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NATIONAL LABORATORY

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# VOLTTRON™ Deployment Overview

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VOLTTRON™ 2017

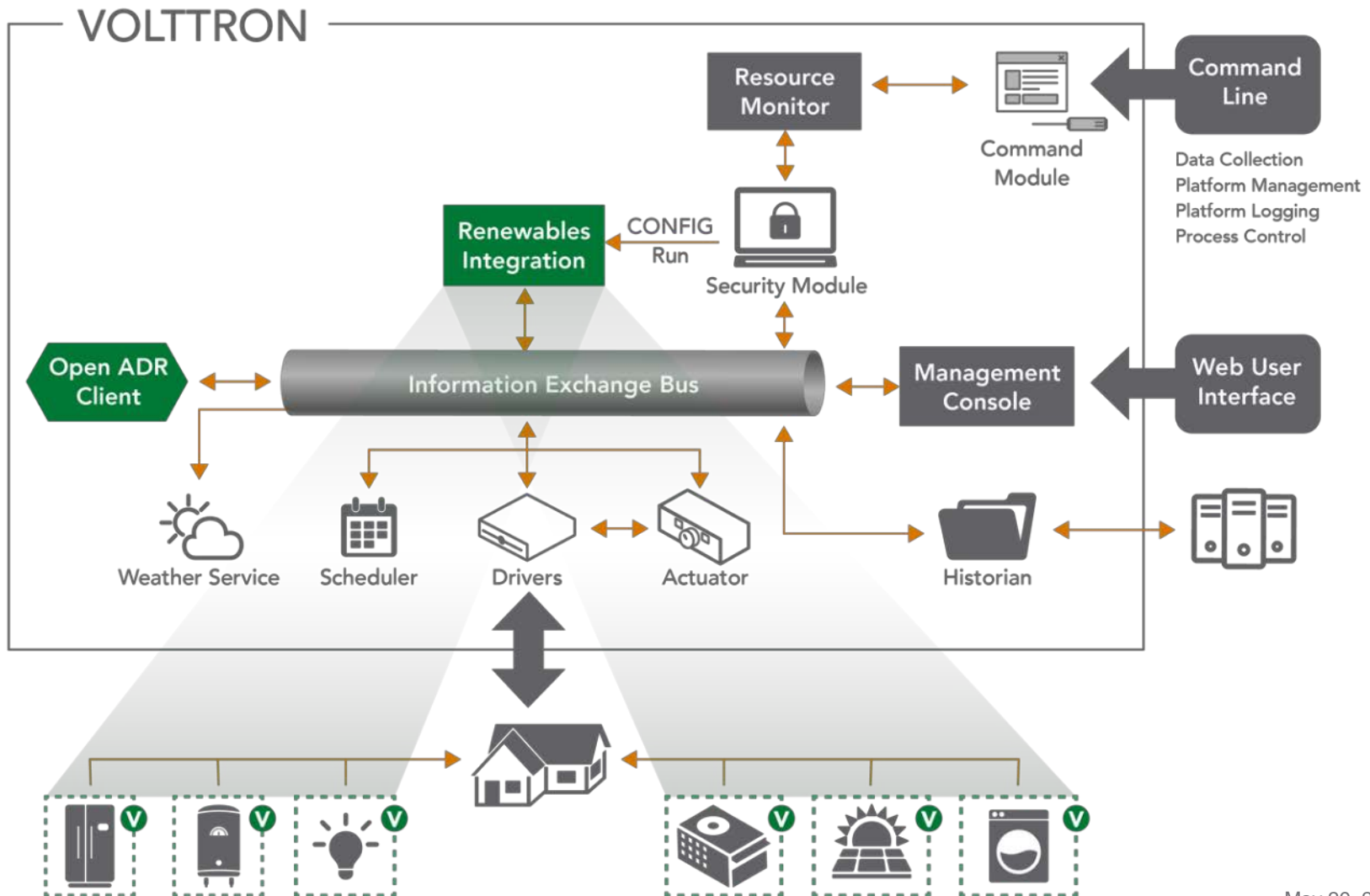


# Enabling Hardware and Software

- ▶ Code is open source and available on github
  - <https://github.com/VOLTTRON/volttron/>
- ▶ Linux as target platform
- ▶ Designed to run on small form factor computers
  - PandaBoard\*
  - Beagle Bone Black
  - Intel NUC
  - Desktop computer/server
- ▶ Python 2.7
  - OMQ: Message bus (<http://zeromq.org/>)
