



General Guidelines of Hardware Requirement for MultiDrive

MultiDrive AMR

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| Date: | 15/12/2014 |

1 PREFACE

1.1 DISCLAIMERS

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| <i>Name</i> | <i>Description Of Change</i> | <i>Date</i> | <i>Version</i> |
|--------------|------------------------------|-------------|----------------|
| ANTONYSWAMI | Initial | 01/02/2011 | 1.00 |
| ANTONY SWAMI | Logo Updated | 18/02/2012 | 2.00 |
| ANTONY SWAMI | Updated the HA Diagram | 10/07/2013 | 3.00 |
| ANTONY SWAMI | Updated the Server Spec | 15/12/2014 | 4.00 |
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1.4 DISTRIBUTION

| <i>Name</i> | <i>Role</i> | <i>Function</i> |
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1.5 REFERENCE DOCUMENTS

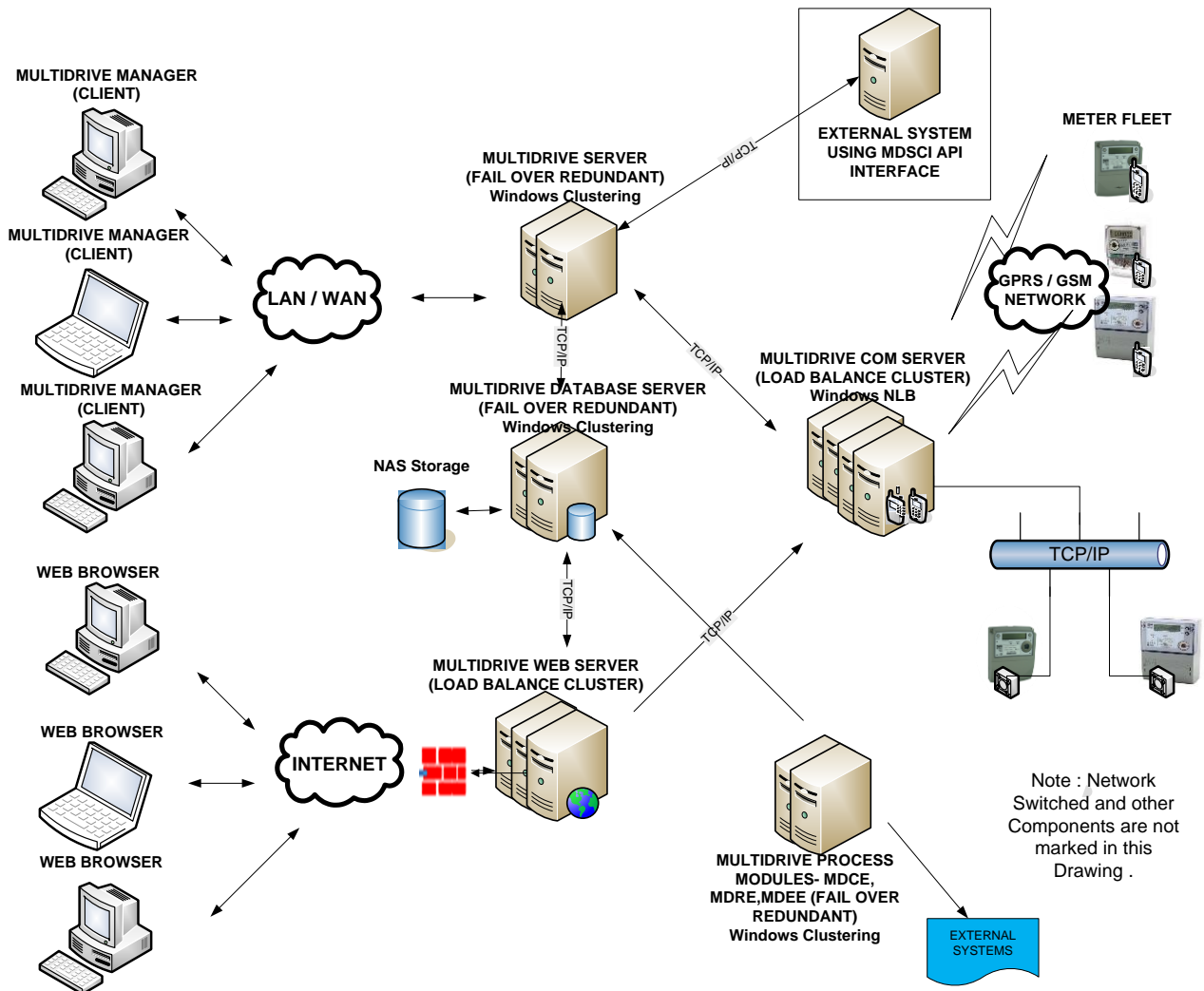
| <i>Document</i> | <i>Owner</i> | <i>Version</i> |
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3 ARCHITECTURE

