PowerHouse 2.5

User Manual

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System Requirements

Below you can find the system requirements related to the PowerHouse installation, if you install PowerHouse in conjunction with other products, the O.S. choice has to be taken into consideration for both system requirements, PowerHouse and the other Software product requirements.

Hardware minimum requirements

Minimum Requirements	Suggested Requirements
Windows XP - 64 bit 8 GB Ram 1 CPU 4 cores	Windows 7 64Bit > 16 GB Ram 2 CPU 8 Cores

Supported OS

OS	Suggested Requirements
Microsoft	Windows XP - 64 bit Windows 7 Pro - 64 bit Windows Server 2008 R2 - 64 bit Windows Server 2003 - 64 Bit

PowerHouse clustering solution requires a network switch, 1 Gbit bandwidth. In case the available switch is layer 2 or layer 3 please check the Installation checklist → *Installation Checklist*, page 40 and the Troubleshooting paragraphs → *Troubleshooting* , page 31.

Matrix Compatibility

PowerHouse works in conjunction with specific RTT Products and therefore cannot be mixed. Here below you can find the RTT Compatibility matrix.

PowerHouse	Picturebook	DeltaGen
PWH 1.5	PB 5.5	DG 9.5.1
PWH 2.0.0.1	PB 6.0	DG 9.6.1
PWH 2.0.1	PB 6.0.2	DG 10.X
PWH 2.5	PB 6.5	DG 11.0

Introduction

PowerHouse is a service abstraction and distribution system of 3 layers. It includes an underlying set of RTT service modules, a scalable SOA distribution layer and a set of Web applications making use of this. It can be deployed inside an enterprise IT infrastructure.

PowerHouse will make both existing and new internal RTT services available to the user in a transparent manner, thus being a frontend to Service Oriented Architecture (SOA).

Application Layer

The Application Layer consists of any kind of applications both web and standalone that sport usage of the underlying RTT Service Interface Layer.

RTT frontends

A set of modular web applications built upon the RTT Service Interface to offer a specific web suite. This includes frontends for backend rendering and batch processing.

Customer's frontend

A web application a customer creates employing the RTT Service Interface via SeCls.

RTT Service Interface

PowerHouse web frontends are applications of a new set of client components called RTT Service Clients or simply "SeCls". A web frontend assembles these SeCls to provide services to the customer. In their entirety the SeCls are forming the "Service Facade". Together with

a distribution, allocation and dispatching system they form "RTT Service Interface".

RTT Service Clients

One component of RTT Service Interfaces "Service Facade", also called "SeCl".

Service Facade

The complete API formed out of the SeCls.

RTT Service Interface

A collection of SeCls bundled with distribution and allocation systems as API library for C++, Java and Python. Accessible by custom applications, the RTT Service Interface allows creation of a scalable distributed system to access both RTT Modules and existing corporate services. This is also called the RTT Service Interface Layer.

A RTT Service Client ("SeCl") is a client implementation of an RTT service. Any such service can be described by a unique URI identifier. It may manifest as a library to be closely embedded into an application such as Render into DeltaGen but also as a RPC network service. Both manifestations use the same interface and are able to provide a detailed description of this very interface.

Currently known services in detail are:

1. Ram
2. Task
3. Stream
4. Render
5. Image
6. Echo
7. MediaStore
8. PictureBook
9. HID
10. FileStore
11. FlashCompiler
12. HMI

Services Layer

Each SeCl can be configured to access one or more specific underlying services. These services form the "Services Layer". All services that are

implemented and provided by RTT are the "RTT Modules" they can be offered as optional components.

RTT Modules

Is an underlying system within the Services Layer, serving functionality using a SeCl.

Services Layer

The down most layer of the PowerHouse system, being a collection of both accessed existing corporate structures such as file systems and LDAP servers and deployed RTT server binaries called "RTT Modules".

Thus a SeCl encapsulates an underlying service with a generic abstract interface.

Business cases

Powerhouse found its business cases in offline rendering in conjunction with DeltaGen as Renderer for example, with RenderFarm script and StillProducer script, in Realtime streaming in conjunction with DeltaGen and Picturebook Composer.

PowerHouse functionalities as standalone without DeltaGen are Image conversions using the Image service and SWF file production out of pictures sequence. Moreover data distribution using the Mediastore distributed Ram file system that could be used to share data between cluster nodes without using file system sharing and other operating system facilities.