  - PyModbus: Used by driver to enable interaction with MODBUS devices. (<https://code.google.com/p/pymodbus/>)
  - BACPytes: Python module for BACnet communication (<http://bacpytes.sourceforge.net/>)
  - Wheel: Used for agent packaging in 2.0 (<https://pypi.python.org/pypi/wheel/>)
  - Several other libraries used



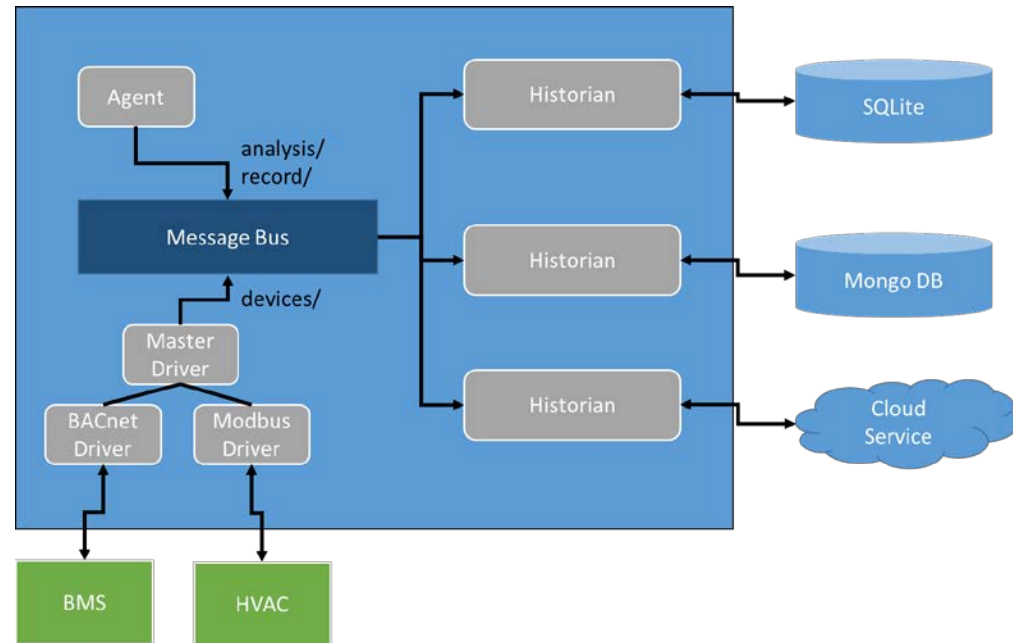
# Platform Overview





# Modularized Historian

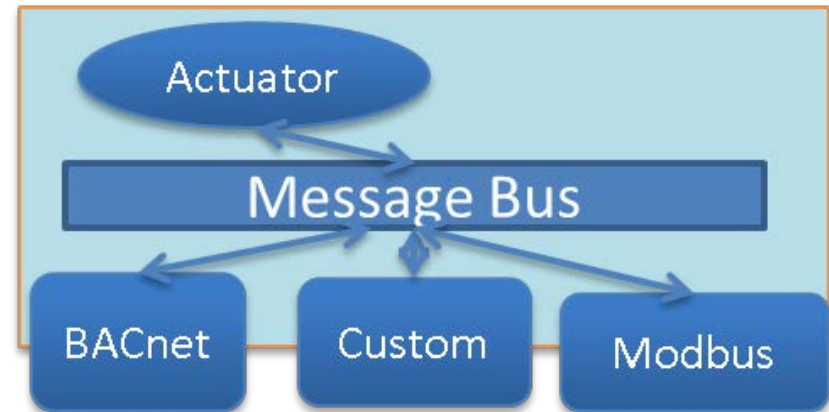
- ▶ Historians can be built for any storage solution
- ▶ BaseHistorian
  - Can be extended for any solution
  - Handles subscribing to Bus
  - Local cache