MULTIDRIVE ARCHITECTURE FOR HIGH RESILIENT CONFIGURATION



4 MINIMUM HARDWARE REQUIREMENTS / INFRASTRUCTURE FOR THE SOFTWARE

The following is the generic guidelines for selecting the hardware requirement for installing MultiDrive System. The various components to be used varies depends on the project requirement .Please contact sales@edmi-meters.com or sales representative before finalising the hardware.

4.1 BASIC ASSUMPTIONS

These requirements are supplied under the following basic assumptions:

- Three month data storage
 - Archiving or removal of data older than three months must be implemented
- Six hour required reading window
- Daily Load Profile Read

- Single Channel, Standard Data Type, 30 minute interval
- Daily Total TOU Read
 - 6 Channels
- Monthly Total TOU Read
- No system redundancy or automatic failover (possible, but will require additional servers and requirements)

4.2 UP TO 5K METERING POINTS

| Component | Operating System | Hardware |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server MultiDrive Communications Server MultiDrive Web Manager (if used) Integration Engines (Reporting Engine, Commissioning Engine, Exception Engine etc.) Database Server (ALL in One Server) | Windows Server 2008 / 2012 (<i>Standard Edition Recommended</i>) | 3.0 GHz or equivalent server grade hardware (physical or virtual) 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x 300 GB (10K RPM SAS recommended) Hard Drive RAID 1 2 Number of Gigabit Network Card Software Crystal Reports XI R2 (Required only for Web Manager) Microsoft SQL Server 2012/2014 (Standard) Or Oracle 10g / 11g /12c (Standard) |
| MultiDrive Manager Client Access PCs | Windows 7 or 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.3 5K TO 20K METERING POINTS

| Component | Operating System | Hardware |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server / MultiDrive Communications Server Integration Engines (Reporting Engine, Commissioning Engine, Exception Engine etc.) (combined on single hardware) | Windows Server 2008 / 2012 Standard Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2 Number of Gigabit Network Card 2x300 GB 10K RPM SAS Hard Drive (<i>recommended</i>) RAID 1 |

| | | |
|-----------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Database Server | Windows Server 2008 / 2012 Standard Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8 GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 4x300 GB 15K RPM SAS Hard Drive RAID 10 Gigabit Network Card Software (Choose One) Microsoft SQL Server 2012/2014 (Standard) Or Oracle 10g / 11g /12c (Standard) |
| MultiDrive Web Manager | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 10K RPM SAS Hard Drive Controller Gigabit Network Card Software Crystal Reports XI R2 |
| MultiDrive Manager Client Access PCs | Windows 7 or Windows 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.4 20K TO 50K METERING POINTS

| Component | Operating System | Hardware |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server - 2 Numbers in Active /Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 10K RPM SAS Hard Drive (<i>recommended</i>) RAID 1 Gigabit Network Card |
| Database Server- 2 Numbers in Active/Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x 300 GB 15K RPM SAS Hard Drive RAID 1 Gigabit Network Card Software (Choose One) Microsoft SQL Server 2012/2014 (Standard) Or Oracle 10g / 11g /12c (Standard) Shared Storage DAS or NAS of 4x300 GB 15K RPM Hard Drive RAID 5 |
| MultiDrive Communications Server- 2 Numbers in Load Balance Cluster | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 10K RPM SAS Hard Drive Controller RAID 1 2 Number of Gigabit Network Card |
| Integration Engines (Reporting Engine, Commissioning Engine, Exception Engine etc.) <i>Single server running all engines</i> | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 10K RPM SAS Hard Drive Controller Gigabit Network Card |

