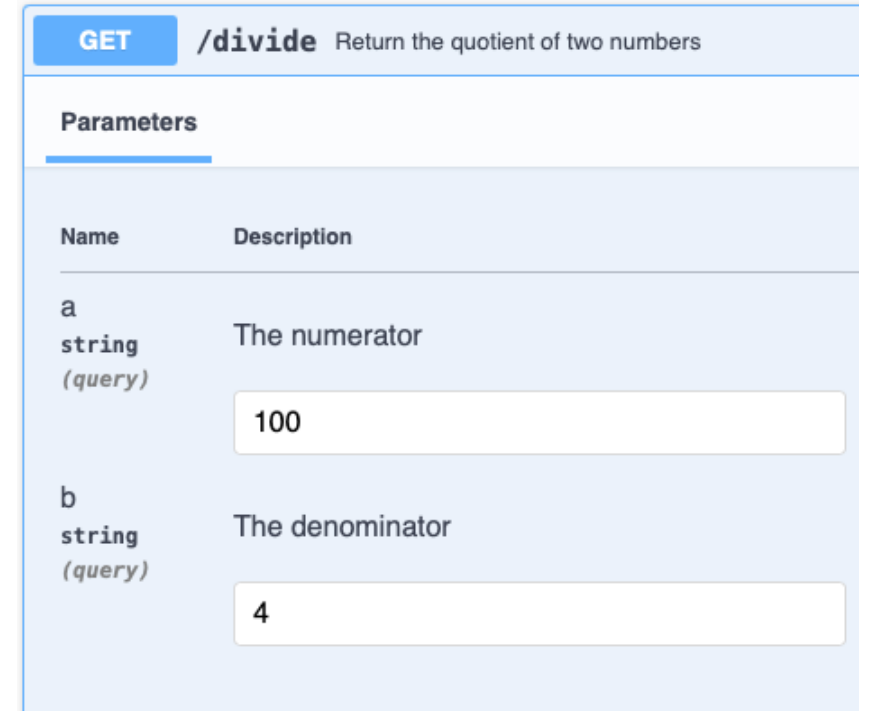
```
## @get /divide
```

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

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

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

```
}
```



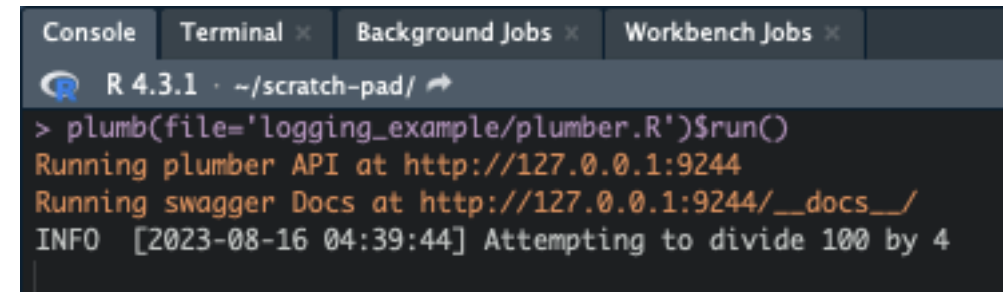
GET /divide Return the quotient of two numbers

Parameters

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

100

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
b string (query)	The denominator

No input!

No input!