# Modularized Drivers

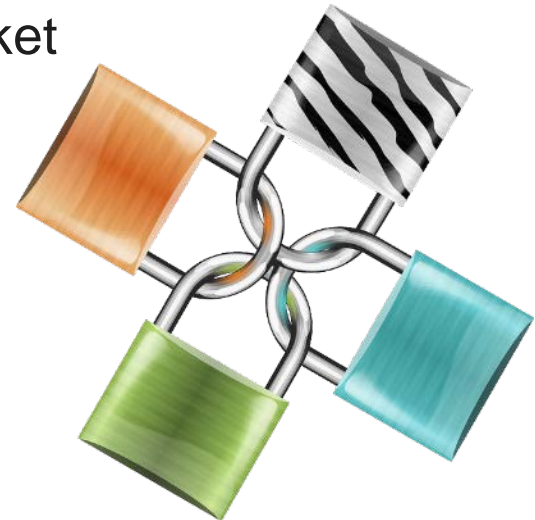
- ▶ Standardized creating custom drivers to scrape data and publish to the message bus
- ▶ Simplify developing drivers and contributing new capabilities back to VOLTTRON
- ▶ Abstracted out driver interfaces allowing Actuator Agent to handle controlling devices via any protocol





# VOLTTRON™ Interconnect Protocol

- ▶ Increase security of the message bus and allow direct communication where appropriate
  - Platform – service
  - Agent – service
  - Agent – Agent large transfer
- ▶ Communication model underneath VOLTTRON™ Message Bus
  - Compatibility layer so changes are transparent to existing agents
- ▶ VOLTTRON™ now requires only a single socket
- ▶ Message Bus can be secured
  - Authenticated publishers
  - Publishers can limit subscribers





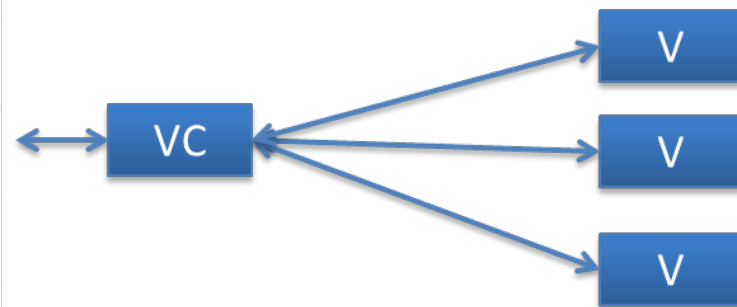
# Management Agent

- ▶ PlatformAgent acts as manager for the platform
  - Send commands to agents
  - Enables monitoring of health of agents and platform
  - Exposes status to other platforms/web console
  - Support for applications which analyze data and issue alerts (behavior out of norm)



# VOLTTRON™ Management Central

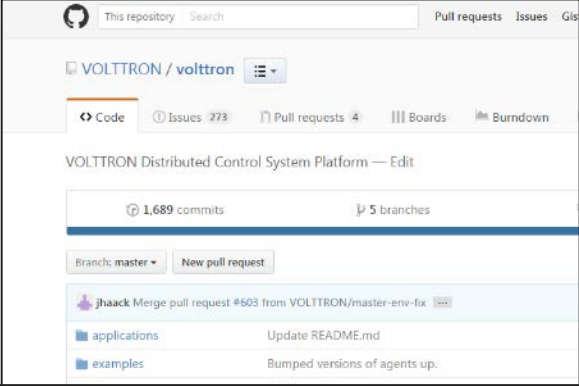
VOLTTRON™	
Platforms	
<b>Beagle EV2</b> ab0c25fd-3718-4222-ad25-ae44d2a5cdaa	Agents: 3 running, 0 stopped, 4 installed
<b>Panda1 WH1</b> b8efd20-825c-4382-900d-003eaaad1be	Agents: 3 running, 0 stopped, 3 installed
<b>Pandas 2 EV1</b> 8785999d-e298-47b2-bb23-8a369240d220	Agents: 3 running, 0 stopped, 4 installed
<b>Rock WH2</b> c4b3282e-7517-4a8b-b76d-cfe5833ed7a6	Agents: 3 running, 0 stopped, 4 installed
<b>VC Platform</b> b5c34dfd-88ed-412b-8a4c-aa4d60ec7ae5	Agents: 3 running, 0 stopped, 4 installed



