IBM Tivoli Monitoring version 6.2.3 FP1

Configuring private history and direct feed to Tivoli Data Warehouse for autonomous agents

In this IBM Tivoli® Monitoring training module, you learn the concepts of *private history data* and *autonomous agents* that generate private history data. You also learn about *private situations* and how to configure private situations for both the short-term and long-term storage of historical data that is collected from autonomous agents.

Objectives

After you complete this training module, you can perform these tasks:

- Describe the main characteristics of private history data collection

- Explain how the private situation data collection architecture is different from the IBM Tivoli Monitoring client/server data collection architecture

- List the main characteristics and capabilities of an autonomous agent

- Navigate to the directory location where private history data files are in either Windows® or in Linux® or UNIX® operating system environments

- Use the Agent Service Interface to view private history data files

- Configure a private history data collection private situation

- Configure the private situation export parameter

- Configure a private situation data warehouse location definition

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After you complete this training module, you can describe the main characteristics of private history data collection. You also learn how to navigate to the directory where private history data files are in either Windows or Linux or UNIX operating system environments. This training module demonstrates how to use the Agent Service Interface, a tool you use to view private history data files. Finally, you learn how to configure a private history data collection private situation, configure the private situation export parameter, and configure a private situation data warehouse location definition.

Autonomous agents, overview

About autonomous agents:

- Requires IBM Tivoli Monitoring 6.2.2 with fix pack two or later release
- Agents that are configured for greater autonomy become Tivoli System Monitoring Agents
- Can function independent of need for an IBM Tivoli Enterprise Monitoring Server
- They can
  - Collect data
  - Run situations
  - Register events

A Tivoli Enterprise Monitoring Agent can run independently of the Tivoli Enterprise Monitoring Server. These monitoring agents are called autonomous agents. You can configure different levels of autonomy that is based on the functionality that the monitoring agent should have, resource constraints, and how much dependency the agent should have on the monitoring server.

Any monitoring agent with an infrastructure of IBM Tivoli Monitoring V6.2.2 FP2 or later can be configured to run autonomously. Autonomous agents start independently of their monitoring server. They can collect data, run situations, and register events while they are disconnected from the monitoring server. This is the default behavior. You can adjust the autonomous agent behavior for greater or less autonomy.

If you configure an Agent Builder or OS agent to be autonomous, it becomes a Tivoli System Monitor Agent. Tivoli System Monitor Agents are installed and configured to have no dependency on, nor any connection to, a monitoring server. Tivoli System Monitor Agents are like any other monitoring agent except that any processing that can be done only through the monitoring server is not available through them. As well, a Tivoli System Monitor Agent must not be installed on the same system as either a Tivoli Management Services component or a Tivoli Enterprise Monitoring Agent.

Understanding private history and private situations, overview

About private history and private situations:

- Private history is the concept, private situations are the objects that make it possible to have private history data

- Private history is the collection and short-term storage of data from a local monitoring agent

- Private situations are created in an XML-formatted file that does not interact with the Tivoli Enterprise Monitoring Server

- Default private situation path and file name
Windows: <install_dir>\localconfig\<pc>\<pc>_situations.xml

  Linux Operating systems such as UNIX: <install_dir>/localconfig/<pc>/<pc>_situations.xml

  z/OS PCSICNFG in the RKANDATV data set where: <install_dir> is the ITM installation dir and <pc> is the product code

- You can use the Agent Service Interface to view private history data

- You can configure autonomous agents for private history data collection situations
  - Short-term storage of private history data on a users local workstation
  - Long-term storage of private history data by way of direct feed to IBM Tivoli Data Warehouse
  - Private history data collection options that are controlled by configuration of the private history export parameter
  - Long-term (warehousing) storage of private history data requires configuration of a private history data warehouse location definition

Private history involves the collection and short-term storage of data from autonomous agents without the need of a complete IBM Tivoli Monitoring infrastructure. Private situations are system configurations and settings that control private history data collection and storage options. Private situations are created with extensible markup language (XML) and they can be defined in proper locations depending on the platform. You can configure autonomous agents for private history data collection. Short-term private history data is stored on a user's local workstation whereas long-term history data can be sent directly to IBM Tivoli Data Warehouse.

