# System Performance: Sizing and Tuning ZENworks. Mobile Management 3.0.x

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# **Sizing for Best Performance**

## Architecture

The *ZENworks Mobile Management* system is comprised of an SQL Database component and a Web/HTTP component. Both components can be installed on a single server.

The system may also be configured with multiple web servers for a Network Load Balanced setup. With this configuration, you can install the SQL component and first instance of the web component on a single machine and install the second instance of the web component on a second machine. Machines where SQL is not installed will be able to support more devices than recommended below. These web servers can support approximately 2,000 users per 2.5 GB RAM.

A note about firewalls or host providers: Device traffic is routed through the ZENworks Mobile Management server. Because of this, the IP address of any server that sits between the ZENworks Mobile Management server and the ActiveSync Server (or LDAP server) will appear to have an increased amount of traffic. Some firewalls or hosts providers view increased traffic as an attempted attack and may limit or throttle connections. As a result, devices can experience sporadic connections with the ActiveSync, LDAP or ZENworks Mobile Management server.

### **Minimum System Requirements**

CPU	RAM	Hard Drive	Maximum Devices
Dual Core 1.60 GHz CPU	3 GB RAM (SQL restricted to 300 MB)	60 GB HD	1000 Devices

This environment can be setup on SQL 2008 R2 Express with proper database maintenance.

### **Performance Requirements**

	CPU	RAM	Hard Drive	Maximum Devices
Low-End Servers*	Quad Core 2.13 GHz	8 GB RAM (SQL restricted to 750 MB)	80 GB HD	4,000 Devices
Mid-Range Servers	Quad Core 2.13 GHz	12 GB RAM (SQL restricted to 750 MB)	120 GB HD	8,000 Devices
High End Servers	Dual Quad Core 2.40 GHz w/ Hyper Threading Enabled (16 Logical Cores)	30 GB RAM (SQL restricted to 1.5 GB)	160 GB HD	20,000 Devices
Large Scale Servers	Dual Hex Core 2.40 GHz w/ Hyper Threading Enabled (24 Logical Cores)	60 GB RAM (SQL restricted to 3 GB)	320 GB HD	40,000 Devices

\* This environment can be setup on SQL 2008 R2 Express with proper database maintenance.

### **Usage Parameters**

These system requirements are based on the usage parameters used in the test setting, which are listed below:

All devices are in Direct Push mode, set with a Direct Push Interval of 30 minutes. Location data is reported based on the 30 minute interval, as well.

Email usage is as follows:

15% of the devices receive 12 emails/hour 50% of the devices receive 8 emails/hour 30% of the devices receive 4 emails/hour 5% of the devices receive no email 25% of the emails are 500K 50% of the emails are 75K 25% of the emails are 10K

Test environments are configured with a 50/50 split between iOS & Android devices.All iOS devices have server side APNs enabled while all Android devices have server side GCM enabled.

Disabling APNs and/or GCM will result in an overall performance reduction of the ZENworks Mobile Management system.

# Tuning ZENworks Mobile Management

### PoolThreadLimit Registry Key

Adjust the PoolThreadLimit registry key on systems with more than 125 devices.

The value of this registry key should be configured to 2 times the total number of devices. For example, if there are 2000 devices on the system, you should adjust this setting to 4000.

If the system is configured with multiple Web servers for a Network Load Balanced setup, you should adjust this setting on every server where a *ZENworks Mobile Management* component is installed. The value should be the same on every server.

1. Navigate through the ZENworks Mobile Management registry to adjust the setting:

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\InetInfo\Parameters

2. If the PoolThreadLimit key already exists, double click on it and adjust the value to 2 times the total number of devices.

Add the PoolThreadLimit registry key if it does not exist by right clicking on **Parameters** and selecting **New** > **DWORD**. Rename the newly created key, then double click on it to adjust the value to 2 times the total number of devices.