- ▶ Improve Visibility of Deployed Platforms
- ▶ Previous interface to the platform “admin centric”
- ▶ Makes use of the service exposed by the Management Agent
- ▶ VOLTTRON™ Management Dashboard
  - Allow for better insight into the state of the platform and agents
  - Does not require expert user
  - Quickly see overview of platforms being monitored



# Support Mechanisms



VOLTTRON / volttron

Code Issues 273 Pull requests 4 Boards Burndown

VOLTTRON Distributed Control System Platform — Edit

1,689 commits 5 branches

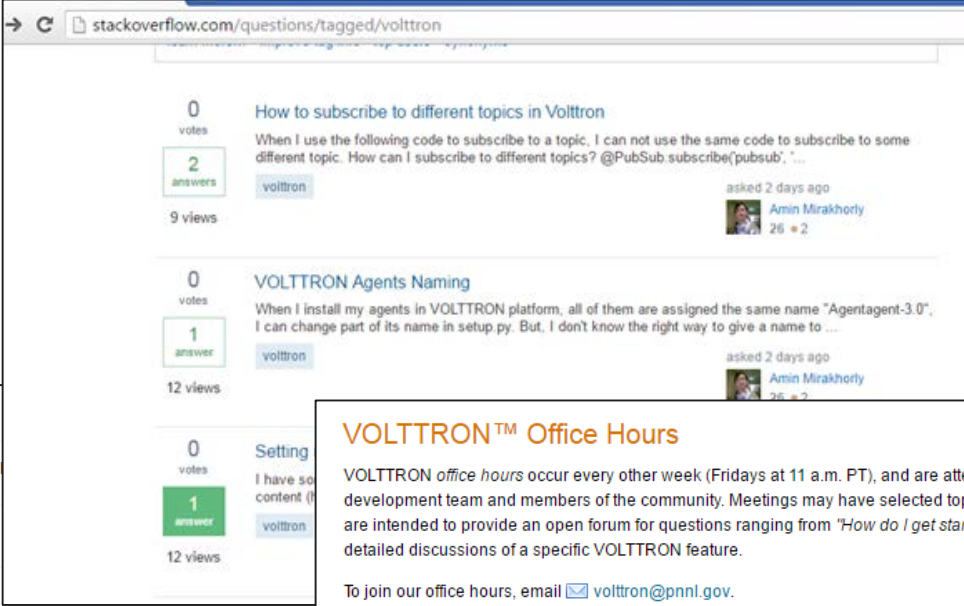
Branch: master New pull request

jhaack Merge pull request #603 from VOLTTRON/master-env-fix

applications Update README.md

examples Bumped versions of agents up.

- TCP replay attacks are rejected but no exception is logged security #666 opened 5 days ago by fstshrk New Issues
- Denial of Service to VOLTTRON Central does not allow a service to operate #665 opened 5 days ago by fstshrk New Issues
- Possible Improvements for VC and Platform Agent #661 opened 14 days ago by mikroup 0 of 20 New Issues
- setting min/max for chart y axis doesn't work bug #659 opened 18 days ago by jchap-pnnl VOLTTRON 3.5.1 Ready To Merge
- Make agent script fails when applications directory is missing #652 opened 27 days ago by mikroup New Issues
- charts s



stackoverflow.com/questions/tagged/volttron

How to subscribe to different topics in Volttron

When I use the following code to subscribe to a topic, I can not use the same code to subscribe to some different topic. How can I subscribe to different topics? @PubSub.subscribe('pubsub', '...'