An Agent Service Interface allows viewing of the short-term and long-term private history data files.

Private history, overview

About configuring short term, to local workstation, and long-term, direct feed to Tivoli Data Warehouse, private history data collection, and storage options:

- To configure and view private history:
  - Define historical collection in a private situation configuration file for an autonomous agent
  - Use the Agent Service Interface to view the short-term history

- There can be only one active history data collection per application table, attribute group

- Attribute group table naming:
  - The table name for an attribute group is also the history binary file, name that is prefixed with **PVTHIST_**;
  - One unique history binary file per table

- As part of the private history configuration, set the **RETAIN** attribute to manage the history file size, in hours

- The autonomous agent outputs all private history files to these subdirectories:
  - *<ITMHome>*\TMAITM6\logs (Win)
  - *<ITMHome>*/*<arch>*/*<pc>*/hist (Linux/UNIX)

- You can configure an alternative private history file location with the **CTIRA_HIST_DIR** agent configuration parameter

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Private history involves collection and storage of local monitoring agent data. To use private history data, you must first define private historical data collection in what is called a private situation for an autonomous agent in a configuration file. After that you use the Agent Service Interface to view the autonomous agent's short-term collected private data history. Only one active history data collection can exist for each application table that is in each attribute group. The private historical data is stored in files that are prefixed with PVTHIST_ . You set the RETAIN attribute to manage the private history file size in hours. The private historical data files are stored in a location that is specified in the CTIRA_HIST_DIR directory. Both the Windows OS and Linux or UNIX environment default directories are shown on this slide.

XML file HISTORY tag

The private history configuration XML <History> element defines private history data collection

<HISTORY **Table**="NT_System" **Interval**="10" **Retain**="24" **Export**="15"/>

Table specifies either a history data attribute group or a table name.

Interval specifies the history data collection interval in time unit of minutes, 1 to 1440, sequence: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, and so on.

Retain specifies the short-term historical data retention period in time unit of hours, default = 24.

Export specifies the historical data export to warehouse interval in time unit of minutes, 15 to 1440, sequence: 15, 30, 60, 120, 180, 240, and so on.

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The HISTORY tag instructs the autonomous agent to collect historical data. With this tag, you can specify the table or attribute from which to collect historical data. The HISTORY tag also specifies short-term historical data's incoming data reception interval and short-term historical data's retention time period interval. The historical data collection interval is set in minutes while the historical data short-term storage or retention interval is set in hours. You can also have the autonomous agent transmit historical data to a long-term storage solution such as Tivoli Data Warehouse. To have your autonomous agent directly feed historical data to a data warehouse, you need to set the EXPORT parameter. The EXPORT parameter defines the time interval in minutes that historical data is pushed directly to a data warehouse.

XML file WAREHOUSE tag

The private history configuration XML <Warehouse> element defines private warehouse location.

<WAREHOUSE LOCATION="ip.pipe:#192.168.225.2[63358]" />

Specify the exact Warehouse Proxy Agent (WPA) listening address *protocol:name or address[port]*.
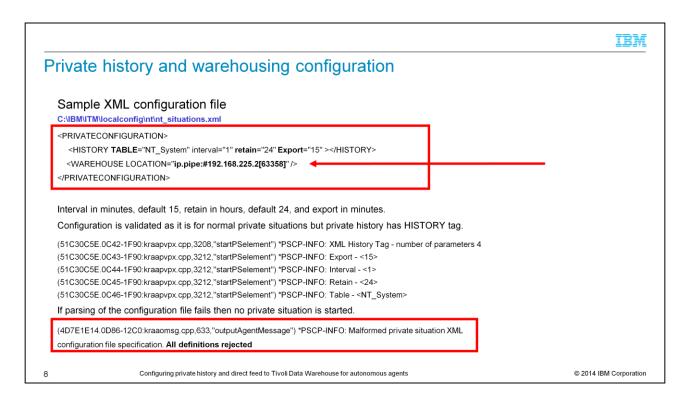
Private history warehouse definition is only used while the agent is running in full autonomous mode that is **Autonomous Manager is active AND no CT_CMSLIST** specified.

