

CA APM TIM Monitor EPAgent Field Extension

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1 Disclaimer

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2 Introduction

Historically it has been difficult to remotely determine if CEM Transaction Impact Monitor (TIM) appliances are functioning normally. While status pages do exist, users had to manually poll those pages to retrieve information and determine whether any problems existed with network feeds, TIM analysis, etc.

This field pack will automatically poll TIM status pages and bring data into Introscope where it can be used to trend behavior, feed dashboards, alerts, etc.

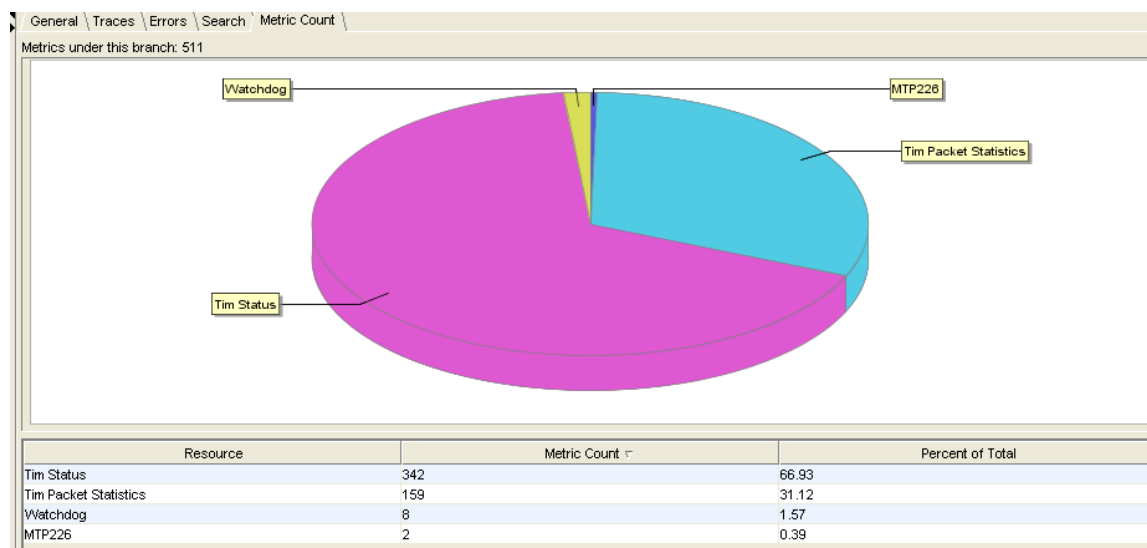
3 How it Works

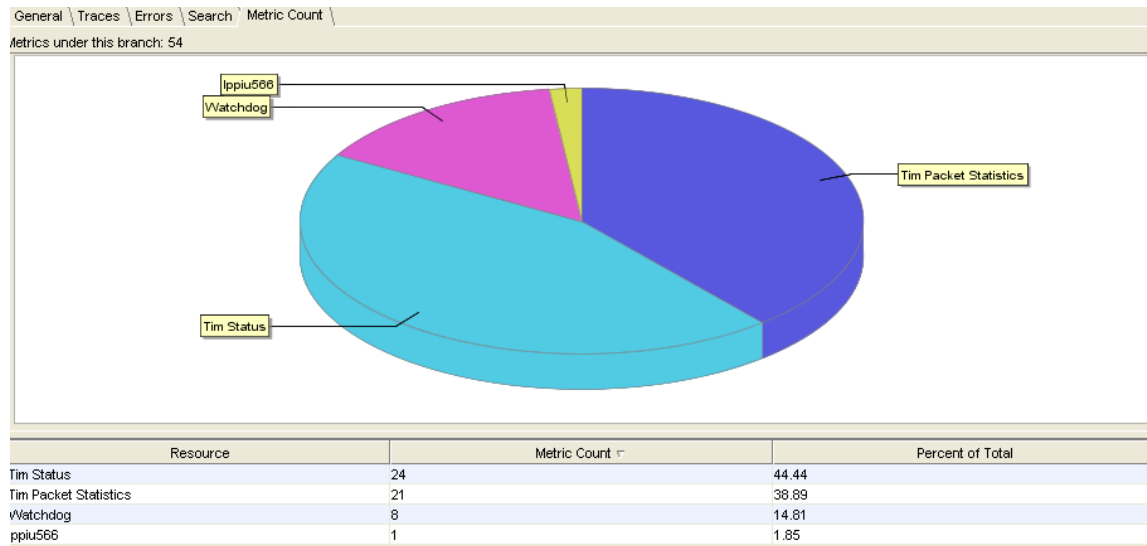
TIMMonitor functions as an EPAgent plugin and will agentlessly (using HTTP) poll status metrics that provide insight as to the health and performance of the TIM. It will poll metrics from standard TIM's as well as Multiport (MTP) appliances running the TIM.

