Cresendo Manual

Version 1.1

Build 20080704

Issue Date: 09/07/2008

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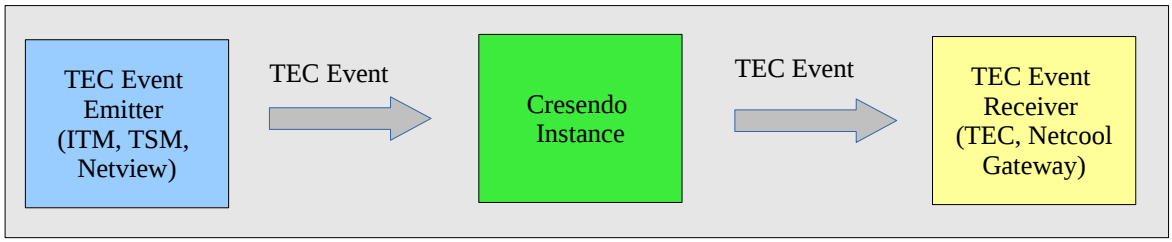
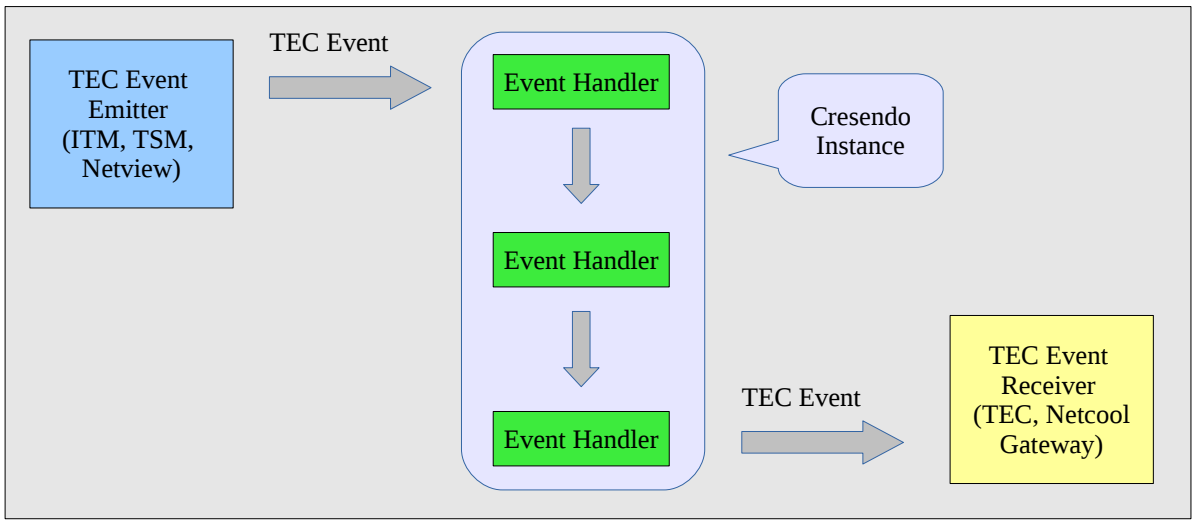
Overview of Cresendo

Cresendo is a standalone software program designed to receive and send non Tivoli Management Environment (TME) Tivoli Enterprise Console (TEC) Events (ie NON TME Events). It is implemented as a long running daemon process and uses the Tivoli Event Integration Facility (EIF) toolkit to store and forward events between TEC event emitters and receivers:



Cresendo Instances

A single Cresendo installation can support one or more Cresendo Instances. Each instance listens on a distinct TCP/IP Port and has it's own defined Cresendo Event Engine. The Event Engine is configured at start-up via an XML file and consists of zero or more Event Handlers. Upon receiving a TEC event, the Cresendo Instance will pass the event to it's Engine, where it will be passed from one defined Event Handler to the next in a serial fashion. The final Event Handler is typically configured to send the event to a receiver such as the Tivoli Enterprise Console:



Event Handler Functionality

While Cresendo could be used to help navigate NON TME TEC Events through complicated firewall environments, it's main advantage comes from the functionality provided by the Event Handlers, which allow for manipulation of the event in ways that would be otherwise difficult to achieve using standard offerings. Some examples are described below.