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For a direct feed from the autonomous agent to the Tivoli Data Warehouse, add a WAREHOUSE tag in the XML configuration file. The attributes of the WAREHOUSE tag reveal the warehouse proxy agent location.

Private history and warehousing configuration

Sample XML configuration file
C:\IBM\ITM\localconfig\nt\nt_situations.xml

```
<PRIVATECONFIGURATION>
  <HISTORY TABLE="NT_System" interval="1" retain="24" Export="15" ></HISTORY>
  <WAREHOUSE LOCATION="ip.pipe:#192.168.225.2[63358]" />
</PRIVATECONFIGURATION>
```

Interval in minutes, default 15, retain in hours, default 24, and export in minutes.

Configuration is validated as it is for normal private situations but private history has HISTORY tag.

```
(51C30C5E.0C42-1F90:kraapvpx.cpp,3208,"startPSelement") *PSCP-INFO: XML History Tag - number of parameters 4
(51C30C5E.0C43-1F90:kraapvpx.cpp,3212,"startPSelement") *PSCP-INFO: Export - <15>
(51C30C5E.0C44-1F90:kraapvpx.cpp,3212,"startPSelement") *PSCP-INFO: Interval - <1>
(51C30C5E.0C45-1F90:kraapvpx.cpp,3212,"startPSelement") *PSCP-INFO: Retain - <24>
(51C30C5E.0C46-1F90:kraapvpx.cpp,3212,"startPSelement") *PSCP-INFO: Table - <NT_System>
```

If parsing of the configuration file fails then no private situation is started.

```
(4D7E1E14.0D86-12C0:kraaomsg.cpp,633,"outputAgentMessage") *PSCP-INFO: Malformed private situation XML
configuration file specification. All definitions rejected
```

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Now look at a sample configuration for historical data collection and data warehousing. Also, look at what are both the possible errors and the expected normal results that you get in the agent's log files. As it is for all private situations, insert the historical data collection definition in the appropriate XML file for either a Windows environment or a Linux or UNIX environment. The configuration in the XML file is checked and if it fails to parse due to some syntax error then the private historical collection is discarded. This sample XML file for PRIVATE CONFIGURATION has the WAREHOUSE tag that is located outside of the main body of the XML file. That condition generates a file syntax error.

Private history historical data collection (1 of 2)

The history file name is set and the private history situation is created based on settings in the XML file:

(51C30C5E.0C57-1F90:kraapvps.cpp,1642,"setHistoryFileName") *PSCP-INFO: History file name set to **PVTHIST_WTSYSTEM**

(51C30C5E.0C61-1F90:kraaomsg.cpp,697,"outputAgentMessage") *PSCP-INFO: length(121) **History data collection PVTHIST_KNT_WTSYSTEM INTERVAL 1 minutes RETAIN 24 hours EXPORT 15-minutes USE Warehouse in effect**

Then, a private history situation is started:

(51C30C5E.0D98-FD8:kraapvps.cpp,443,"startPrivateSituation") *PSCP-INFO: **Start private situation PVTHIST_KNT_WTSYSTEM** using instruction HIST(PVTHIST_KNT_WTSYSTEM TRIMFREQ(60) RETAIN(24) FILE(PVTHIST_WTSYSTEM)   ) WAREHOUSE(TRIGGER(15),RETAIN(24),PRIVATE(Y))

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Remember, XML file syntax rules are strict. If no problems are found in the XML file syntax, then the XML file settings are implemented. In this particular example, you can see that the EXPORT interval is set to 15 minutes and that USE WAREHOUSE is in effect. In this example, a private history situation is started with all of the settings from the XML file.