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|--------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Web Manager | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card Software Crystal Reports XI R2 |
| MultiDrive Manager Client Access PCs | Windows 7 or Windows 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.5 50K TO 100K METERING POINTS

| Component | Operating System | Hardware |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server - 2 Numbers in Active /Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 10K RPM Hard Drive in RAID 1 Gigabit Network Card |
| Database Server- 2 Numbers in Active/Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 4x300GB 15K RPM SAS Hard Drive Gigabit Network Card or Fiber link Software (Choose One) Microsoft SQL Server 2012/2014 (Standard) Or Oracle 10g / 11g /12c (Standard) Shared Storage DAS or NAS of 8x300 GB 15K RPM Hard Drive RAID 5 |
| MultiDrive Communications Server (2 sets recommended for 100k) | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 4GB (1x4096), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 10K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card |
| MultiDrive Web Manager (2 sets recommended if using high volume transactions with Windows NLB) | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 10K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card Software Crystal Reports XI R2 |
| Integration Engines (two sets) Server 1: Reporting Engine Server 2: All other engines (Commissioning, Exception etc.) | Windows Server 2008 / 2012 Standard Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 4x300GB 10K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card |
| MultiDrive Manager Client Access PCs | Windows 7 or Windows 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.6 100K TO 250K METERING POINTS

| Component | Operating System | Hardware |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server - 2 Numbers in Active /Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.8 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Gigabit Network Card |
| Database Server – 2 Sets in Load Balances Cluster | Windows Server 2008 / 2012 Enterprise Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Gigabit Network Card or Fiber link Software (Choose One) Microsoft SQL Server 2012/2014 (Standard) Or Oracle 10g / 11g /12c (Standard) |
| MultiDrive Communications Server (4 sets recommended for 250k) | Windows Server 2008 / 2012 Standard Edition | - 3.0 GHz CPU - 2x 6MB cache 1333MHz FSB - 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory - 2x300GB 15K RPM SAS Hard Drive Controller - Gigabit Network Card |
| MultiDrive Web Manager (4 sets recommended if using high volume transactions with Windows NLB) | Windows Server 2008 / 2012 Standard Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 15K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card Software Crystal Reports XI R2 |
| Integration Engines (two sets) Server 1: Reporting Engine Server 2: All other engines (Commissioning, Exception etc.) | Windows Server 2008 / 2012 Standard Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 4GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 10K RPM SAS Hard Drive Controller RAID 1 Gigabit Network Card |
| DAS/NAS Storage <u>1 set</u> | Windows Unified Data Storage Server Standard Edition recommended | eg. Dell PowerVault(TM) - Quad-Core Intel(R) Xeon(R) , 2x6MB Cache - 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory - <u>12 x300 GB</u> 15K RPM SAS Hard Drive RAID 5 - SAS 5/E Controller Card and 5/E HBA Card |
| MultiDrive Manager Client Access PCs | Windows 7 or 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.7 250K TO 500K METERING POINTS

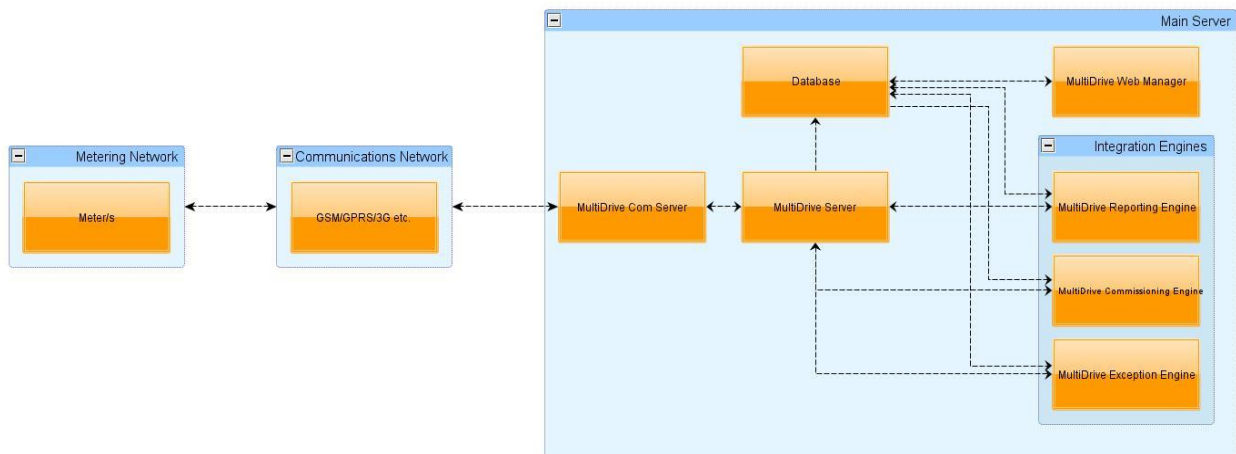
| Component | Operating System | Hardware |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server - 2 Numbers in Active /Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.8 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive (Master) 1x300GB 15K RPM SAS Hard Drive (Slaves) Gigabit Network Card |
| Database Server – 2 Sets in Load Balances Cluster | Windows Server 2008 / 2012 Enterprise Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 1x300GB 15K RPM SAS Hard Drive Gigabit Network Card or Fiber link Software (Choose One) Microsoft SQL Server 2012/2014 (Enterprise) Oracle 10g / 11g/12c (Enterprise) |
| MultiDrive Communications Server (6-8 sets recommended for 500k) | Windows Server 2008 / 2012 Enterprise Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card |
| MultiDrive Web Manager (6 sets recommended if using high volume transactions with Windows NLB) | Windows Server 2008 / 2012 Enterprise Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card Software Crystal Reports XI R2 |
| Integration Engines (four sets) Server 1/2: Reporting Engine cluster Server 3/4: All other engines clustered (Commissioning, Exception etc.) | Windows Server 2003 R2 SP2 /2008 Enterprise Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card |
| NAS Storage <u>1 set</u> | Windows Unified Data Storage Server Standard Edition recommended | eg. PowerVault(TM) - Quad-Core Intel(R) Xeon(R) , 2x6MB Cache - 4GB (4x1024), DDR-2 667MHz Fully-Buffered Memory - 15x300GB 3.5-inch 15K RPM SAS Hard Drive - SAS 5/E Controller Card and 5/E HBA Card |
| MultiDrive Manager Client Access PCs | Windows 7 or 8 | CPU 1.8GHz, RAM 512 MB with network card |