Metrics are taken from the following pages:

- **Watchdog** - The TIM Watchdog log, used to tell whether the TIM is up/down
- **Viewstats** - The “unsupported” TIM Packet Statistics page (used for most alert statistics)
- **Viewstatus** - The “unsupported” TIM Status page (used for out-of-order packets)

A standard TIM will produce approximately 50 metrics and a MTP TIM will produce approximately 500 metrics. Metrics are polled every 5 minutes and request 5-minute rollups. If a TIM fails to parse, the next TIM in the list will be polled.

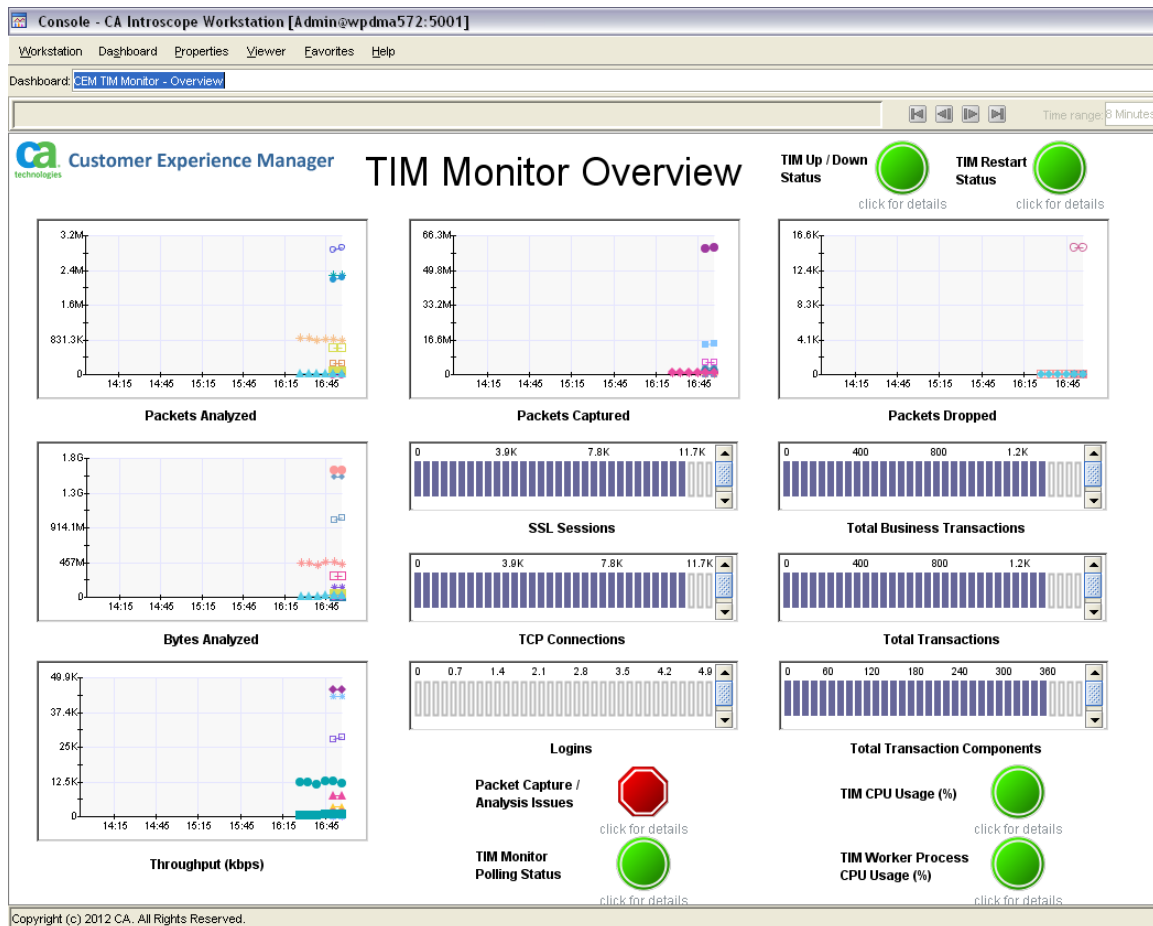




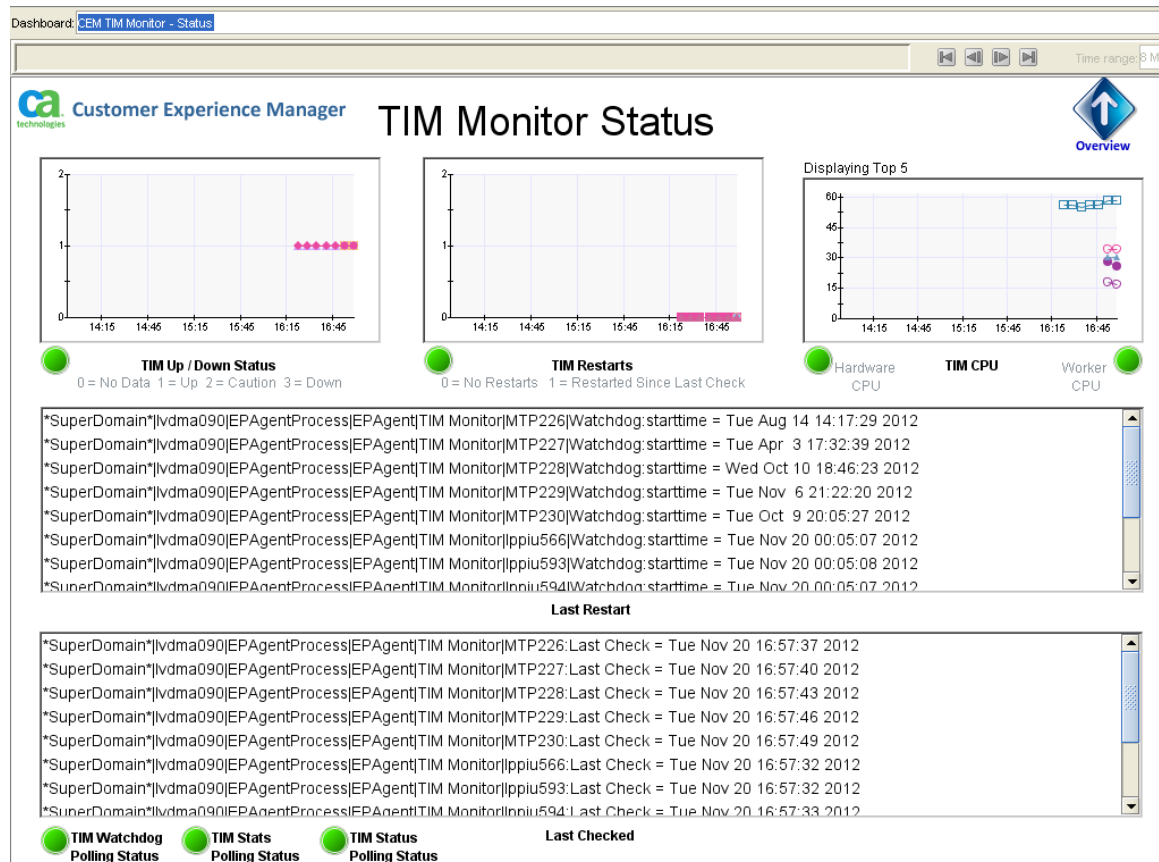
3.1 Management Module and Dashboards

The field pack includes a management module with preconfigured dashboards and alerts. It is not intended to be an exhaustive analysis of included metrics. Rather, it's provided as a starting point to illustrate what can be done with this type of data. Below are examples of the data provided.

