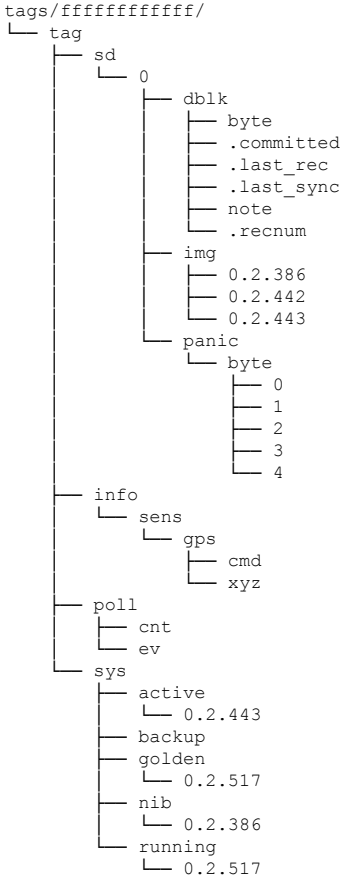
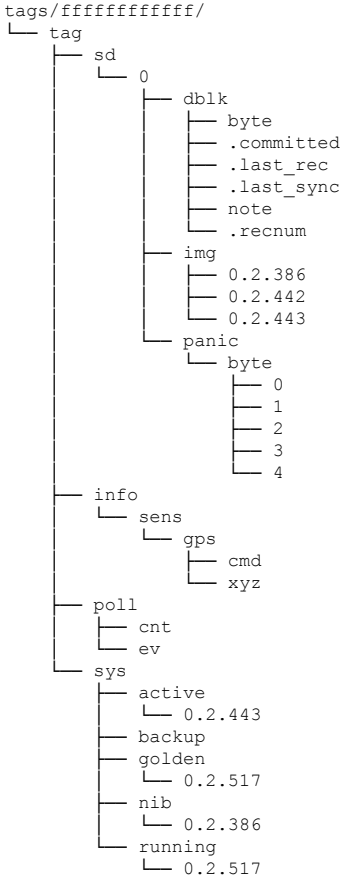
TagFuse
User Guide

Access TagNet Node Information
Using the
Linux File System Paradigm
March 13, 2018



TagFuse User Guide Contents

1. Overview
2. Content organization
3. Usage examples



Overview

TagNet protocol communicates over a radio network

TagNet represents a Tag's data, status, and control information as a tree (see left hand side of slide)

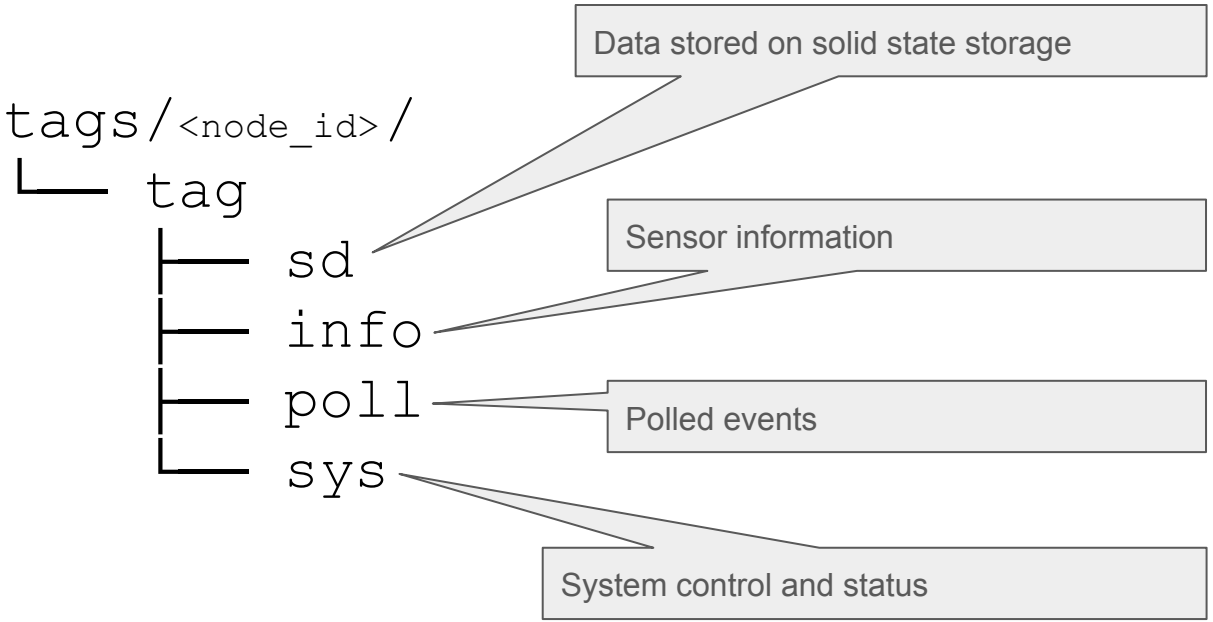
A RPi basestation collects information from one or more Tags