- The stripping of IP addresses and domain name suffixes from all event attribute values.
- Insertion of additional attributes into the original event. This feature, for example, can be used to add an attribute which identifies the event as originating from a particular client.
- Insertion of new attributes based on the contents of existing attributes. For example, his feature can be used to associate a particular support group to the event based on a sub-string value contained in an attribute such as the ITM “situation_name”.

- Sending the event to more than one Tivoli Enterprise Console (TEC) server regardless of whether one of the servers is available or not.
- Dynamically changing the severity of the event based on the hostname attribute. This is useful in cases when a single situation runs on both production and non-production systems and events from the production systems need to have their severity escalated.
- Dynamically dropping events based on the hostname attribute. This Event Handler can be used to simulate a form of Maintenance Mode.

Implementation Planning

Cresendo is a standalone piece of software that can be implemented on a dedicated or existing server. An existing server system may already run IBM Tivoli Monitoring (ITM), Netview or Tivoli Enterprise Console (TEC) software components.

Supported Platforms

Installation images for Cresendo are available for the following platforms:

Platform	Notes
AIX 5.2 64bit AIX 5.3 64bit	Requires xlC.aix50.rte to be 8.0.0.4 or better
Red Hat Enterprise Linux (RHEL) 32bit	

Space Requirements

The Cresendo software unpacks into a single installation directory. The directory may be any path on the system however, where possible, it is recommended that a file system be created with the following parameters:

Mount Point	Minimum Size
`/opt/cresendo`	`256 MB`

Administration User

The Cresendo software does not require any special privileges to run, as long as the port numbers that the Instances use to listen for events on are greater than 1024, however, it is recommended that a dedicated user identity be created under which the software is installed and executes.

Note that when the cresendo command script is executed as follows; `cresendo boot enable`, it sets up the boot script to start the Instances under the identity of the user who owns the Cresendo `bin` subdirectory. If this happens to be the Super User, otherwise know on Unix systems as root, then when the system reboots , all the defined Cresendo Instances will run as root.

In order to avoid this, create a user identity on the system and install the software into the installation directory using the credentials of this user.

Installation and Configuration

The installation and configuration of Cresendo usually involves the following steps:

1. Login as the Administration User Identity

2. Unpack the tar bundle in the Cresendo Installation directory
3. Create a Cresendo Instance
4. Enable Event Handlers by editing the Instance's Event Engine XML file.
5. Create any additional EIF configuration files used by EventSend handler(s).
6. Verify the host name(s) of any remote event receivers resolve to the correct IP Addresses
7. Start the Cresendo Instance.
8. Test event handling by posting one or more events to the Cresendo instance.
9. Enable the boot script so that Cresendo instance(s) are run when the system restarts

Important Files and Directories

In order to successfully install and configure Cresendo it is important to understand the purpose of the several key files and subdirectories located under the installation directory:

File or Subdirectory	Description
bin	Bin directory containing application scripts and binaries.
bin/cresendo	Cresendo script which provides the interface by which cresendo instances are started, stopped, created and removed, among other things.
bin/postemsg	EIF toolkit binary which can be used to generate TEC events for testing purposes.
etc	Directory containing configuration data
etc/dtd	Directory containing the document type definition for the event engine xml.
etc/template	Directory containing template files which are used to seed new Cresendo instances.
jre	Directory containing the java runtime environment.
lib	Directory containing application specific jar files.
run	Root of the common runtime directory for all cresendo instances.
run/<instance_name>	A subdirectory is created under the runtime directory for each cresendo instance.
run/<instance_name>/etc	Directory containing the configuration files for a specfic instance.
run/<instance_name>/etc/<instance_name>.xml	The event engine xml file which needs to be edited so that event handlers can process incoming events and send the event on to another event receiver.
run/<instance_name>/log	Instance specific log directory
run/<instance_name>/var	Instance specific var directory which is designed to contain meta-information for certain event handlers.
run/<instance_name>/var/DropByHost	Directory containing meta-information for the EventDropByHost event handler.
run/<instance_name>/var/MapSeverityByHost	Directory containing meta-information for the EventMapServerityByHost event handler.