0 votes 2 answers 9 views

asked 2 days ago Amin Mirakhori 26 +2

VOLTTRON Agents Naming

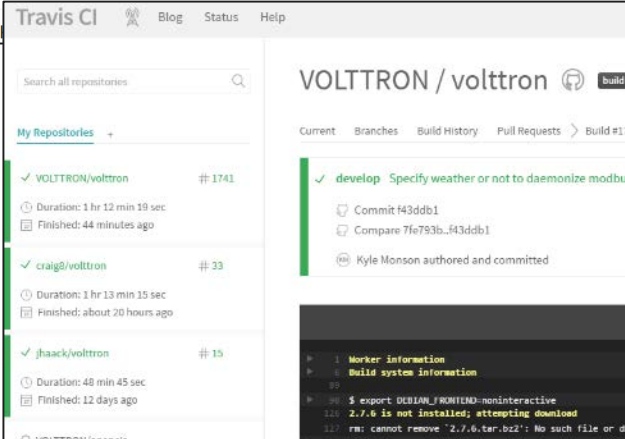
When I install my agents in VOLTTRON platform, all of them are assigned the same name "Agentagent-3.0". I can change part of its name in setup.py. But, I don't know the right way to give a name to ...

0 votes 1 answer 12 views

asked 2 days ago Amin Mirakhori 26 +2

Setting I have so content (I

0 votes 1 answer 12 views



Travis CI Blog Status Help

Search all repositories

My Repositories +

- VOLTTRON/volttron #1741
  - Duration: 1 hr 12 min 19 sec
  - Finished: 44 minutes ago
- craig/volttron #33
  - Duration: 1 hr 13 min 15 sec
  - Finished: about 20 hours ago
- jhaack/volttron #15
  - Duration: 48 min 45 sec
  - Finished: 12 days ago
- VOLTTRON/opensis

VOLTTRON / volttron

Current Branches Build History Pull Requests Build #1

develop Specify weather or not to daemonize module

Commit f43ddb1

Compare f7e793b..f43ddb1

Kyle Monson authored and committed


```
1 Worker information
2 Build system information
3
4 $ export DEBIAN_FRONTEND=noninteractive
5 2.7.6 is not installed; attempting download
6 rm: cannot remove '2.7.6.tar.bz2': No such file or d
7 $ if [ -f /tmp/2.7.6.tar.bz2 ]; then rm -f /tmp/2.7.6.tar.bz2; fi
```

## VOLTTRON™ Office Hours

VOLTTRON office hours occur every other week (Fridays at 11 a.m. PT), and are attended by the development team and members of the community. Meetings may have selected topics, but they are intended to provide an open forum for questions ranging from "How do I get started?" to detailed discussions of a specific VOLTTRON feature.

To join our office hours, email [volttron@pnnl.gov](mailto:volttron@pnnl.gov).


### Playback recorded VOLTTRON Office Hour sessions



VOLTTRON Office Hours - June 24, 2016

Chad Corbin of PNNL presented the Transactive Control of Commercial Building HVAC multi-agent VOLTTRON application (recording is audio-only; download PDF of presentation [here](#)).

PNNL-SA-119047



VOLTTRON Office Hours - June 10, 2016

Discussion of creating a data model for adding context to VOLTTRON data, presentations on integrating VOLTTRON with MATLAB and the FNCS project, and an update on data aggregation historians.

PNNL-SA-118861



# VOLTTRON™ Resources

- ▶ GitHub
  - Codebase: <https://github.com/VOLTTRON/volttron.git>
  - Issues and requests: <https://github.com/VOLTTRON/volttron/issues>
- ▶ Documentation: <http://volttron.readthedocs.io/en/develop/>
  - Documentation is per branch
- ▶ StackOverflow: <http://stackoverflow.com/questions/tagged/volttron>
- ▶ Email: [volttron@pnnl.gov](mailto:volttron@pnnl.gov)
- ▶ Bi-weekly office hours, email to be added
  - Recordings: <http://bgintegration.pnnl.gov/volttronofficehours.asp>