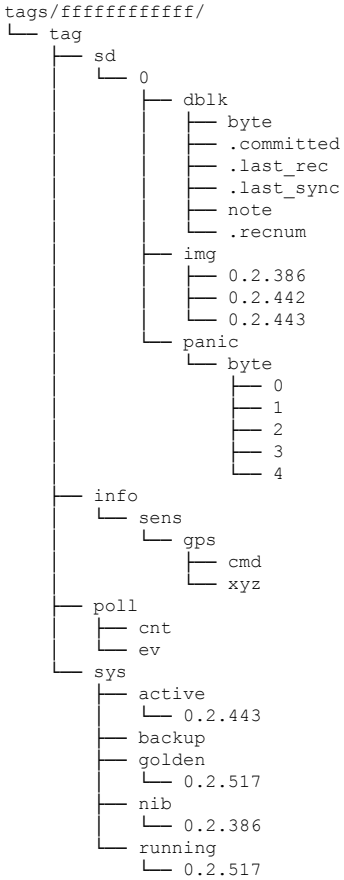
A user accesses a Tag's information through the Linux FUSE file system interface using the TagFuse basestation software.

Standard Linux commands (e.g., ls, cp, cat, echo) as well as Python and C programs can operate on the files provided by TagFuse

```
tags/ffffffffffff/
└── tag
    ├── sd
    │   └── 0
    │       ├── dblk
    │       │   ├── byte
    │       │   ├── .committed
    │       │   ├── .last_rec
    │       │   ├── .last_sync
    │       │   ├── note
    │       │   └── .recnum
    │       ├── img
    │       │   ├── 0.2.386
    │       │   ├── 0.2.442
    │       │   └── 0.2.443
    │       └── panic
    │           └── byte
    │               ├── 0
    │               ├── 1
    │               ├── 2
    │               ├── 3
    │               └── 4
    ├── info
    │   └── sens
    │       └── gps
    │           ├── cmd
    │           └── xyz
    ├── poll
    │   ├── cnt
    │   └── ev
    └── sys
        ├── active
        │   └── 0.2.443
        ├── backup
        ├── golden
        │   └── 0.2.517
        ├── nib
        │   └── 0.2.386
        └── running
            └── 0.2.517
```

Content Organization: Top Level of Tree





Content Organization: Persistent Data Storage

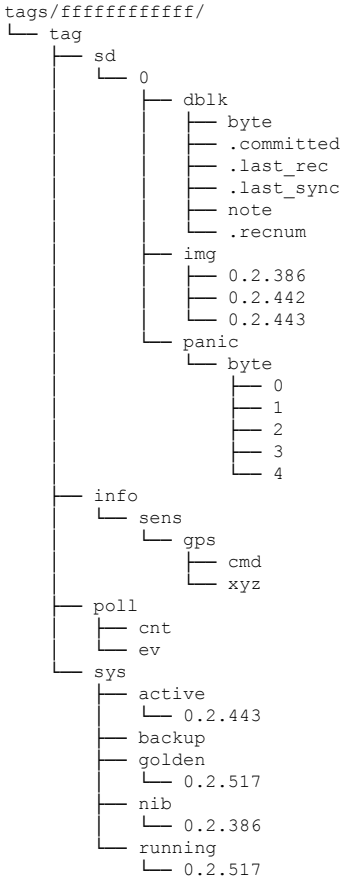
- Single Unit of Storage (0), expandable to more
- `dblk` contains the log record data collection*
  - `byte` contains the log record data in byte file format
  - `note` can be used to write extemporaneous data into the log
  - `.recnum` file size is the number of records stored
  - other `.*` file sizes specify the byte offset position of last committed, last record, and last sync record
- `img` contains loaded software images**
  - Up to four software images can be stored on the Tag
- `panic` contains core dumps of system failures**
  - Up to 32 system software core dumps can be stored on the Tag
  - ?How to erase?