Main Components

From an administrators point of view the main components of Cresendo residing under the installation directory include:

- The `bin/cresendo` script, which is the primary administration interface. Among other things, it allows an administrator to:
  - Create Cresendo instances
  - Remove Cresendo instances
  - Start Cresendo instances
  - Stop Cresendo instances
  - List Cresendo instances
- The `run/<instance_name>/etc` directory which contains the Event Engine XML file and other Instance specific configuration files. The XML file defines the Event Handlers loaded when a Cresendo Instance is started.
- The `run/<instance_name>/log` directory, which contains the status log, message log, trace log, as well as various EIF cache files used by the Cresendo Instance when receiving and sending events.
- The `run/<instance_name>/var` directory, which contains meta-information used by Event Handlers such as EventMapSeverityByHost and EventDropByHost.

Example Installation

The following example details in a “blow by blow” fashion how to successfully install and configure Cresendo. It assumes the following:

- An administration user identity “itmexe” and group “itm” have been created.
- A filesystem mounted at “`/opt/cresendo`” and owned by “itmexe” exists.
- The Cresendo tar bundle exists on the system in “`/images/cresendo`”.
- One Cresendo Instance will be created and it's name will be “`hub2tec`”.
- The “`hub2tec`” instance will forward TEC events to “`tecsrv01`” and “`tecsrv02`”.

Unpack and Install Cresendo

```
itmexe@server01 $ uname -a
AIX tdcesm01 3 5 0006BEECD700

itmexe@server01 $ id
uid=8454(itmexe) gid=5371(itm) groups=5028(db2iadm1)

itmexe@server01 $ cd /opt/cresendo
itmexe@server01 $ ls -l /images/cresendo
total 145200
-r--r--r--   1 itmexe   itm   74342400 Feb 11 12:06 cresendo-1.1-aix-64bit-20080628.tar

itmexe@server01 $ umask 022
itmexe@server01 $ tar -xf /images/cresendo/cresendo-1.1-aix-64bit-20080628.tar
itmexe@server01 $ ls -l
total 0
drwxr-sr-x   7 itmexe   itm             256 Nov 28 15:01 cresendo
drwxr-xr-x   2 root     system          256 Feb 11 12:03 lost+found

itmexe@server01 $ cd cresendo
```

```
itmexe@server01 $ ls -l
total 8
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 bin
drwxr-sr-x   4 itmexe   itm             256 Nov 28 15:01 etc
drwxr-sr-x   4 itmexe   itm             256 Aug 17 19:47 jre
drwxr-sr-x   2 itmexe   itm            4096 Nov 28 15:01 lib
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 run

itmexe@server01 $ mv * ..
itmexe@server01 $ cd ..
itmexe@server01 $ rmdir cresendo
itmexe@server01 $ ls -l
total 8
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 bin
drwxr-sr-x   4 itmexe   itm             256 Nov 28 15:01 etc
drwxr-sr-x   4 itmexe   itm             256 Aug 17 19:47 jre
drwxr-sr-x   2 itmexe   itm            4096 Nov 28 15:01 lib
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 run
drwxr-xr-x   2 root     system          256 Feb 11 12:03 lost+found
```