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±	hidserv	(Default)	REG_SZ	(value not set)
	HidUsb	100 PoolThreadLimit	REG_DWORD	0x00001000 (4096)
<b>.</b>	hkmsvc	1.22		
±	HpSAMD			
±	HTTP			
<b>±</b>	hwpolicy			
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÷.	inetaccs	Value adda.		
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÷	IPBusEnum —			
	IpFilterDriver			
÷.	iphlpsvc			
<b>+</b>	IPMIDRV			
	IPNAT			
	isapnp			
÷	iScsiPrt			
<b>.</b>	kbdclass			

#### MaxUserPort Registry Key

Due to a default Windows setting allowing a maximum of 5000 concurrent open ports, it is a good idea to adjust the MaxUserPort registry key on systems with more than 1000 devices. The value of this registry key should be set to 5 times the total number of devices on the system. For example, if there are 2,000 devices on the system, adjust this key to 10,000.

If the system is configured with multiple web servers for a Network Load Balanced setup, you should adjust this setting on every server where a *ZENworks Mobile Management* component is installed. The value should be the same on every server.

- 1. Navigate to the following location in the registry: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Tcpip\Parameters
- 2. If the MaxUserPort key already exists, double click on it and adjust the value to 5 times the total number of devices.

Add the MaxUserPort registry key if it does not exist by right clicking on **Parameters** and selecting **New** > **DWORD**. Rename the newly created key, then double click on it to adjust the value to 5 times the total number of devices.

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	÷- ]	SQLWriter		Name	Туре	Data		
	÷-	srv		ab (Default)	REG_SZ	(value not set)		
	Ē-	srv2		abDataBasePath	REG_EXPAND_SZ	%SystemRoot%\System	32\drivers\etc	
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	<b>+</b> -	SstpSvc		ab Domain	REG_SZ			
	<b>H</b> -	stexstor		B DontAddDefaultGatew	REG DWORD	0×00000000 (0)		
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	H-1	UmRdpService						
	H-T	uppphost						
	T_T	usbecap						
		uchabei						
	_							
Computer\HKEY_LOG	CAL_MA	CHINE\SYSTEM\CurrentC	Controls	Set\services\Tcpip\Parameters				

# Setting Up a Web Garden

## Configuring a Web Garden for the ZENworks Mobile Management Web Server

A Web Garden is a server configuration where multiple processes run on a single Web server. This is accomplished by activating the Web Garden feature in Microsoft Internet Information Services (IIS), version 6 or 7. By default, an application pool in IIS runs in a single process on the server; however, there is an option to increase the *Maximum Worker Processes* to a value greater than 1. The result is that the server runs multiple processes, thus improving system performance.

If you have configured your system with multiple Web servers for a Network Load Balanced setup, the Web Garden feature (*Maximum Worker Processes*) should be adjusted on all servers running the *ZENworks Mobile Management* Web/Http component.

### **Recommendations**

- One Worker Process per 1000 devices.
  - o 1000 devices Leave Worker Processes setting at 1
  - 2000 devices Increase Worker Processes to 2
  - o 4000 devices Increase Worker Processes to 4
- Increasing the number of Worker Processes beyond 2 per 1000 devices could result in a reduction in performance.

Instructions follow for setting up a Web Garden with IIS 6 or IIS 7.

# Setting up a Web Garden in IIS 6

1. Open Internet Information Services Manager, located under Administrative Tools.



- 2. In the left menu, expand the server and select Application Pools.
- 3. Expand Application Pools and select DefaultAppPool.
- 4. Right-click *DefaultAppPool* and select **Properties** from the menu.

🐌 Internet Information Serv	rices (IIS) Manager			_ 🗆 🗵
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Internet Information Services	Description		Path	
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	Properties Help	1		
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Opens the properties dialog box fo	or the current selection.			