* file sizes are updated by reading from Tag
** list if files are updated by reading from Tag

```
tags/ffffffffffff/
└── tag
    ├── sd
    │   └── 0
    │       ├── dblk
    │       │   ├── byte
    │       │   ├── .committed
    │       │   ├── .last_rec
    │       │   ├── .last_sync
    │       │   ├── note
    │       │   └── .recnum
    │       ├── img
    │       │   ├── 0.2.386
    │       │   ├── 0.2.442
    │       │   └── 0.2.443
    │       └── panic
    │           └── byte
    │               ├── 0
    │               ├── 1
    │               ├── 2
    │               ├── 3
    │               └── 4
    ├── info
    │   └── sens
    │       └── gps
    │           ├── cmd
    │           └── xyz
    ├── poll
    │   ├── cnt
    │   └── ev
    └── sys
        ├── active
        │   └── 0.2.443
        ├── backup
        ├── golden
        │   └── 0.2.517
        ├── nib
        │   └── 0.2.386
        └── running
            └── 0.2.517
```

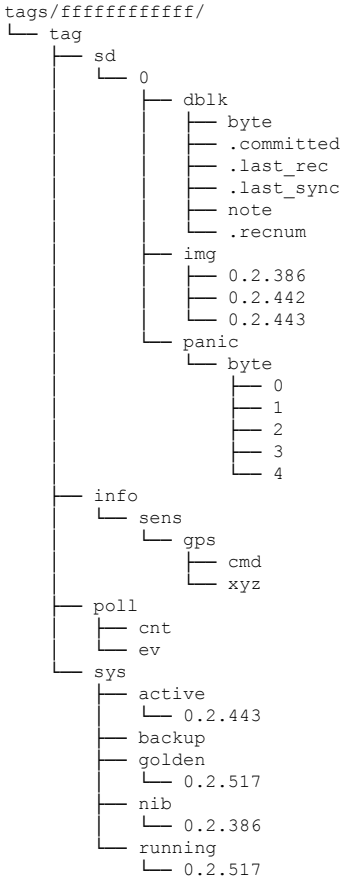
Content Organization: Sensor Information

- Sensor data can be retrieved and operation controlled
- `gps` Sensor
  - `cmd` to issue direct commands to the GPS device
  - `xyz` provides most recent position values read from from device



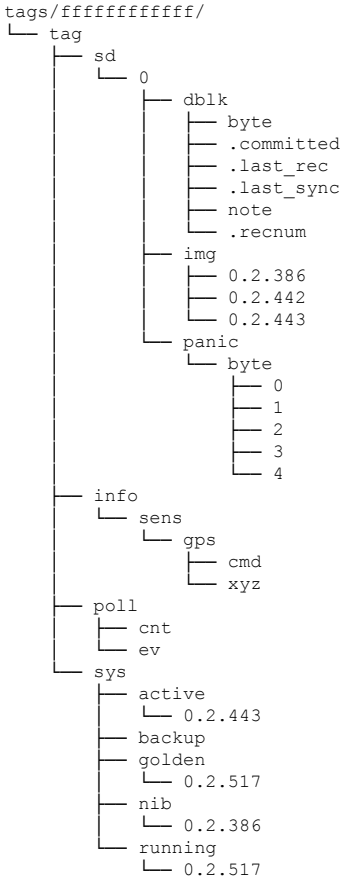
Content Organization: Polled Events

- Polling is a power efficient network protocol designed to collect event information from tags
- Polling allows a large number of tags to co-exist in close proximity and have their data collected with minimal interference
- `ev` contains list of events pending on Tag