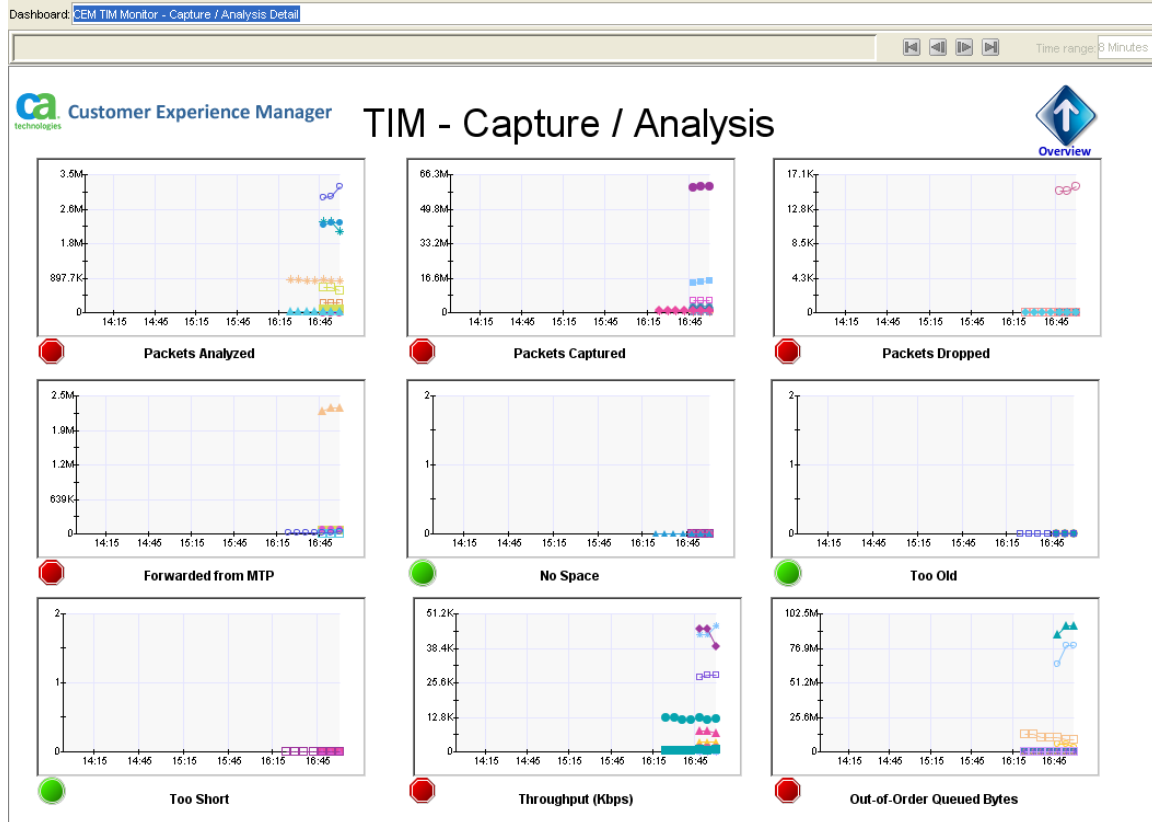
This is the primary dashboard "CEM TIM Monitor – Overview". All traffic lights link to detail-level dashboards. See "[Alert Settings](#)" section for details on the alert definitions.



The “TIM Monitor Status” dashboard displays TIM up/down status, restart status, and CPU levels.). The EPAgent maintains state for each TIM and compares the last-start time (as pulled from the watchdog page) to see if it has been updated. The bottom of the dashboard provides details as to the polling of the EPAgent itself. See [“Alert Settings”](#) section for details on the alert definitions.



The “TIM – Capture / Analysis” dashboard provides details for the inbound packet collection and decode. Some of the fields are only applicable to MTP-based TIM appliances. See “[Alert Settings](#)” section for details on the alert definitions.