In this manual we will see how to install PowerHouse, how to configure the PowerHouse in combination with Picturebook Composer. Moreover in the Advanced section will be shown a simple example using python and the PowerHouse API, about how to render a picture and how to stream in RealTime.

Installation and Configuration

In this section we will learn how to install PowerHouse and how to configure it.

The prerequisites for the installation of PowerHouse is to ensure you have local administrator rights and have a network connection available, without these prerequisites the installation will not be successful.

Hardware resources and Network configuration

To proceed with the installation you need to plan the Hardware resources and the network configuration. Let's start with the simplest scenario a single Node installation.

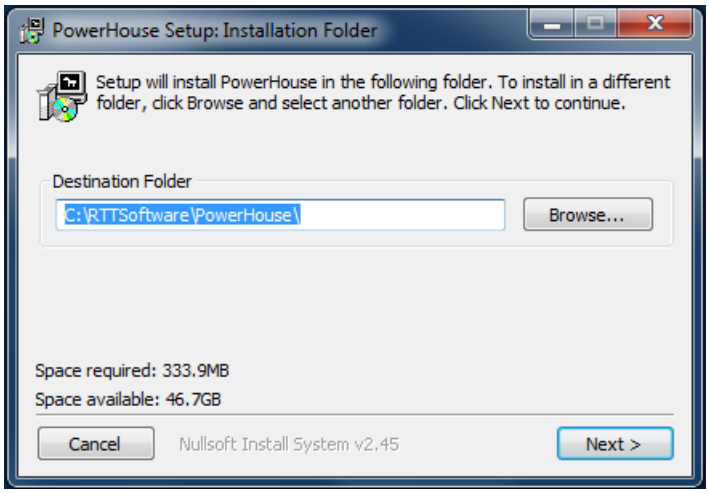
A Node is a single machine that participates in a cluster, in case a cluster is composed from one single node, the node corresponds to a single instance cluster.

You don't need in advance to know how many nodes you will deploy because PowerHouse is capable of adding more nodes to the cluster without shutdown or reconfigure the other running nodes.

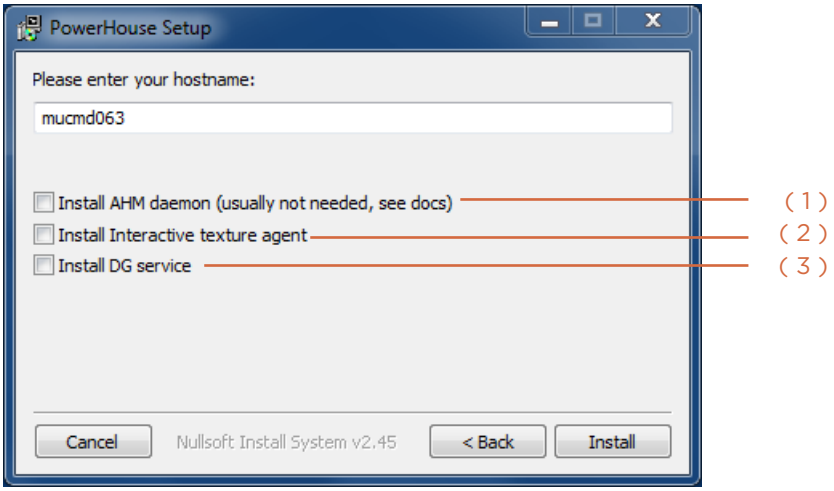
You will instead need to have a switch that is gigabit Ethernet capable and with the possibility to forward the multicast packets without any filtering.

Install PowerHouse

In order to install PowerHouse, close any running application, locate the installer and double click on it. The following dialog will appear, select the destination directory where you like to install PowerHouse and then click Next.



The following dialog will appear and there you need to check if the Hostname is correct then you can click Next.