4.8 500K TO 1,000K METERING POINTS

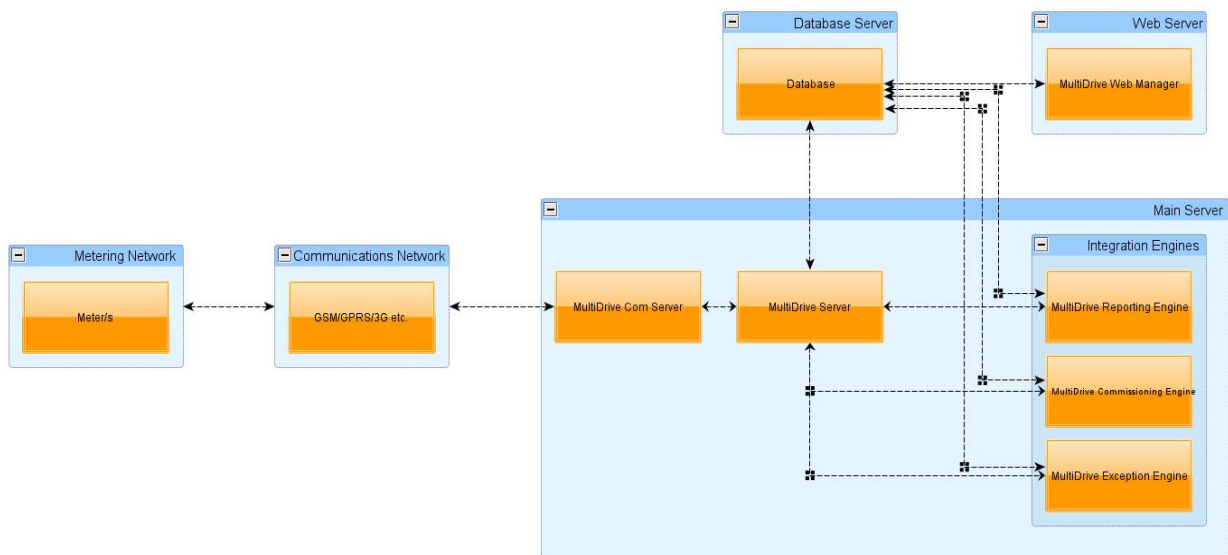
| Component | Operating System | Hardware |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MultiDrive Server - 2 Numbers in Active /Passive Cluster | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.8 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 6x300GB 15K RPM SAS Hard Drive RAID 1 Gigabit Network Card |
| Database Server – 2 Sets in Load Balances Cluster | Windows Server 2008 / 2012 Enterprise Edition Or Unix/Linux equivalent | Quad-Core Xeon 3.4 GHz 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300 GB 15K RPM SAS Hard Drive RAID 1 Gigabit Network Card or Fiber link Software (Choose One) Microsoft SQL Server 2012/2014 (Enterprise) Oracle 10g / 11g /12c (Enterprise) |
| MultiDrive Communications Server (8-12 sets recommended for 1,000k) | Windows Server 2008 / 2012 Enterprise Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card |
| MultiDrive Web Manager (10 sets recommended if using high volume transactions with Windows NLB) | Windows Server 2008 / 2012 Enterprise Edition | 3.0 GHz CPU 2x 6MB cache 1333MHz FSB 2GB (2x1024), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card Software Crystal Reports XI R2 |
| Integration Engines (eight sets) Server 1-4: Reporting Engine cluster Server 4-8: All other engines clustered (Commissioning, Exception etc.) | Windows Server 2008 / 2012 Enterprise Edition | Xeon 3.0 GHz or equivalent server grade hardware (physical or virtual) 2x 6MB cache 1333MHz FSB 8GB (2x4096), DDR-2 667MHz Fully-Buffered Memory 2x300GB 15K RPM SAS Hard Drive Controller Gigabit Network Card |
| DAS/NAS Storage <u>1 set</u> | Windows Unified Data Storage Server Standard Edition recommended | eg. Dell PowerVault(TM) - Quad-Core Intel(R) Xeon(R) , 2x6MB Cache - 4GB (4x1024), DDR-2 667MHz Fully-Buffered Memory - 20x300GB 3.5-inch 15K RPM SAS Hard Drive - SAS 5/E Controller Card and 5/E HBA Card |
| MultiDrive Manager Client Access PCs | Windows 7 or 8 | CPU 1.8GHz, RAM 512 MB with network card |