Private history historical data collection (2 of 2)

When the history collection interval expires, data collection is performed:

(51C30C9E.05E2-22EC:kraafira.cpp,884,"DriveDataCollection") KNT.WTSYSTEM, <1,1812989777> PVTHIST_KNT_WTSYSTEM expired.

...

(4D7E221F.1426-16C:krant11b.cpp,362,"PrintSelf") knt_wtsystem_base @D9F900 <1,1569720166>
(4D7E221F.1427-16C:krant11b.cpp,364,"PrintSelf")   ::**appl=KNT,table=WTSYSTEM,interval=60000,samptype=1**
(4D7E221F.1428-16C:kraacmpd.cpp,318,"PrintSelf") CompositePredicate(520D728) <OR> {
(4D7E221F.1429-16C:kraacmpd.cpp,321,"PrintSelf") }
(4D7E221F.142A-16C:krant11b.cpp,370,"PrintSelf")   _data {
(4D7E221F.142B-16C:krant11b.cpp,371,"PrintSelf")   count=1, allocated=20, allocSize=20

A metafile (HDR file) is created if this is not present:

+51C30C9E.0606 ERROR MESSAGE: "Unable to open Metafile "C:\ibm\ITM\TMAITM6\logs\History\KNT\PVTHIST_WTSYSTEM.hdr" "
(51C30C9E.0611-22EC:kraahbin.cpp,366,"verifyMetaFile") Meta file 'C:\ibm\ITM\TMAITM6\logs\History\KNT\PVTHIST_WTSYSTEM.hdr' was not found, will create.

History data is written to the binary file and situation expiration time is reset for the next cycle:

(51C30C9E.0623-22EC:kraahbin.cpp,753,"WriteData") **Wrote 1 rows history data, PVTHIST_KNT_WTSYSTEM KNT.WTSYSTEM, <1,1812989777>.**
(51C30C9E.062F-22EC:kraatblm.cpp,1039,"resetExpireTime") Situation PVTHIST_KNT_WTSYSTEM <1,1812989777> expired at 1371737246 and **will next expire at 1371737306** : timeTaken = 0

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When the collection interval expires, the needed table is queried. Data is collected and written into the appropriate historical data file.

Private history warehousing (1 of 3)

Two possible errors that can occur during warehousing:

- Warehouse Proxy Agent is started but not defined in the XML configuration file

(51C314680.0022-22EC:kraahexp.cpp,143,"HistoricalExporter__Dispatch") ***** KHD_ExportHistoryThread/EVT Warehouse Option<0>
Parm <TRIGGER(15),RETAIN(24),PRIVATE(Y) > fileName<PVTHIST_WTSYSTEM> Address<>
NotifyList<ip.pipe:#192.168.225.2[6015];ip6.pipe:(::1)[6015];ip6:(::1)[49676];ip6.spipe:(::1)[7757];> CMShost<> CurrentCMS<NULL>

(51C31468.002A-2EC4:khdxdacl.cpp,790,"resolveServerAddress") **Warehouse proxy not registered**

(51C31468.002B-2EC4:khdxdacl.cpp,597,"routeExportRequest") Export for object <NT_System> (table WTSYSTEM appl KNT) **failed in createRouteRequest, Status = 8**.

- If the agent is at a level lower than 623 FP1 or if CT_CMSLIST is defined, then Warehouse specification is rejected

(51C4177A.0053-1228:kbbssge.c,52,"BSS1_GetEnv") CT_CMSLIST="IP.PIPE:WIN-8DG7FB36JFR"

....