3.2 ALERT SETTINGS

The following alerts are configured in the included management module:

- **Watchdog - Up/Down** == RED if any TIM is down according to the watchdog log file
- **Watchdog - Restarts** == RED if any TIM has been restarted since the last EPA polling interval (5 minutes). The EPAgent maintains state for each TIM and compares the last-start time (as pulled from the watchdog page) to see if it has been updated.
- **Status - Out-of-order Packets** == YELLOW when found to be greater than zero for one polling interval (5 min). RED when greater than zero for 2 or more polling intervals (10 min). A standard TIM has a single metric; MTP TIM's have one metric for each worker process.
- **Stats - CPU** == YELLOW for any overall CPU found above 80% for two polling intervals (10 min), RED for any overall CPU found above 90% for two polling intervals (10 min).
- **Stats - Worker CPU** == YELLOW for any overall CPU found above 80% for two polling intervals (10 min), RED for any overall CPU found above 90% for two polling intervals (10 min).
- **Stats - Throughput** == YELLOW when throughput reaches zero for one polling interval (5 min); RED when zero for 2 or more polling intervals (10 min).
- **Stats - Packets Too Short** == YELLOW when packets-too-short are greater than zero for one polling interval (5 min); RED when greater than zero for 2 or more polling intervals (10 min).

- **Stats - Packets Too Old** == YELLOW when packets-too-old are greater than zero for one polling interval (5 min); RED when greater than zero for 2 or more polling intervals (10 min).
- **Stats - Packets No Space** == YELLOW when packets-no-space are greater than zero for one polling interval (5 min); RED when greater than zero for 2 or more polling intervals (10 min).
- **Stats - Packets Forwarded From MTP** == YELLOW when packets-forwarded-from-MTP are zero for one polling interval (5 min); RED when zero for 2 or more polling intervals (10 min).
- **Stats - Packets Dropped** == YELLOW when packets-dropped are greater than zero for one polling interval (5 min); RED when greater than zero for 2 or more polling intervals (10 min).
- **Stats - Packets Captured** == YELLOW when packets-captured are zero for one polling interval (5 min); RED when zero for 2 or more polling intervals (10 min).
- **Stats - Packets Analyzed** == YELLOW when packets-analyzed are zero for one polling interval (5 min); RED when zero for 2 or more polling intervals (10 min).

3.3 Metric Interpretation

Metrics are retrieved every 5 minutes.

Metrics are taken from the following pages:

- **Watchdog** - The TIM Watchdog log, used to tell whether the TIM is up/down
- **Viewstats** - The “unsupported” TIM Packet Statistics page (used for most alert statistics)
- **Viewstatus** - The “unsupported” TIM Status page (used for out-of-order packets)

All metrics found on those pages will be polled via the agent. Metrics are stored in folders representing the page from which they were pulled. The “URL” metric in each folder provides the exact location from which data was polled.

3.3.1 TIM Packet Statistics – “View Stats”

The following fields are common to a single-process and multi-process Tim. The ones that mention MTP are present only when running on an MTP machine. The Name column references the raw field name from which data is polled, not the metric name in the investigator (which has already been parsed for easier reading).

Name	Index	Value
ver		Version number of this line – always 1
fmt		m for multi-process or s for single-process
time		Date and time of this entry
pkts-capture		Number of packets captured
pkts-drop		Number of packets dropped
pkts-forward		Packets forwarded from MTP
pkts-nospace		Packets dropped by MTP because of no space to write them

pkts-short		Short packets received by MTP, possibly because user defined hard
pkts-tooold		Old packets not processed. Their timestamp is older than (now – TimMtpLimitPeriodInMinute * 60). Default value of TimMtpLimitPeriodInMinute is 15
pkts-analyze		Number of packets analyzed
bytes-analyze		Number of bytes analyzed
thruput		Throughput
stats		Number of statistics records open
cpu-use	CPU number	Time used by this CPU

The following fields are present for a multi-process Tim:

Name	Index	Value
hub-cpu		Percentage of CPU time used by the hub
hub-mem		Memory used by the hub
w-cpu	Worker number	Percentage of CPU time used by this worker
w-mem	Worker number	Memory used by this worker
w-conn	Worker number	TCP connections managed by this worker
w-ts	Worker number	Transets open for this worker
w-tu	Worker number	Transets open for this worker
w-tc	Worker number	Transets open for this worker
w-ssl	Worker number	SSL sessions open for this worker
w-lgn	Worker number	Logins managed by this worker

Records for a single-process Tim have the following fields:

Name	Index	Value
tim-cpu		Percentage of CPU time used by Tim
tim-mem		Memory used by Tim
conn		TCP connections managed by Tim
ts		Transets open
tu		Transets open
tc		Transets open
ssl		SSL sessions open
lgn		Logins managed