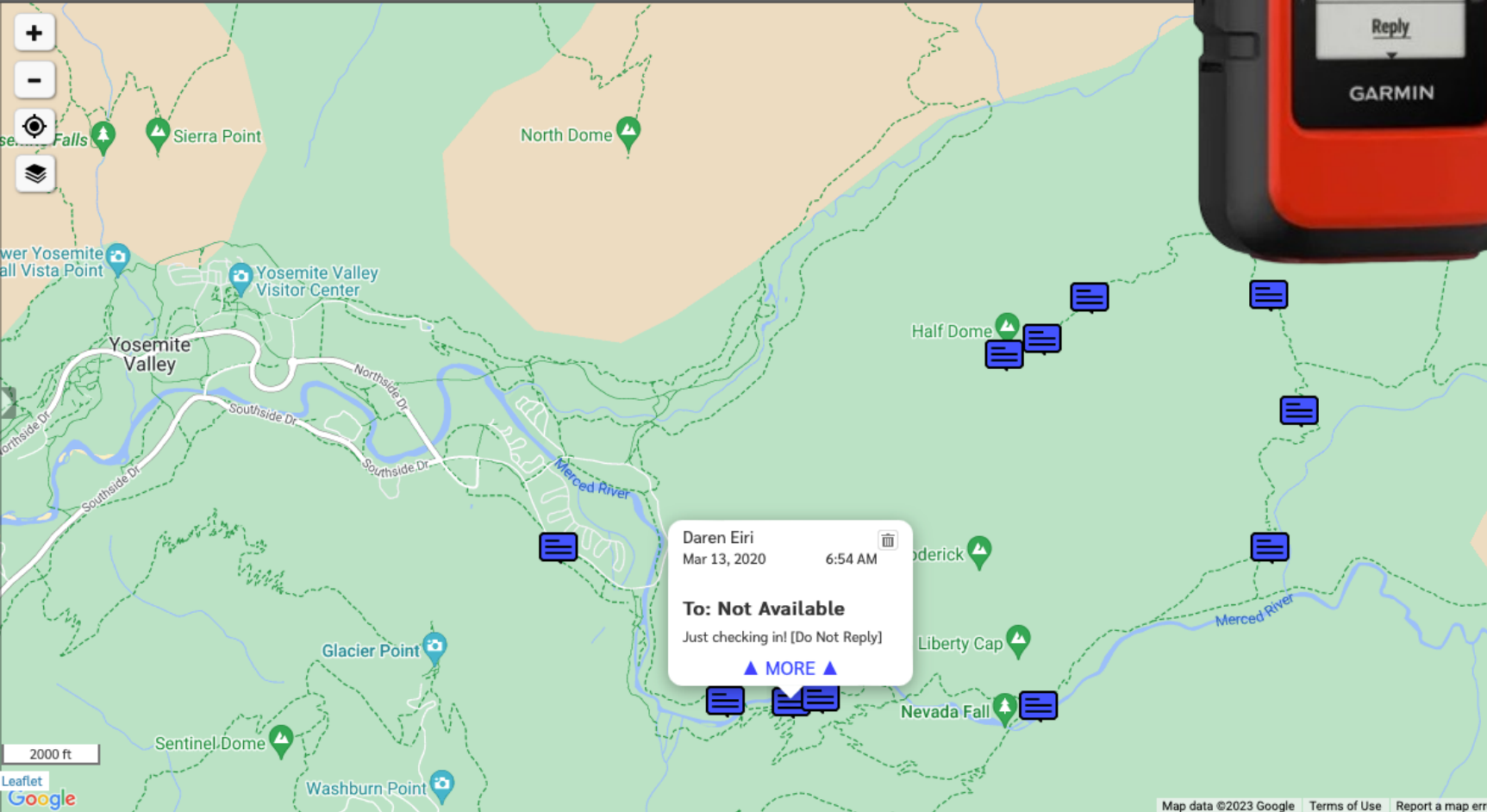
Code	Details
400	Error: Bad Request
	Response body
	<pre>{ "error": ["Must supply numerator and denominator"] }</pre>

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





Search



Add satellite communicator capability



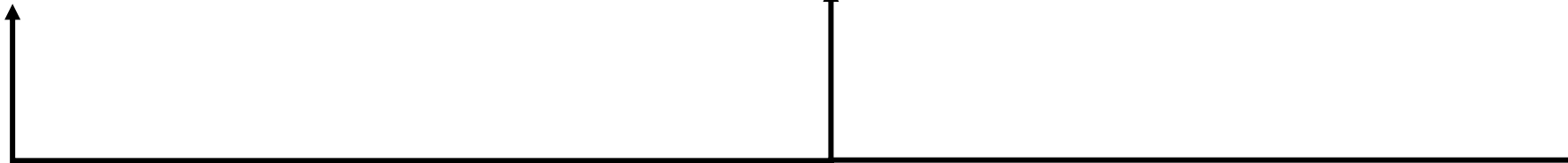
Azure Monitor



AWS CloudWatch



Cloud Logging



- 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?