(51C412CC.0E62-680:kraapvpx.cpp,3208,"startPSelement") *PSCP-INFO: XML Warehouse Tag - number of parameters 1

(51C412CC.0E63-680:kraapvpx.cpp,3212,"startPSelement") *PSCP-INFO: Location - <ip.pipe:#192.168.225.2[63358]>

(51C412CC.0E6B-680:kraaomsg.cpp,697,"outputAgentMessage") *PSCP-INFO: length(108) Warehouse specification
ip.pipe:#192.168.225.2[63358]; **rejected while agent operating in non-autonomous mode**

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Here you can see two possible errors that can be faced during a warehousing attempt. The first one is the condition where the EXPORT parameter is specified in an XML tag. The problem is that when the interval expires, the export process cannot find any warehouse proxy agent. It has not been defined in the XML file with the WAREHOUSE parameter.

The second scenario relates to when the warehouse tag is specified but it is recognized only by agents at level 623 fix pack 1 or later. In previous versions, the warehouse specification is rejected.

Private history warehousing (2 of 3)

Warehouse specification takes effect:
- When CT_CMSLIST is *not* defined, Warehouse specification takes effect:

(51C42856.14CE-2690:kraahexp.cpp,338,"SetNewWarehouseAddress") Setting new warehouse location to <ip.pipe:#192.168.225.2[63358];>, previous location was <>

- As for the enterprise warehouse data collection, the rolloffCounter is increased every Warehouse Interval, 1 min in this case, until it reaches the rolloffTrigger, the Warehouse Interval that is 15 mins in this case:

(51C41439.0074-1108:khdxprts.cpp,1402,"printStatusRecord")
+51C41439.0074 Status Record: **tableName: WTSYSTEM**, objectName: NT_System,
+51C41439.0074 exportState: 0, exportStatus: 0, **rolloffTrigger: 15, rolloffCounter: 6,**
+51C41439.0074 pureEventType: 0, timer_running: 0, batch_rowcnt: 0, timer_handle: 0, exportParms: NULL , private: Y

- When the export occurs, a process is initialized with parameters from the XML file, then connection to Warehouse Proxy Agent is created:

(51C42BDC.14D9-242C:khdxcpub.cpp,258,"exportHistory") Input parms: options=<0x10000000>, histfile=<PVTHIST_WTSYSTEM>, metafile=<NULL>, renamefile=<NULL>,
+51C42BDC.14D9 applname=<KNT>, tablename=<WTSYSTEM>, odbcDatasource=<NULL>,
+51C42BDC.14D9 odbcTablename=<NULL>, originnode=<Primary:WIN-8DG7FB36JFR:NT>, parms=<TRIGGER(15),RETAIN(24),PRIVATE(Y) >,
+51C42BDC.14D9 targetUserid=<NULL>, **warehouseProxyAddr=<ip.pipe:#192.168.225.2[63358];>,** ipNotifySocket=<ip.pipe:#192.168.225.2[6015];ip6.pipe:(::1)[6015];ip6:(::1)[49202];ip6.spipe:(::1)[7757];>, localLBHost=<>, localTEMSName=<>
(51C429FC.187F-242C:khdxhist.cpp,1475,"open") **Starting export** at 0000000000000000, row 0 for NT_System
(51C429FC.1895-242C:khdxdacl.cpp,2632,"bindServer") New rpc handle **bound to ip.pipe:#192.168.225.2[63358],** handle 0x4029E78

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If there are no errors in the XML file, the CT_CMSLIST parameter is not defined and the specified Warehouse Proxy agent is up and running, then the warehouse specification takes effect.
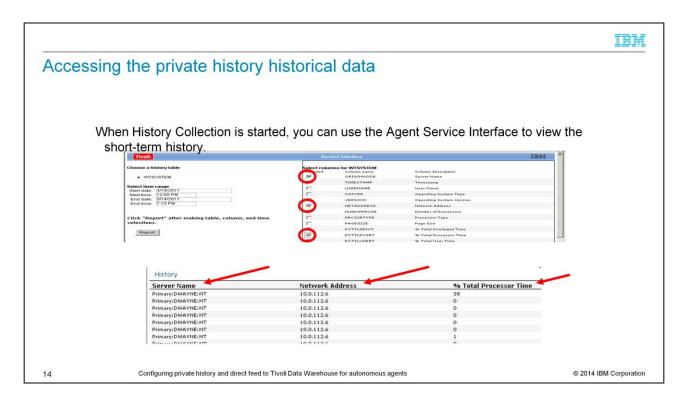
Private history warehousing (3 of 3)