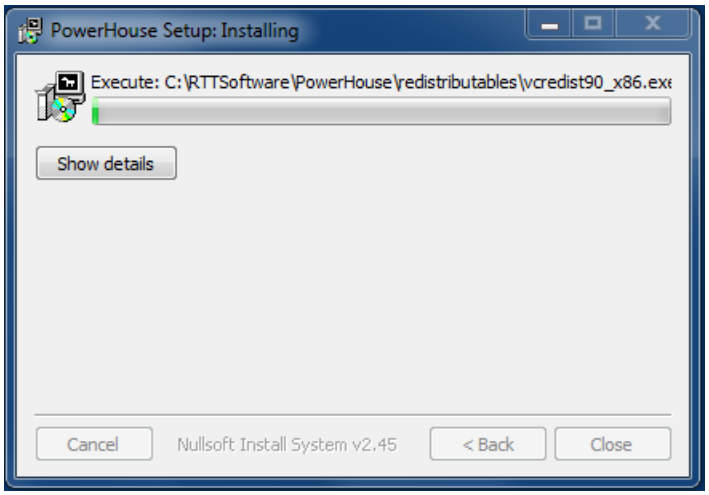
(1) AHM is used to register external services; default off

(2) This is will install the interactive texture agent; default off

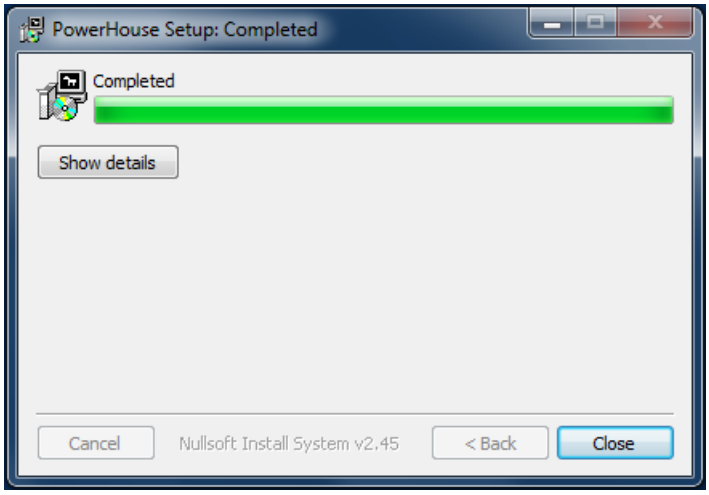
(3) Install PWH Render Service; default off. In order to use it check chapter *Render Backend Configuration*, page 14.

The above checkbox are for advanced users, leave this unchecked if you are not sure about the functionality they will expose.

The following dialog will appear and the installation will take place



Once the installation is completed click close.



You have successfully installed PowerHouse node. Now you can check the configuration file and modify it in order to set your new configuration parameter accordingly with the infrastructure available on your IT environment.

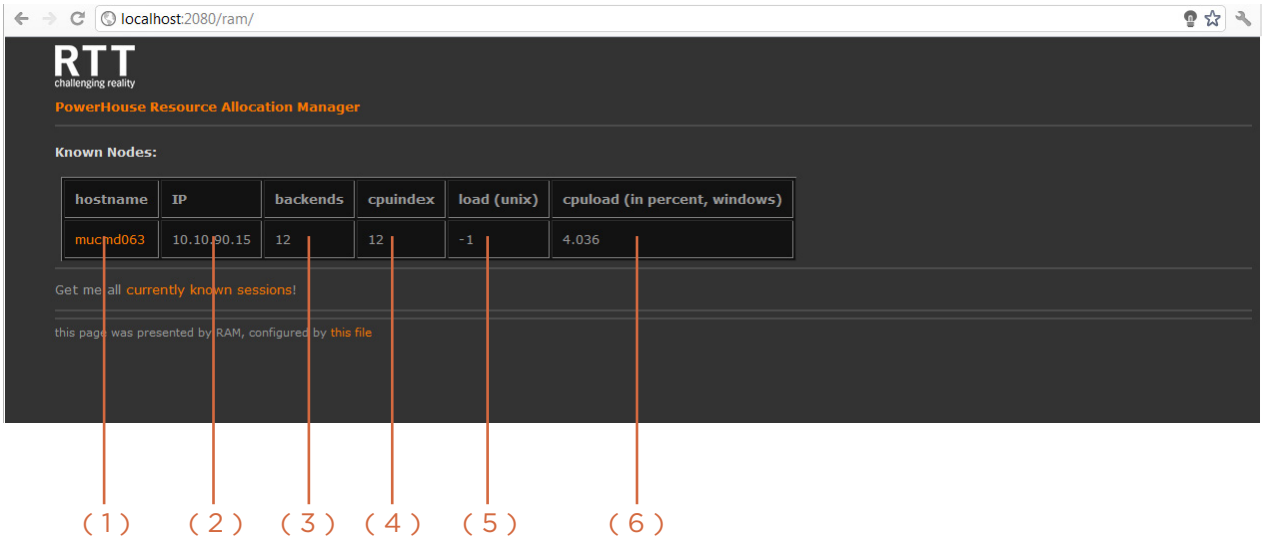
Check the installation

Before you proceed with the configuration, let's have a short look what Powerhouse looks like. Open your preferred browser and go to the following URL:

http://localhost:2080/ram/

You should see the following web page:

This means that PowerHouse is up and running. Let's now look at what the parameters mean on the Resource Allocation Manager page.