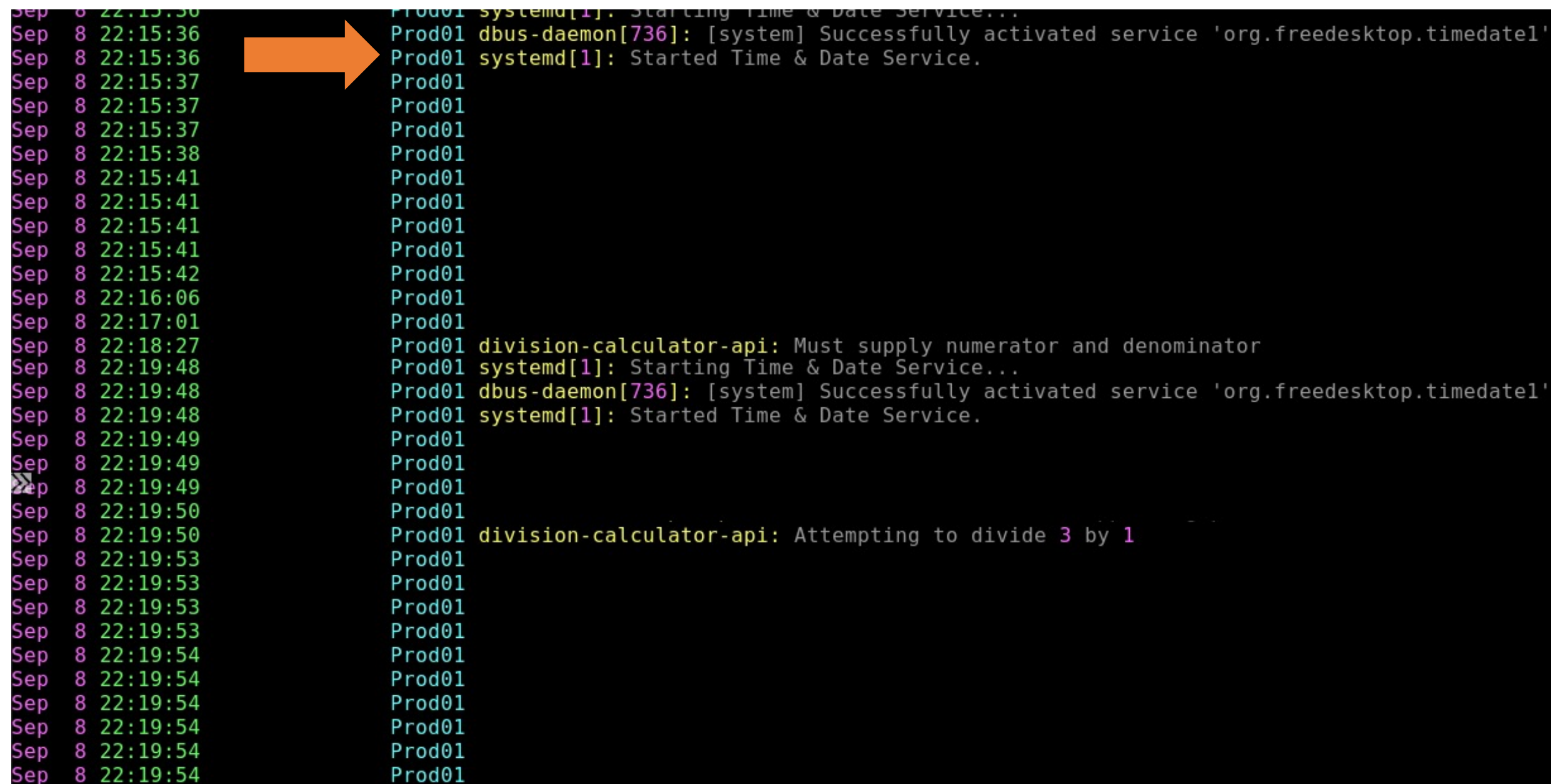
syslog = system's primary logging file (linux)

```
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 22:15:41 Prod01
Sep  8 22:15:41 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 22:19:49 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
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
```