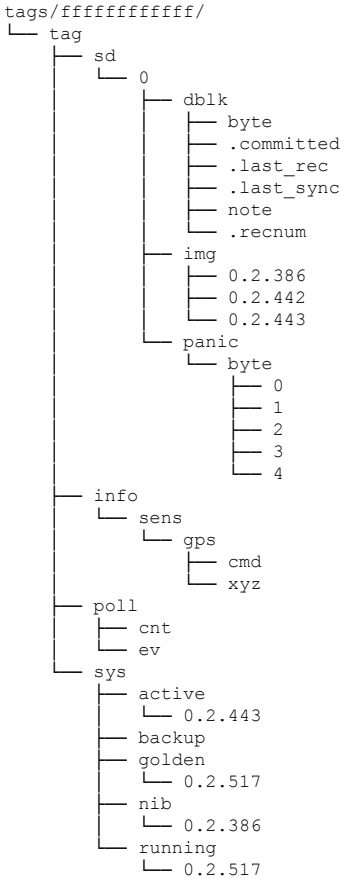
Content Organization: System Information

- `Active` indicates software version currently selected for running in normal operation. User settable.
- `Backup` indicates software version currently selected for taking over should Active fail too many times. User settable
- `Golden` indicates software version currently loaded in the “factory” area of the flash. Programed at factory.
- `Nib` indicates the software version loaded in the “user” area of the flash. Programed on demand by user. Should be the active version.
- `Running` indicates the version of software currently executing. Should be either `golden` or `nib`.



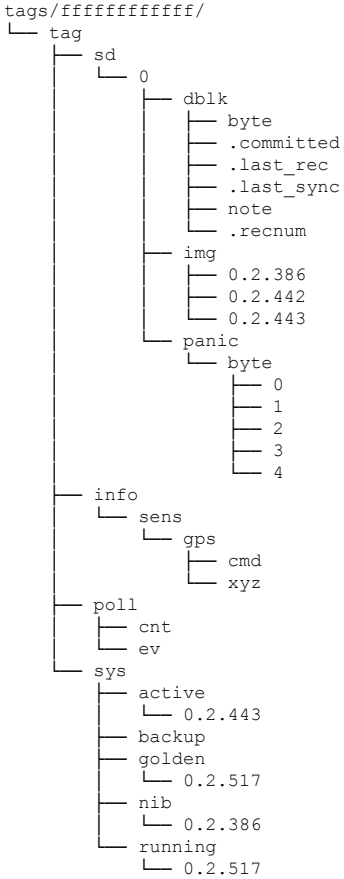
Usage Examples: Reading Log Information

- Get file size and timestamp information
  - `ls tag/sd/0/dblk/byte`
- Copy data from log data file
  - `cp tag/sd/0/dblk/byte <newfile>`
- Delete the local cache (no effect on Tag)
  - `rm tag/sd/0/dblk/byte`
- Get hidden file information
  - `ls -al tag/sd/0/dblk`
- Display log data in readable format
  - `tagdump tag/sd/0/dblk/byte`
- Read continuously from end of log file (tail -f)
  - `tagdump --tail tag/sd/0/dblk/byte`



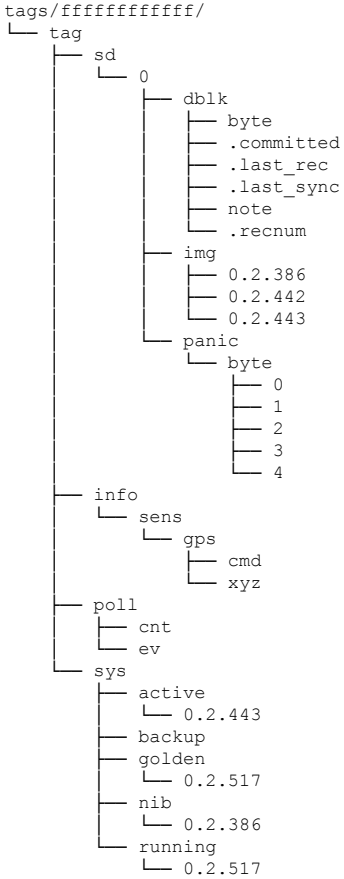
Usage Examples: Software Image Management