3.3.2 Status Metrics

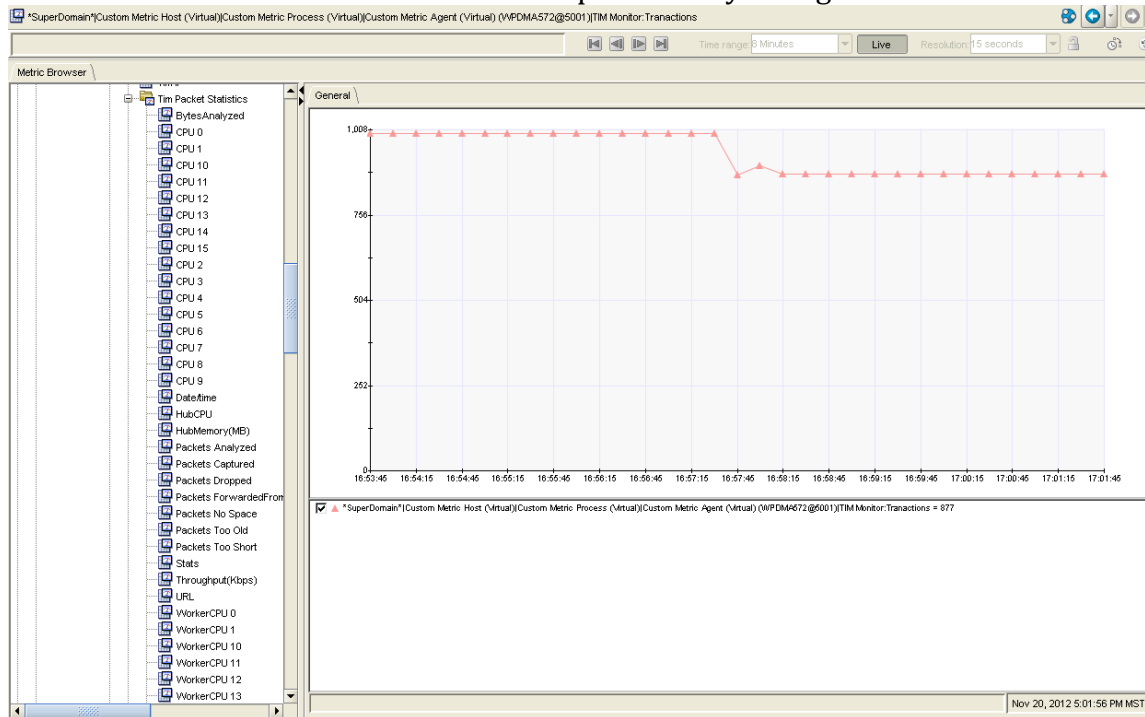
The "status" metrics provided by this agent show whether the data was retrieved successfully. The "running" metric shows whether the TIM is up/down. All will be set as follows:

- 0 = no data (used if the data cannot be retrieved)
- 1 = normal (green)
- 2 = caution (yellow)

- 3 = alert (red)

When a TIM is restarted between EPA check intervals, the "restart" metric will move to 1. Normally is 0. This metric is provided to alert when TIM's are restarting (usually due to overload) automatically.

The screenshot below illustrates the data provided by the agent.



4 Installation and Configuration

The field extension is tested and developed against TIM versions 4.5.x and 9.x. No software needs to be installed on the TIM. The EPAGent can be run from anywhere that has network access to TIM appliances on port 80.

4.1 Prerequisites

- Requires the "wget" command, which is included by default on Linux/UNIX platforms.
 - A version for Windows has been included in the prereqs/ folder.
- This plugin is written in Perl. It requires Perl 5.8 or newer. It should run on any platform that supports Perl.
 - It has been tested on Solaris, Windows, Linux, and Mac OS X.
- Requires the `HTML::Parser` and `HTML::Tagset` Perl modules, which are compiled and thus cannot be easily distributed directly within the package itself. Versions have been

precompiled and are included for RedHat 5 and 6 running 64bit platforms. Other platforms will need to be compiled manually.

- All other dependent modules are included in the package itself. See the lib directory that accompanies the package.
- Disable TIM Web Protection (details below).