(1) Node Name

(2) Ip Address of the node

(3) Number of services available on the node

(4) CPU performance index

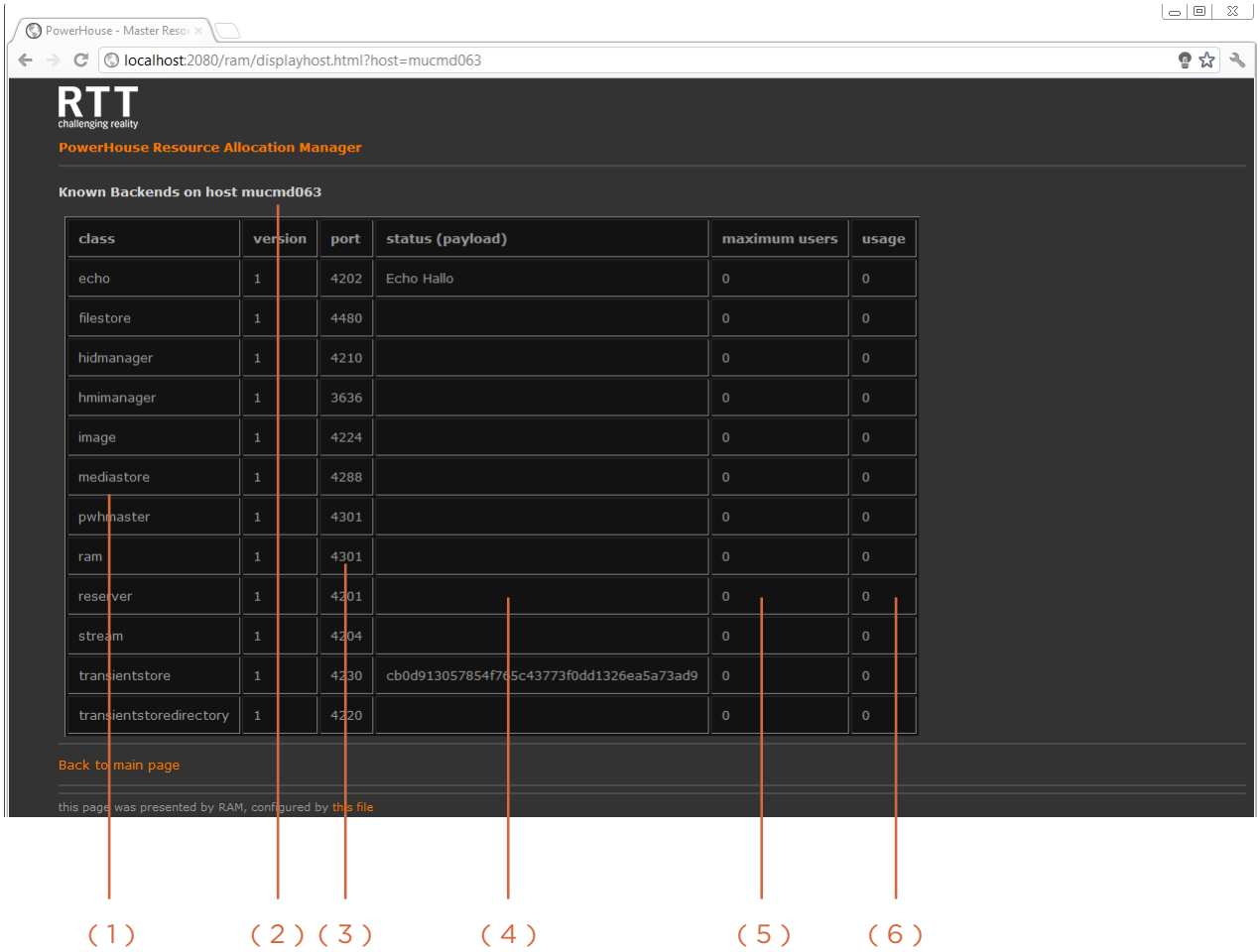
(5) CPU Load (Unix node)

(6) CPU Load (Win node)

Clicking on the hostname will open another page node related, where the user can find the service status information. The page will show the services started on the node and the usage information.