What Is Syslog?




The image shows a terminal window with a black background and multi-colored text (green, yellow, purple, white). The text represents system logs. An orange arrow points to the line: `Prod01 dbus-daemon[736]: [system] Successfully activated service 'org.freedesktop.timedate1'`. The logs show the following sequence of events:

```
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 22:15:41 Prod01
Sep  8 22:15:41 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 22:19:49 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
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
```

What Is Syslog?

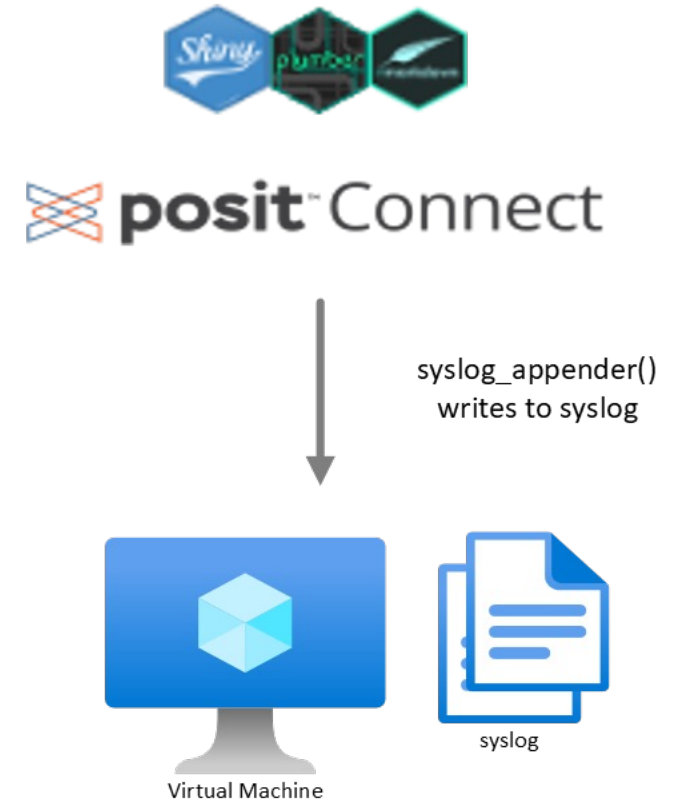
```
Sep  8 22:15:30 Prod01 systemd[1]: Starting Time & Date Service...
Sep  8 22:15:36 Prod01 dbus-daemon[736]: [system] Successfully activated service 'org.freedesktop.timedate1'
Sep  8 22:15:36 Prod01 systemd[1]: Started Time & Date Service.
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Sep  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 22:15:41 Prod01
Sep  8 22:15:41 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
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Sep  8 22:19:48 Prod01 systemd[1]: Started Time & Date Service.
Sep  8 22:19:49 Prod01
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Sep  8 22:19:49 Prod01
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Sep  8 22:19:50 Prod01 division-calculator-api: Attempting to divide 3 by 1
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Sep  8 22:19:53 Prod01
Sep  8 22:19:53 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
Sep  8 22:19:54 Prod01
```



Add satellite communicator capability Send syslog to Azure Monitor

```
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)  
  }  
}
```