4.1.1 Disable TIM Web Protection

For TIM version 9.1.1 and newer, you will need to disable "TIM Web Protection", a feature that uses session id's to permit access to web pages. To do this, go to "Configure Tim Web Protect Options" in the TIM admin UI and uncheck the box "Pages that display system information". No restart is necessary.

If you fail to do this, watchdog status will be retrieved but other metrics will fail to load.

4.2 Installation

Installation itself is quite simple.

1. First, install a traditional EPAgent on your desired polling server (this doesn't need to be an EM or TIM; it can be any machine with access to TIM's).
 - a. Use EPAgent documentation to complete this process.
2. Unzip this package anywhere desired.
 - a. You can put them in epaplugins/ or in a simple directory like /wily/TIMMonitor/.
 - b. The package will extract two folders: lib/ (shared libraries that could be used by other programs as well) and TIMMonitor/ (actual program).
3. Compile required Perl modules ([below](#)) if running on platforms other than RedHat 5 or 6 (64bit).
4. Update the TIMMonitor plugin configuration file.
 - a. The TIMMonitor EPAgent plugin has a configuration file that must be configured to point to the TIM appliances to be polled. The `TIMMonitor.properties` file is self-documenting, with a global section and a section for each TIM to be monitored.
 - b. You will need to provide the address and credentials for each desired TIM.
5. Update the EPAgent configuration file.
 - a. The EPAgent configuration file should have a stateless plugin configured as follows. For example, if running in the epaplugins/ folder of an epagent, it would appear like this:

```
introscope.epagent.plugins.stateless.names=TIM
introscope.epagent.stateless.TIM.command=epaplugins/TIMMon/TIMMonitor.pl
introscope.epagent.stateless.TIM.delayInSeconds=300
```

No config file is specified (as the second argument to the command line), so the default file at `epaplugins/TIMMon/config/TIMMonitor.properties` will be used.

- b. Additional plugins can also be run in the same EPAgent without issue.
6. Copy the sample management module.

- a. Copy from `modules/TIMMon.jar` to the `deploy/` directory on the MOM. (This will fail if there is already a management module of the same name deployed. In that case, remove the existing module first).
 - b. It will auto-deploy in 60 seconds.
7. Configure EPAgent startup.
 - a. Create a script with something like the following:
Linux:


```
nohup /usr/bin/java -classpath lib/EPAgent.jar -
Dcom.wily.introscope.epagent.properties="IntroscopeEPAgent.properties"
com.wily.introscope.api.IntroscopeEPAgent 2>&1 >/dev/null &
```
 - b. If you installed the required Perl modules to a non-system location (usually required if you do not have root on the box), you will also need to set the PERL5LIB variable in the EPA startup script, with something similar to the following:


```
export PERL5LIB="$PERLBASelib/$PERLVER:\
$PERLBASelib/$PERLVER/darwin-thread-multi-2level:\
$PERLBASelib/site_perl:\
$PERLBASelib/site_perl/$PERLVER:\
$PERLBASelib/site_perl/$PERLVER/darwin-thread-multi-2level:\
$PERL5LIB"
```
8. Start the EPAgent and verify metrics are visible in the Introscope workstation.

4.3 Install HTML::Parser and HTML::Tagset (Skip for RedHat 5 and 6 x64)

These perl packages are not platform-portable and thus must be created specifically for your desired platform. Versions have been precompiled and included for 64-bit Linux platforms (RHEL5 and 6), so you can skip this section if running on those platforms. You can also compile them by hand using CPAN or steps below, if required.

4.3.1 Check if Packages are Already Installed

Run the following command to determine whether needed packages are already installed:

```
perl -e "use HTML::Parser;"
```

If the command comes back without any output, the modules are already installed and you can proceed with installation.

If the output says "Can't locate HTML/Parser.pm in @INC" then the modules need to be installed.