Create a Cresendo Instance

```
itmexe@server01 $ id
uid=8454(itmexe) gid=5371(itm) groups=5028(db2iadm1)

itmexe@server01 $ pwd
/opt/cresendo

itmexe@server01 $ ls -l
total 8
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 bin
drwxr-sr-x   4 itmexe   itm             256 Nov 28 15:01 etc
drwxr-sr-x   4 itmexe   itm             256 Aug 17 19:47 jre
drwxr-sr-x   2 itmexe   itm            4096 Nov 28 15:01 lib
drwxr-sr-x   2 itmexe   itm             256 Nov 28 15:01 run
drwxr-xr-x   2 root     system          256 Feb 11 12:03 lost+found

itmexe@server01 $ ls -l bin
total 256
-rwxr-xr-x   1 itmexe   itm           21653 Nov 28 15:01 cresendo
-rwxr-xr-x   1 itmexe   itm          104417 Nov 28 15:01 postemsg

itmexe@server01 $ bin/cresendo
  Usage:
         cresendo start [<instance>]
         cresendo stop [<instance>]
         cresendo list [<instance>]
         cresendo create <instance> <port>
         cresendo remove <instance>
         cresendo view status [<instance>]
         cresendo view log <instance>
         cresendo view trace  <instance>
         cresendo post <instance> <postemsg_args>
         cresendo boot enable
         cresendo boot disable
         cresendo version

itmexe@server01 $ bin/cresendo create hub2tec 8421
..... Creating directory /opt/cresendo/run/hub2tec/etc
..... Creating directory /opt/cresendo/run/hub2tec/etc/dtd
..... Creating directory /opt/cresendo/run/hub2tec/log
..... Creating directory /opt/cresendo/run/hub2tec/var
..... Creating /opt/cresendo/run/hub2tec/etc/hub2tec.conf
..... Creating /opt/cresendo/run/hub2tec/etc/hub2tec.send
..... Creating /opt/cresendo/run/hub2tec/etc/hub2tec.postemsg
..... Creating /opt/cresendo/run/hub2tec/etc/hub2tec.xml
..... Creating /opt/cresendo/run/hub2tec/etc/hub2tec.port
..... Installing document type definition engine.dtd
..... Now uncomment and edit the event handlers in:
.....   /opt/cresendo/run/hub2tec/etc/hub2tec.xml
```

```
itmexe@server01 $ bin/cresendo list
..... Instance hub2tec configured on port 8421 is not running
```

Edit the Event Engine XML File

In this example the event engine XML file can be found in the following location:

```
/opt/cresendo/run/hub2tec/etc/hub2tec.xml
```

By default, a description and example of each currently supported Event Handler is enclosed in HTML comments. In order to activate one or more Event Handlers you just need to adjust the location of the HTML end comment (ie "`-->`") and modify any options as appropriate.

The entry for the EventSend handler is the last entry in the default Event Engine XML file. This is because, after processing the event, you generally want to send it on to a remote TEC event reciever, such as a TEC server. The default entry for the EventSend handler looks like this:

```
<!--
    EventSend
    Send the event using the EIF TECAgent Sender.
    If the path is not fully qualified (ie does not begin with a "/")
    then the handler looks for the file in the following directory:
      <cresendo_install_directory>/run/<instance>/etc

  <class>
    <name> EventSend </name>
    <option varname="cfgfile" javatype="String"> hub2tec.send </option>
  </class>
-->
```

You can activate the EventSend Handler by adjusting the position of the HTML end comment to expose the `<class></class>` tags as in the following example:

```
<!--
    EventSend
    Send the event using the EIF TECAgent Sender.
    If the path is not fully qualified (ie does not begin with a "/")
    then the handler looks for the file in the following directory:
      <cresendo_install_directory>/run/<instance>/etc
-->
  <class>
    <name> EventSend </name>
    <option varname="cfgfile" javatype="String"> hub2tec.send </option>
  </class>
```

