

AutoPyFactory (APF) 2.0



John Hover, BNL jhover@bnl.gov





Outline



- Rationales
- Design, Internals, Plugins, Features
- Wrappers
- Monitor
- Current use
- Future Plans



Rationales



Why migrate from Autopilot?

- cron-based, installed via tarball → tricky to set up.
- Some stability issues.
- one process per queue -> condor_q delays.

Benefits of APF v. 1.X?

- single process for all queues
- configured via files
- installed via RPM



Rationales



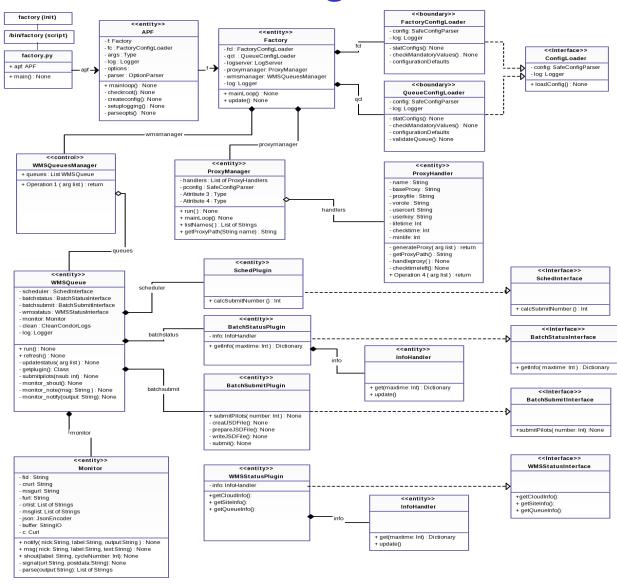
Why APF v. 2.X?

- Heavy multi-threading: no coupling between processing for different sites-> greater reliability (so far)
- object-orientation: threading becomes easy, plugins natural
- plugins: different behavior per APF queue
- Increase UNIX integration/deployability
- Clean install/upgrade via YUM



Design







UNIX Integration



Full Linux system integration:

- Standard service init script in /etc/init.d, configs in /etc/apf, /etc/syconfig, daemonization with dropped privileges.
- Standard packaging (RPM) with clean upgrade path.
- Runs as single-process daemon (no cron necessary)
- Server log rollover handled by UNIX logrotate service.

Repository-based deployment

- Development, testing, and production YUM repositories at BNL for RPMs.
- RPMs are signed for security.





Internals



Heavily Multi-threaded

Failures/timeouts in one section should not affect others.

Fully modularized.

- Each function handled by self-contained object with defined interface for usage by other objects.
- Overall system now candidate for embedding, i.e. we run it as a daemon from init now, but it could also be instantiated as a web service with a web GUI.

Plugin architecture

Allows easy configuration, extension, and customization.



Plugins



WMS Status (Panda) Plugin

 Queries WMS for its queue config and current state, e.g. how many jobs activated? Running?

Batch Status Plugin

 Queries local batch system (e.g. Condor-G or Condor) for submitted job state info (pending, failed, submitted, etc.)

Batch Submit Plugin

- Creates the submit file and issues batch submit command(s).
- E.g. CondorGT2, CondorLocal

Sched Plugins

- Decides exactly how many pilots to submit each cycle.
- E.g. Fixed, Activated, NQueue



Self-Contained



- Built-in web server for batch log export
 - No more separate Apache setup.
- Built-in in-process batch log cleanup
 - Configurable by time and/or disk % usage.
- Integrated Proxy Management
 - Allows for multiple proxy types, with each queue specifying which to use.
 - Allows for use of long-lived base vanilla proxy. No requirement for clear text passwords on system.





New Wrappers



Uses new wrapper system

- Hierarchical: Top-level wrapper never changes.
- Maintainable/modular: Functionality split between layers of the wrapper system. Grid, VO, type, project.
- General: Handles any type of job on any grid from any VO, (provided plugins exist for the combination).
- Extensible: Plugin architecture allows admins and other VOs to customize functionality without re-invention.
- Robust: Very little logic in bash, mostly in Python.
- Better Logging: Due to near-total migration to Python.

Rationale

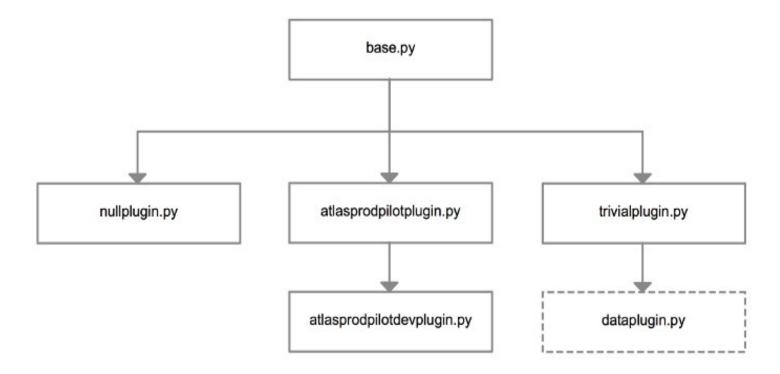
- Current copy-and-customize approach is unsustainable.
- Current non-modular design requires new wrapper for every combination of characteristics for non-ATLAS users.