4.3.2 Compile Packages Manually

If you need these modules for another platform and CPAN is not available, you can compile them manually with the following steps. You do not need root access to complete these steps, but gcc does need to be installed:

1. Unzip the source code to a temporary location. Source packages (HTML-Parser and HTML-Tagset) are provided in the prereqs/ directory for convenience¹. This directory will be \$LIBDIR in the below instructions.
2. Set PERLLIBDIR. This is the directory where your modules will be created. It can be any directory to which you have write permissions.
 - a. `export PERLLIBDIR=</your/dir/here>`
3. Install HTML:Tagset (this is not a XS module but is required for HTML::Parser, below)
 - a. `cd $LIBDIR`
 - b. `perl Makefile.PL PREFIX=$PERLLIBDIR`
 - c. `make`
 - d. `make test`
 - e. `make install`
4. Add HTML::Tagset to your current perl library directory (it is required in order to build HTML::Parser)
 - a. `export PERL5LIB=$PERL5LIB:$PERLLIBDIR/lib/perl5/site_perl/5.8.8/`
5. Install HTML::Parser
 - a. `cd $LIBDIR`
 - b. `perl Makefile.PL PREFIX=$PERLLIBDIR`
 - c. `make`
 - d. `make test`
 - e. `make install`
6. Set PERL5LIB. This variable is used by Perl to read in additional library directories at runtime. You may need to change it slightly based on your platform or perl version. This is just an example.
 - a. \$PERLLIBDIR was set above as the install location (just using here for convenience)
 - b. `export PERL5LIB=$BASEDIR
/lib/perl5/site_perl/5.8.8/:$PERLLIBDIR/lib64/perl5/5.8.8/x86_64-
linux-thread-multi/:$PERLLIBDIR
/lib64/perl5/site_perl/5.8.8/x86_64-linux-thread-multi/`
7. Run the TIMMonitor.pl by hand and ensure that it compiles (we don't care if it completes at this point).
8. Edit EPAgent startup script to set the \$PERL5LIB variable prior to the plugin being invoked.

5 Troubleshooting

5.1 Run the script by hand

If there's problems retrieving data, the first step should be to run the plugin by hand to analyze output. The TIMMonitor script takes a single argument of the config file name, but will default to the included config file if no argument is provided.

¹ HTML::Tagset can be downloaded from <http://search.cpan.org/~petdance/HTML-Tagset-3.20/Tagset.pm> and HTML::Parser can be downloaded from <http://search.cpan.org/~gaas/HTML-Parser-3.69/Parser.pm>.

```
TIMMonitor.pl [/path/to/TIMMonitor/TIMMonitor.properties]
```

The output should include diagnostic (log) messages and xml-formatted metrics.

5.2 Debug Logging

If you have issues with this script, turn on debug and see if you can find the problem.

Debug is enabled using the DEBUG environment variable with integers; the higher the number the more verbose debug will be. A debug level of 2 will dump much more information.

```
export DEBUG=2
```

```
<then run the EPAgent in the foreground or execute the script by hand (above)>
```

6 Frequently Asked Questions

1. What platforms does the field pack support?

A: Windows, Linux, Solaris, and Mac OS X have been tested, but it should work on any platform that supports Perl.

2. Can the field pack support a TIM running on MTP?

A: Yes. It will establish and maintain a session with the MTP to handle login and then retrieve necessary HTML pages.

3. I see the field pack has a shared library directory at TIMMon/./lib/. I want to put it in another location because it conflicts with an existing lib/ directory on my file system. How would I do that?

A: This is done because the shared libraries can be used by other programs. If you wish to change the location of these libraries, update the location at the top of the TIMMonitor.pl file. Updates will be made to the "\$FindBin::Bin" lines (4 of them) directly under the "INITIALIZE THE ENVIRONMENT" section. There is not a config-file property for this update.

4. Will the field pack work with a TIM that's behind a firewall?

A: Yes, so long as port 80 is open or port forwarding is enabled.

5. Can I use a DNS name for TIM's instead of an IP address?

A: Yes

6. I would like to mimic TIM behavior. Can the field pack digest HTML files instead of making direct HTTP requests to a real TIM?

A: Yes. See the testData section of the configuration file for examples of how to import static HTML files (helpful if there are firewall/authorization issues or you just wish to illustrate behavior prior to actual deployment)

7. **Can I retrieve metrics on a different interval than 5 minutes?**

A: No, not easily. While the TIM supports 5-second metrics that could create too much work for the Enterprise Manager. Also, management-module alerts are all set based on the 5-minute intervals.

8.

7 Author and Change History

AUTHOR

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VERSION

2.0.1 11/30/2012 Initial

2.0.2 12/03/2012 Fixes to support Windows and Solaris. Added FAQ. Updated Mgmt Module.