5. Select the *Performance* tab.

6. Under the *Web garden* section, adjust the *Maximum number of worker processes* to a value greater than 1, (see the recommendations listed earlier in this section). The value should remain at 1 for a non-Web garden setup or on single core machines.

faultAppPool Properties		?
Recycling Performance Health Identity		
☐ Idle timeout ☐ Shutdown worker processes after being idle for (time in minutes):	÷	20
Request queue limit	11.00	
Limit the kernel request queue (number of requests):	÷	1000
Enable CPU monitoring		100
Refresh CPU usage numbers (in minutes):		5
Action performed when CPU usage exceeds maximum CPU use No action		~
- Web garden		
Maximum number of <u>w</u> orker processes:	÷	1
OK Cancel Apply	1	Help

# Setting Up a Web Garden in IIS 7

1. Open Internet Information Services Manager, located under Administrative Tools.



- 2. In the left menu, expand the server and select Application Pools.
- 3. In the Application Pools section, select DefaultAppPool.
- 4. Right-click *DefaultAppPool* and select *Advanced Settings* from the menu.

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Connections	This page lets yo pools are association among c	ication u view and ted with wo lifferent ap	Poo manag orker pr plication	<b>IS</b> e the list of applic rocesses, contain ns.	ation pools on the s one or more applica	erver. Applicatio tions, and provid	n Je
	Filter:		- 6	월 Go 👒 🕁 Sho	w All Group by:		
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		×	Adva Rena Remo	anced Settings ame ove Applications			
	•		Help	a Help		1	

 Under the *Process Model* section, adjust the *Maximum Worker Processes* to a value greater than 1, (see the recommendations listed earlier in this section). The value should remain at 1 for a non-Web garden setup or on single core machines.

	(General)					
	.NET Framework Version	v2.0				
E	Enable 32-Bit Applications	True				
ſ	Managed Pipeline Mode	Integrated				
1	Name	DefaultAppPool				
(	Queue Length	1000				
5	Start Automatically	True				
Ξ (	СРО					
l	Limit	0				
l	Limit Action	NoAction				
l	Limit Interval (minutes)	5				
F	Processor Affinity Enabled	False				
F	Processor Affinity Mask	4294967295				
ΞI	Process Model					
1	Identity	NetworkService				
1	Idle Time-out (minutes)	20				
l	Load User Profile	False				
	Maximum Worker Processes	1				
F	Ping Enabled	True				
F	Ping Maximum Response Time (seconc	90				
F	Ping Period (seconds)	30				
4	Shutdown Time Limit (seconds)	90				
0	Startun Time Limit (seconds)	90	-			

# Hardware Requirements for Scaling ZENworks Mobile Management

# **100K Devices**

#### Web Component

- 4 physical servers set up as a Web Cluster, each consisting of:
  - Windows 2008 Enterprise Server R2 SP1 (64-bit version)
  - 48 GB RAM
  - o 2 -eight-core CPUs with hyper-threading enabled
  - o 150 GB HDD space (recommended mirrored configuration)
  - o 32 worker processes

#### **Database Component**

- Use a dedicated SAN
  - Dual Head (High Availability)
  - o 5-250 GB SAS Drives
  - 4 set up in a RAID 5 configuration
  - 1 set up as a hot spare
- 2 physical host servers connecting to the SAN, each consisting of:
  - o 2 Hex-core processors with hyper-threading enabled
  - o 16 GB of RAM per server (10 GB allocated to SQL)
  - Windows 2008 Enterprise Server R2 SP1 (64 bit version)
  - o SQL Server 2008 R2 Advanced / Enterprise
  - Using SAN as shared storage

## **100K Devices**



# 200K Devices

#### Web Component

- 6 physical servers set up as a Web Cluster, each consisting of:
  - Windows 2008 Enterprise Server R2 SP1 (64-bit version)
  - 60 GB RAM
  - o 2 Eight-core CPUs with hyper-threading enabled
  - o 150 GB HDD space (recommended mirrored configuration)
  - o 32 worker processes

#### **Database Component**

- Use a dedicated SAN
  - Dual Head (High Availability)
  - 5 500 GB SAS Drives
  - 4 set up in a RAID 5 configuration
  - 1 set up as a hot spare
- 2 physical host servers connecting to the SAN, each consisting of:
  - o 2 Hex-core processors with hyper-threading enabled
  - o 32 GB of RAM per server (20 GB allocated to SQL)
  - Windows 2008 Enterprise Server R2 SP1 (64 bit version)
  - SQL Server 2008 R2 Advanced / Enterprise
  - Using SAN as shared storage

## 200K Devices

