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
  ■ 0MQ: Message bus (http://zeromq.org/)
  ■ PyModbus: Used by driver to enable interaction with MODBUS devices. (https://code.google.com/p/pymodbus/)
  ■ BACPypes: Python module for BACnet communication (http://bacpypes.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

<table>
<thead>
<tr>
<th>Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beagle EV2</td>
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<td>Panda1 WH1</td>
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<td>VC Platform</td>
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<tr>
<td>05c34d5f-88ed-4128-8a4c-aaa0640c7ae5</td>
</tr>
</tbody>
</table>

- 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

TCP replay attacks are rejected but no exception is logged.

Denial of Service to VOLTTRON Central does not allow a service to operate.

Possible Improvements for VC and Platform Agent

Setting min/max for chart y axis doesn't work.

Make agent script fails when applications directory is missing.

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.

Playback recorded VOLTTRON Office Hour sessions

VOLTTRON Office Hours - June 24, 2016
Chad Corbin of PNNL presented the Transactional Control of Commercial Building HVAC multi-agent VOLTTRON application (recording is audio-only, download PDF of presentation here: https://example.com).

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.
VOLTTRON™ Resources

► GitHub
  ■ Codebase: https://github.com/VOLTTRON/volttron.git
  ■ Issues and requests: https://github.com/VOLTTRON/volttron/issues

  ■ Documentation is per branch

► StackOverflow: http://stackoverflow.com/questions/tagged/volttron

► Email: volttron@pnnl.gov

► Bi-weekly office hours, email to be added
  ■ Recordings: http://bgintegration.pnnl.gov/volttronofficehours.asp