- Copy new software image to tag
  - `cp <newimage> tag/sd/0/img/<version>`
- Delete software image from tag
  - `rm tag/sd/0/img/<version>`
- Get file size and timestamp information
  - `ls -l tag/sd/0/img`
  - `ls -l tag/sd/0/img/<version>`
- Set software image to active
  - `ln tag/sd/0/img/<version> tag/sys/active/<version>`
- Set software image to backup
  - `ln tag/sd/0/img/<version> tag/sys/backup/<version>`



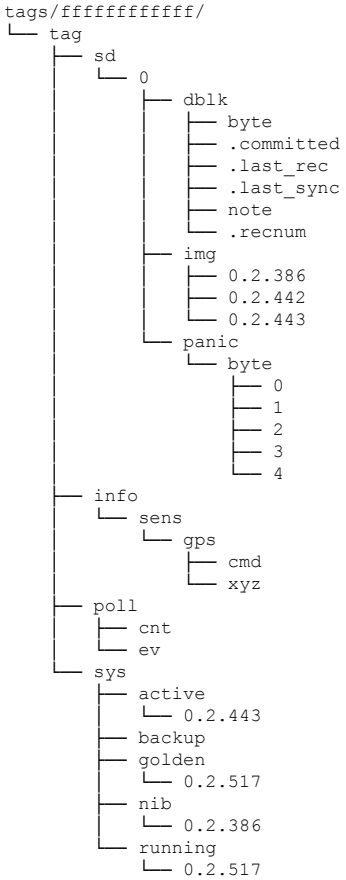
Usage Examples: Panic Management

- Copy panic file from Tag
  - `cp tag/sd/0/panic/byte/0 <newfile>`



Usage Examples: Sensor Information

- Retrieve most recent XyZ position from Tag
  - `cp tag/info/sens/gps/xyz <samplefile>`
- Write a command directly to the GPS device
  - `echo -ne '\06' > tag/info/sens/gps/cmd`



Usage Examples: System Information

- Show which image version is currently active
  - `ls tag/sys/active`
- Set new image version to active
  - `ln tag/sd/0/img/<version> tag/sys/active/<version>`
- Show all files in TagFuse file system
  - `Tree tag/*`

```
tags/ffffffffffff/
└── tag
    ├── sd
    │   └── 0
    │       ├── dblk
    │       │   ├── byte
    │       │   ├── .committed
    │       │   ├── .last_rec
    │       │   ├── .last_sync
    │       │   ├── note
    │       │   └── .recnum
    │       ├── img
    │       │   ├── 0.2.386
    │       │   ├── 0.2.442
    │       │   └── 0.2.443
    │       └── panic
    │           └── byte
    │               ├── 0
    │               ├── 1
    │               ├── 2
    │               ├── 3
    │               └── 4
    ├── info
    │   └── sens
    │       └── gps
    │           ├── cmd
    │           └── xyz
    ├── poll
    │   ├── cnt
    │   └── ev
    └── sys
        ├── active
        │   └── 0.2.443
        ├── backup
        ├── golden
        │   └── 0.2.517
        ├── nib
        │   └── 0.2.386
        └── running
            └── 0.2.517
```

Usage Examples: Polled Events

- tbd

```
tags/fffffffffff/
└── tag
    ├── sd
    │   └── 0
    │       ├── dblk
    │       │   ├── byte
    │       │   ├── .committed
    │       │   ├── .last_rec
    │       │   ├── .last_sync
    │       │   ├── note
    │       │   └── .recnum
    │       ├── img
    │       │   ├── 0.2.386
    │       │   ├── 0.2.442
    │       │   └── 0.2.443
    │       └── panic
    │           └── byte
    │               ├── 0
    │               ├── 1
    │               ├── 2
    │               ├── 3
    │               └── 4
    ├── info
    │   └── sens
    │       └── gps
    │           ├── cmd
    │           └── xyz
    ├── poll
    │   ├── cnt
    │   └── ev
    └── sys
        ├── active
        │   └── 0.2.443
        ├── backup
        ├── golden
        │   └── 0.2.517
        ├── nib
        │   └── 0.2.386
        └── running
            └── 0.2.517
```

Usage Examples: Te

- D)
  - Re
-