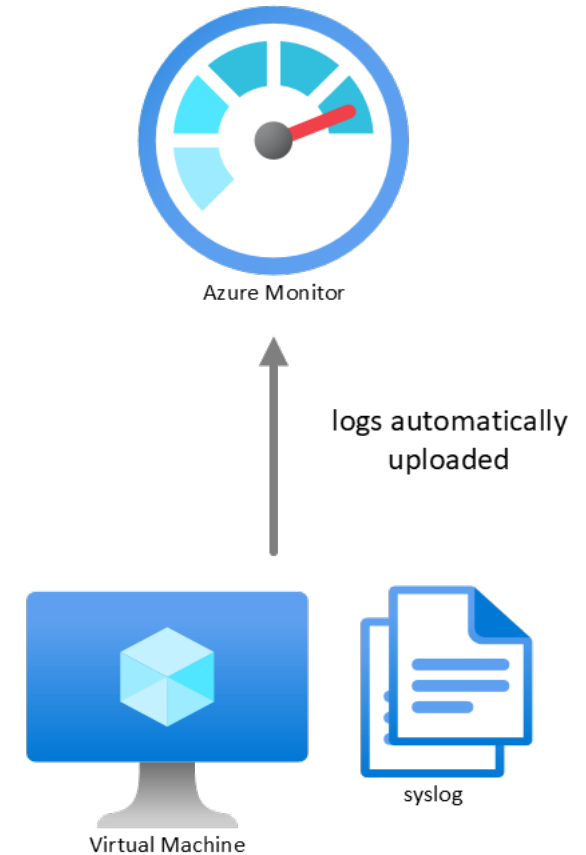


Add satellite communicator capability Send syslog to Azure Monitor

```
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)
  }
}
```



Home > Monitor

Monitor | Logs

Microsoft

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Insights

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- Containers
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- Azure Cosmos DB
- Key Vaults