- Then, actual export is performed: short-term binary files are read and the data sent to WPA to put into datawarehouse.

(51C42C54.005F-242C:khdxdacl.cpp,1960,"routeData") **Export for object NT_System** (table WTSYSTEM appl KNT)

(51C42C54.009E-242C:khdxhist.cpp,1919,"openHistoryFile") Short Term History file
"C:\ibm\ITM\TMAITM6\logs\History\KNT\PVTHIST_WTSYSTEM" opened successfully

(51C42C5A.0013-242C:khdxdacl.cpp,560,"routeExportRequest") **Export request for object NT_System table WTSYSTEM appl KNT), 127 rows, is successful.**

- Finally, rolloffCounter is reset to 0 and export status is updated:

(51C42C5A.01F5-242C:khdxprts.cpp,1132,"exportHistoryFinish") Status record updated:

(51C42C5A.01F6-242C:khdxprts.cpp,1402,"printStatusRecord")

+51C42C5A.01F6 Status Record: tableName: WTSYSTEM, objectName: NT_System,

+51C42C5A.01F6 **exportState: 3, exportStatus: 0, rolloffTrigger: 1, rolloffCounter: 0,**

+51C42C5A.01F6 pureEventType: 0, timer_running: 0, batch_rowcnt: 0, timer_handle: 0, exportParms: NULL , private: Y

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Then, when the warehouse interval defined in the EXPORT parameter expires, the data is exported from the historical data file to the data warehouse database using the specified warehouse proxy agent.

Accessing the private history historical data

When History Collection is started, you can use the Agent Service Interface to view the short-term history.

Use the Agent Service Interface to access the short-term history data. Short-term history data is contained in the appropriate private historical files.

Accessing warehoused private history data

Warehoused (long-term) private history data is retained in the Tivoli Data Warehouse database.

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On this slide, warehoused private history data is retained in the Tivoli Data Warehouse database. You can access this data by using a database navigation tool or use it as report generation tool source data.

References

Links to related IBM Tivoli Monitoring V6.3 documentation:

- IBM Tivoli Monitoring V6.3 Agent Autonomy:
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/adminuse/agentautonomy_intro.htm

- IBM Tivoli Monitoring V6.3 Private Situation XML Specification:
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/adminuse/privatesituation_xmlspec.htm

- IBM Tivoli Monitoring V6.3 Private History:
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/adminuse/historyprivate_info.htm

Here are some links to more information on IBM Tivoli Monitoring version 6.3 agent autonomy, private situations, and private history.

Summary

Now that you have completed this training module, you can accomplish these tasks:

- Describe the main characteristics of private history data collection

- Explain how the private situation data collection architecture is different from the IBM Tivoli Monitoring client/server data collection architecture

- List the main characteristics and capabilities of an autonomous agent

- Navigate to the directory location where private history data files are located in either Windows or Linux/UNIX operating system environments

- Use the Agent Service Interface to view private history data files

- Configure a private history data collection private situation

- Configure the private situation export parameter

- Configure a private situation data warehouse location definition

Now that you have completed this training module, you can describe the main characteristics of private history data collection. You also can navigate to the directory where private history data files are located in either Windows or Linux or UNIX operating system environments. This training module has demonstrated to you how to use the Agent Service Interface to view private history data files. Finally, you learned how to configure a private history data collection private situation, configure the private situation export parameter, and configure a private situation data warehouse location definition.

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