Now if you wish to send a processed event to more than one TEC you need to copy the contents of the `<class></class>` tags and modify the `cfgfile` option value so that separate EIF configuration files, each pointing to a different TEC server, are referenced by each of the instantiated EventSend Handlers:

```
<!--
    EventSend
    Send the event using the EIF TECAgent Sender.
    If the path is not fully qualified (ie does not begin with a "/")
    then the handler looks for the file in the following directory:
      <cresendo_install_directory>/run/<instance>/etc
-->
  <class>
    <name> EventSend </name>
    <option varname="cfgfile" javatype="String"> hub2tec-tecsrv01.send </option>
  </class>

  <class>
    <name> EventSend </name>
    <option varname="cfgfile" javatype="String"> hub2tec-tecsrv02.send </option>
  </class>
```

Because we have activated two EventSend handlers, the next logical step would be to create the two EIF configuration files (ie `hub2tec-tecsrv01.send` and `hub2tec-tecsrv02.send`), which are referred to in the above example, in the same directory as the Instance Event Engine XML file (ie `/opt/cresendo/run/hub2tec/etc`).

Create any required EIF Send Files

The best way to do this is to copy the default EIF Send file, in this example `hub2tec.send`, and then edit the contents of the new file(s):

```
itmexe@server01 $ id
uid=8454(itmexe) gid=5371(itm) groups=5028(db2iadm1)

itmexe@server01 $ cd /opt/cresendo/run/hub2tec/etc
itmexe@server01 $ ls -l
total 40
drwxr-sr-x   2 itmexe   itm             256 Feb 11 13:32 dtd
-rw-r--r--   1 itmexe   itm             537 Feb 11 13:32 hub2tec.conf
-rw-r--r--   1 itmexe   itm             229 Feb 11 13:32 hub2tec.postemsg
-rw-r--r--   1 itmexe   itm             545 Feb 11 13:32 hub2tec.send
-rw-r--r--   1 itmexe   itm            5187 Feb 11 13:32 hub2tec.xml

itmexe@server01 $ cp -p hub2tec.send hub2tec-tecsrv01.send
itmexe@server01 $ cp -p hub2tec.send hub2tec-tecsrv02.send
itmexe@server01 $ vi hub2tec-tecsrv01.send
itmexe@server01 $ vi hub2tec-tecsrv02.send
itmexe@server01 $ cat hub2tec-tecsrv01.send
# EIF Configuration File
#
ConnectionMode=connection_less
EventMaxSize=4096
BufferEvents=YES
BufEvtPath=/opt/cresendo/log/instance/hub2tec/hub2tec-tecsrv01.cache
BufEvtMaxSize=4096
BufferFlushRate=60
FQDomain=NO
ServerPort=20350
```

```
# Uncomment the following two lines and provide an ip address or hostname
# of the remote TEC server in order to activate event forwarding.
#
TestMode=NO
ServerLocation=tecsrv01

# Comment out the following two lines to disable test mode
#
#TestMode=YES
#ServerLocation=/opt/cresendo/log/instance/hub2tec/hub2tec-send.testmode


itmexe@server01 $ cat hub2tec-tecsrv02.send
# EIF Configuration File
#
ConnectionMode=connection_less
EventMaxSize=4096
BufferEvents=YES
BufEvtPath=/opt/cresendo/log/instance/hub2tec/hub2tec-tecsrv02.cache
BufEvtMaxSize=4096
BufferFlushRate=60
FQDomain=NO
ServerPort=20350

# Uncomment the following two lines and provide an ip address or hostname
# of the remote TEC server in order to activate event forwarding.
#
TestMode=NO
ServerLocation=tecsrv02

# Comment out the following two lines to disable test mode
#
#TestMode=YES
#ServerLocation=/opt/cresendo/log/instance/hub2tec/hub2tec-send.testmode
```

Note that in the above example it would be important to check that the host names, `tecsrv01` and `tecsrv02`, resolve to IP Addresses on the system on which Cresendo is running.