New Query 1* | 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

Home > Monitor

Monitor | Logs

Microsoft

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New Query 1*

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 | where SeverityLevel != "info"
4
5

```

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

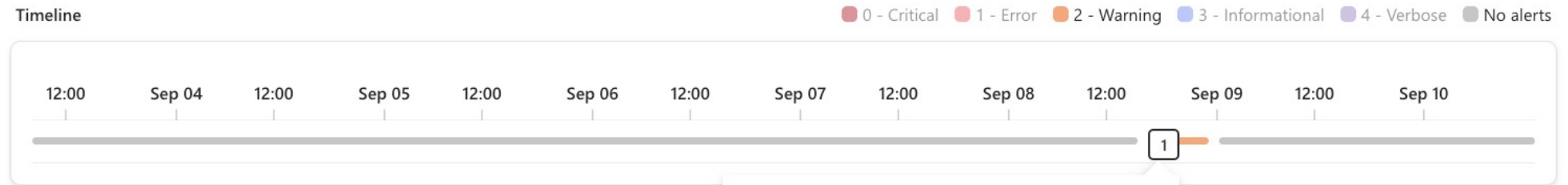
4s 246ms | Display time (UTC-07:00) [Query details](#) | 1 - 4 of 4

- Home > Posit - Division API Warning
- Overview
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- Tags
- History
- Settings
 - Locks
 - Identity (preview)
- Automation
 - Tasks (preview)
 - Export template
- Help
 - New Support Request

Posit - Division API Warning | History

Log search alert rule

Search [] Time range: Last 7 days



Fired time	Alert condition	Affected resource
09/8/2023, 04:00 PM	Fired	prod01

09/8/2023, 04:00 PM

Posit - Division API Warning

Monitor service	Monitor service
Log Alerts V2	Log Alerts V2
Alert condition	Affected resource
Fired	prod...
Severity	Value (when alert fired)
2 - Warning	1

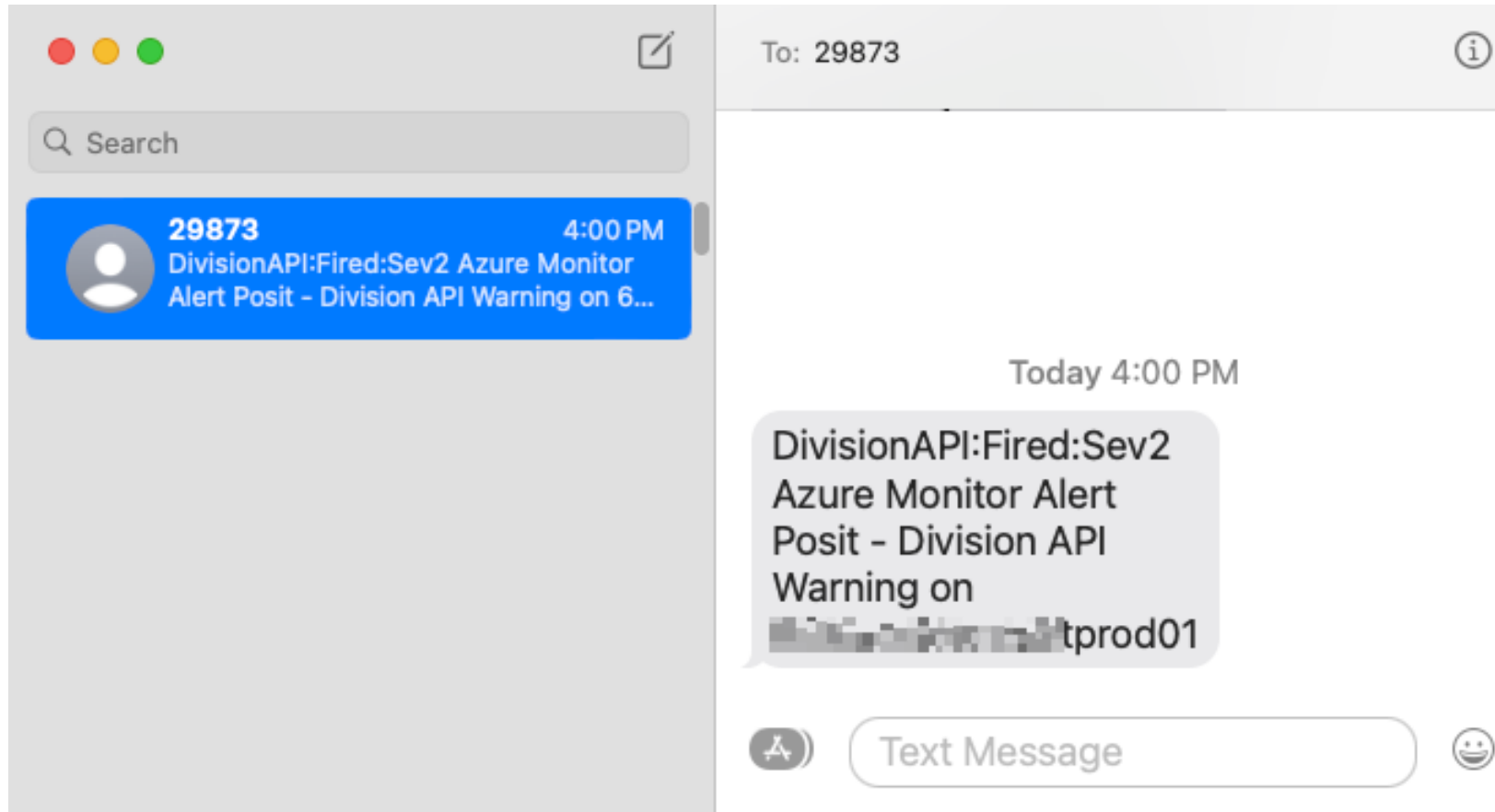
[View details](#)

Dimensions

None

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