Wrapper Hierarchy







Monitor: Display



Home | Admin | News & Into | Graphs

Factory view: BNL-gridui11-jhover

BNL-gridui11-jhover

VERSION 2.0.0

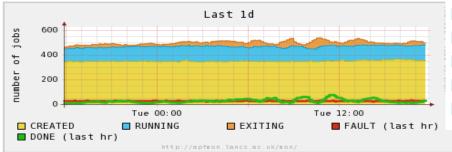
FACTORY

LAST STARTUP 1 day, 14 hours ago LAST CYCLE 0 minutes ago

EMAIL jcaballero@bnl.gov

IP 130.199.3.165

LOGS http://griduill.usatlas.bnl.gov:25880



Home | Admin | News & Into | Graphs

Global view - all factories

Site search

Factory Activity When Version ASGC-TW-1 1 1 minute ago - BNL-griduil1-jhover 4 2 minutes ago 2.0.0 BNL-localsub01-xzhao 1 1 day, 14 hours ago 2.0.0 david apf IT 6 1 minute ago 1.3.0 FR-Analysis-cclcgatlas02 20 2 minutes ago 1.3.0 FR-Production-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago 1.3.0 TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0 voatlas215 146 2 minutes ago 1.3.0	Site search	J		
BNL-griduil1-jhover 4 2 minutes ago 2.0.0 BNL-localsub01-xzhao 1 1 day, 14 hours ago 2.0.0 david apf IT 6 1 minute ago 1.3.0 FR-Analysis-cclcgatlas02 20 2 minutes ago 1.3.0 FR-Analysis-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago 1.3.0 Uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	Factory	Activity	When	Version
BNL-griduil1-jhover 4 2 minutes ago 2.0.0 BNL-localsub01-xzhao 1 1 day, 14 hours ago 2.0.0 david apf IT 6 1 minute ago 1.3.0 FR-Analysis-cclcgatlas02 20 2 minutes ago 1.3.0 FR-Analysis-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago 1.3.0 Uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	ASGC-TM-1	1	1 minute ago	_
BNL-localsubO1-xzhao 1 1 day, 14 hours ago 2.0.0 david apf IT 6 1 minute ago 1.3.0 FR-Analysis-cclcgatlas02 20 2 minutes ago 1.3.0 FR-Analysis-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago 1.3.0 Uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0		_	-	2.0.0
FR-Analysis-cclcgatlas02 20 2 minutes ago 1.3.0 FR-Analysis-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago - TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0		1		
FR-Analysis-cclcgatlas03 147 1 minute ago 1.3.0 FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago - TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	david apf IT	6	1 minute ago	1.3.0
FR-Production-cclcgatlas02 4 0 minutes ago 1.3.0 FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago - TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	FR-Analysis-cclcgatlas02	20	2 minutes ago	1.3.0
FR-Production-cclcgatlas03 4 3 minutes ago 1.3.0 harenberg-DE 43 0 minutes ago - TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	FR-Analysis-cclcgatlas03	147	1 minute ago	1.3.0
harenberg-DE 43 0 minutes ago - TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	FR-Production-cclcgatlas02	4	O minutes ago	1.3.0
TRIUMF-productionPilots 97 0 minutes ago 1.3.0 uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	FR-Production-cclcgatlas03	4	3 minutes ago	1.3.0
uk-glasgow 177 2 minutes ago 1.3.0 voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	harenberg-DE	43	O minutes ago	-
voatlas195 279 1 minute ago 1.3.0 voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	TRIUMF-productionPilots	97	O minutes ago	1.3.0
voatlas213 180 0 minutes ago 1.3.0 voatlas214 311 0 minutes ago 1.3.0	uk-glasgow	177	2 minutes ago	1.3.0
<u>voatlas214</u> 311 0 minutes ago 1.3.0	voatlas195	279	1 minute ago	1.3.0
	voatlas213	180	O minutes ago	1.3.0
voatlas215 146 2 minutes ago 1.3.0	voatlas214	311	O minutes ago	1.3.0
	voatlas215	146	2 minutes ago	1.3.0

Factory queue label	created	running	exiting	done (1 hr)	fault (1 hr)	last msg
ANALY BNL ATLAS 1	10	41	<u>1</u>	<u>o</u>	<u>0</u>	7 minutes ago
ANALY TEST-APF2	0	4	5	<u></u>	0	7 minutes ago
BNL ATLAS 1	3	19	1	<u>0</u>	0	1 minute ago
BNL CVMFS 1	<u>o</u>	<u>60</u>	<u>1</u>	<u>0</u>	<u>o</u>	O minutes ago
BNL ITB Test1	0	0	0	<u></u>	<u></u>	1 week, 6 days ago
BNL TEST APF	0	0	0	<u>0</u>	<u>o</u>	1 week, 5 days ago
TEST2	348	0	0	<u></u>	<u></u>	1 minute ago





Current Experience



7 Active APF Queues

- 2 production (1 CVMFS)
- 1 test production
- 1 analysis
- 1 test analysis
- 1 non-ATLAS (OSG ITB)
- 1 trivial test

Run experience

- 120 simultaneous on CVMFS queue.
- Steady running for a week so far.





Wide Release v2.0



Very soon! (After S&C)

- We want to run at a large scale for a week at BNL
- Want to deal with any glitches in local submission at T3s.
- Want to finalize documentation based on testing.
- Still need feedback from OSG ITB test factory.



11 Oct 2011

Future Plans



Better Panda Monitor Integration

Currently posts pilot log links, but more would be nice.

More plugins

(if needed or requested)

Allow usage with glideInWMS as WMS.

Web-based administrative interface.

Multiple configuration sources

 Queues.conf merged from exterior sources (e.g. URL backed by DB).

Reloading configuration without restart





Future Plans 2



Embedded persistence

John Hover

Allows cross-cycle comparisons and calculations.

Intelligent, instance-aware clustering

- allow multiple APF submit hosts to be aware of jobs submitted by other hosts for a particular Panda queue.
- This will allow one instance to "take up the slack" for an offline instance.

Experiment with local submission as Cloud-based VM job engine.



