ICONICS - CPU Load Balancing

APPLICATIONS NOTE

October 2013

Description: This application note describes CPU core allocation using ProcessorAffinityMask.
OS Requirement: Win XP Pro, Server 2003, Vista, Server 2008, Windows 7
General Requirement: GENESIS32 version 9.13 or later

Introduction

When creating large applications using GENESIS32 on multi-CPU, multi-core server systems, it can be useful to allocate one or more CPU cores to a particular application. This will ensure that the application has both sufficient resources allocated to do its job, and ensure that the effect the application may have on other processes is limited.

Processor Affinity Mask

Windows allow assigning all available processor cores or only a subset of the available processor cores to a process using the **ProcessorAffinityMask** attribute. However, when a process is assigned to all available processor cores, this does not necessarily mean that it is actually using all cores or using them all the time this depends on the internal design of the application.

Because not all cores are used with the **ProcessorAffinityMask** configured, it could be seen as a restrictive measure, allowing the user to limit the maximum number of cores an application will use at any point in time. This makes the **ProcessorAffinityMask** a useful tool to balance the applications across all CPU cores and ensure that they only have a limited effect on each other's performance.

ProcessorAffinityMask Values

The **ProcessorAffinityMask** is set using a decimal value representing a bit mask, where each bit represents one of the available cores. The value is a 32-bit word, therefore it can address up to 32 cores. Typical values for the **ProcessorAffinityMask** are listed in Table 1.

Table 1 - Typical Processor Affinity Mask Values

Value	Core(s)
1	1
2	2
3	1 & 2
4	3
8	4
12	3 & 4
15	1, 2, 3, & 4

IcoSetup.INI Setting

The **ProcessorAffinityMask** for the different ICONICS applications that support this feature is set in the IcoSetup.INI file. To set the **ProcessorAffinityMask** use the following format:

```
[DWX]
ProcessAffinityMask=3
```

This will allow DataWorX32 to use the first 2 cores of the system.

Supported applications

The following defines the list of applications that supports the **ProcessAffinityMask** property and gives their default if the ProcessAffinityMask is not present in the INI file for that application.

Table 2 - Applications that Support the ProcessAffinityMask

Application	INI File Section	Default
AlarmWorX32 Server	[AWX32\AWXSvr32]	1
AlarmWorX32 Logger	[AWX32\AWXLog32]	1
AlarmWorX32 Multimedia	[Awx32\AWXMMX32]	1
BridgeWorX	[BridgeWorX.net]	(all)
Database OPC Server	[DatabaseOPCServer]	(all)
DataWorX32	[DWX]	1
GenBroker	[GENBROKER]	(all)
Global Aliasing Client	[GASClient]	1
Global Aliasing Engine	[GASEngine]	1
Language Aliasing Engine	[LASEngine]	1
Productivity Analytics	[ProductivityAnalytics.net]	(all)
ReportWorX	[ReportWorX.net]	(all)
TrendWorX32 SQL Data Logger	[TWX32\TWXLog32]	1
TrendWorX32 HDA Server	[TWX32\TWXHDA32]	1
Unified Data Manager Runtime Engine	[DataManager\DataRuntime]	(all)
Unified Data Manager Trigger Engine	[DataManager\TriggerRuntime]	(all)
Security Server	[ICONICS SECURITY SERVER\ProcessAffinityMask]	1

NOTE: The INI file headers above must all be on one line in the INI file.