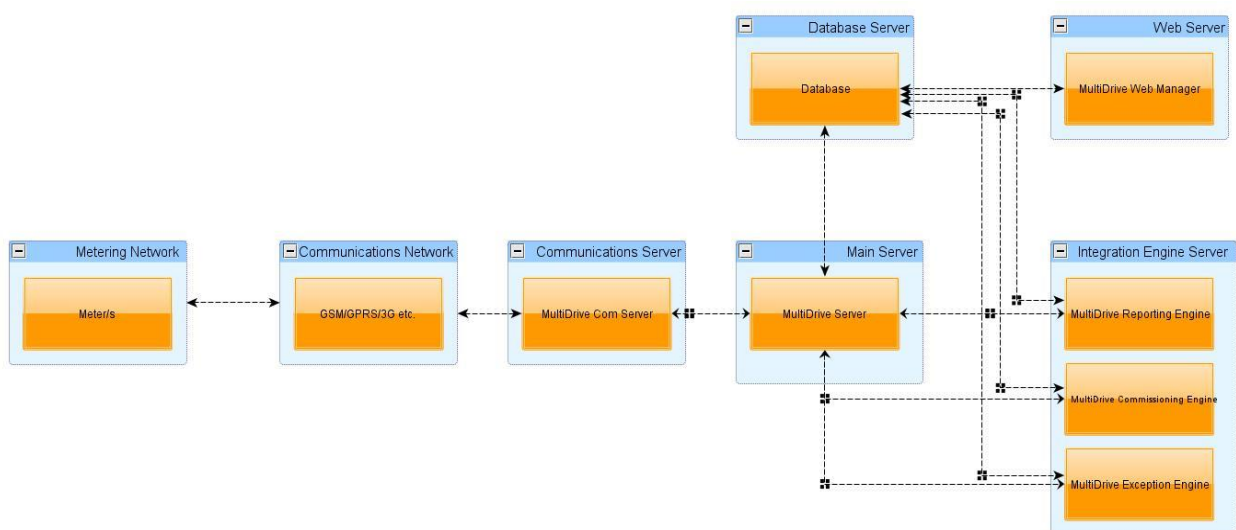
4.9 RECOMMENDED INFRASTRUCTURE - LESS THAN 5K METERS



4.10 RECOMMENDED INFRASTRUCTURE - 5K TO 20K METERS



4.11 RECOMMENDED INFRASTRUCTURE - 20K TO 50K METERS



4.12 RECOMMENDED INFRASTRUCTURE - 50K UPWARDS

As system is scaled, additional Web Servers, Integration Servers and Communications Servers are added (as required).please contact sales@edmi-meters.com