Start the Cresendo Instance

The `cresendo` script is used to start the configured instance.

```
itmexe@server01 $ id
uid=8454(itmexe) gid=5371(itm) groups=5028(db2iadm1)

itmexe@server01 $ /opt/cresendo/bin/cresendo list
..... Instance hub2tec configured on port 8421 is not running

itmexe@server01 $ /opt/cresendo/bin/cresendo start hub2tec
..... Starting cresendo instance hub2tec

itmexe@server01 $ /opt/cresendo/bin/cresendo list
..... Instance hub2tec configured on port 8421 is running with pid 557252
```

In order to check that the configured Event Handlers and their options have been successfully loaded by the Cresendo Instance you can use the "`view log`" option to the `cresendo` script:

```
itmexe@server01 $ /opt/cresendo/bin/cresendo view log hub2tec
..... cat /opt/cresendo/run/hub2tec/log/hub2tec-engine.log
2008.07.02 10:14:22.825 Cresendo main
  Loading xml engine from: '/opt/cresendo/run/hub2tec/etc/hub2tec.xml'

  Instantiated event handler class: 'EventSend'
      option name: 'cfgfile'
```

```
     option type: 'String'
    option value: 'hub2tec-tecsrv01.send'
  Instantiated event handler class: 'EventSend'
     option name: 'cfgfile'
     option type: 'String'
    option value: 'hub2tec-tecsrv02.send'
  Cresendo instance 'hub2tec' listening for events on port '8421'
```

Post Test Event(s)

In order to conveniently test whether the new Cresendo instance does what it is supposed to there is an option to the cresendo script which allows for the posting of events from the command line:

```
itmexe@server01 $ id
uid=8454(itmexe) gid=5371(itm) groups=5028(db2iadm1)


itmexe@server01 $ /opt/cresendo/bin/cresendo post

  Usage:
         cresendo start [<instance>]
         cresendo stop [<instance>]
         cresendo list [<instance>]
         cresendo create <instance> <port>
         cresendo remove <instance>
         cresendo view status [<instance>]
         cresendo view log <instance>
         cresendo view trace  <instance>
         cresendo post <instance> <postemsg_args>
         cresendo boot enable
         cresendo boot disable
         cresendo version

itmexe@server01 $ /opt/cresendo/bin/cresendo post hub2tec
..... /opt/cresendo/bin/postemsg -f /opt/cresendo/run/hub2tec/etc/hub2tec.postemsg
 Usage: /opt/cresendo/bin/postemsg { -S <server> | -f <config_file> } [-r <severity>]
        [-m <message> ] [<slot_name=value>, ...] <class> <source>


itmexe@server01 $ /opt/cresendo/bin/cresendo post hub2tec -r WARNING -m "Please ignore"
CLASS SOURCE
```

Note that the options "`{ -S <server> | -f <config_file>}`" are not required to be supplied when running "`postemsg`" via the `cresendo` script in this way.

Enable Instance Start at System Boot

In order to allow for the automatic start of the Cresendo instances when the system boots the Cresendo boot script needs to be setup and installed. Fortunately, the cresendo script provides options for "enabling" and "disabling" the boot script on supported platorms. Note that, in order to run this you need to be the system SuperUser (ie root). The example below is executed on the AIX system platform:

```
root@server01 # id
uid=0(root) gid=0(system) groups=2(bin),3(sys),7(security),8(cron),10(audit),11(lp)

root@server01 # /opt/cresendo/bin/cresendo boot enable
..... Creating boot script /etc/rc.cresendo
..... chmod 755 /etc/rc.cresendo
..... Adding boot script to inittab
..... mkitab cresendo:2:wait:/etc/rc.cresendo start > /dev/console 2>&1
```

```
root@server01 # grep rc.cresendo /etc/inittab
cresendo:2:wait:/etc/rc.cresendo start > /dev/console 2>&1

root@server01 # ls -l /etc/rc.cresendo
-rwxr-xr-x   1 root     system          572 Feb 11 15:06 /etc/rc.cresendo
```