The number of the services started on the node will be reflected and summarized on the main page under backends. 10 backends means that 10 services are running on the node.

The nodes belonging to a cluster can have different backend numbers, this mean that different types of services has started among the nodes. The page below shows the services running on the node, and the services started on the node and the usage information. The number of the services started on the node will be reflected and summarized on the main page.



(1) Service Name running on the node

(2) Node name (hostname)

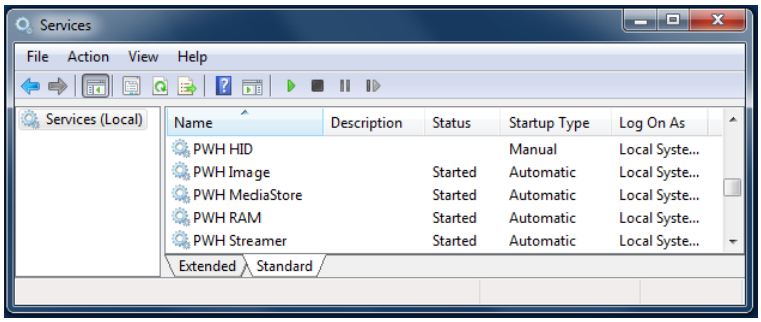
(3) Port were the service is listening

(4) Service Payload

(5) Max number of user supported by the service

(6) Service usage status

Another check is to open the windows service manager in order to locate and check the services. Go to Start, and then enter services.msc. A dialog will pop up, then scroll through the window and locate the PowerHouse Services:



There you can see that PowerHouse has 5 services, PWH Ram, PWH Streamer, PWH Image, PWH Mediastore and PWH HID. The HID is not automatically started, this is a special service that works in conjunction with an Immersive device. Contact RTT Support if you need further information. The 4 other services are automatically started once PowerHouse is installed. From these 4 you can observe 3 of those in the PowerHouse Resource Allocation Manager web page under the host page; these are PWH Mediastore, PWH Ram and PWH Image. The streamer is not shown on the PowerHouse RAM page; this is a separate service that streams the content from DeltaGen or from a source that is sharing a Shared Memory Buffer throughout a http server using Mjpeg encoding.

You can start and stop the services using the command console in windows or using the services.msc dialog. The services have dependencies, the right startup sequence is;

_ Start the PWH Ram before you start the other services

_ Stop the PWH Services (Mediastore, Streamer, Image) then stop the PWH Ram

If the machine you are using is not connected to the network, the Ram will not start. Please check the chapter troubleshooting for more details → *Troubleshooting* , page 31.

General Configuration

Now that you've installed PowerHouse you can configure it in order to run your solution.

Multicast Grouping Configuration

Locate the configuration file powerhouse.conf using windows explorer pointing the following path %POWERHOUSE_HOME%/etc. The file is a json description, there are several parts where you can tweak and optimize the configuration. Let us first look at the basics and then move on to the advanced configuration.

First you need to know that PowerHouse uses multicast strategy to live deploy the cluster node, the single node listens and talks to a multicast port. The configuration of the multicast port per default is 3333, you can modify it as per your needs. To do this, locate the section below and modify the port, after that you need to restart the PWH services.

I.E: powerhouse.conf – mcast section

```
…..
   "mcast":
   {
     "listen_address" : "0.0.0.0",
     "port" : 3333,
     "ttl" : 2
   },
 …..
```

In case your network environment has particular IT limits imposed on it for the multicast groups, please check the Troubleshooting paragraph
→ *Multicast Troubleshooting & Configuration*, page 31.

Since PowerHouse version 2.0.0.1 the master configuration does not need to be done, the master is automatically elected using a PowerHouse Election Protocol, therefore in the configuration file the flag related to the master has been deleted.

Render Backend Configuration

Other important configuration parameters set, are the ones regarding the Renderbackend. Here you will see how to configure the render backend. In the next chapter you will see how to load the render backend in DeltaGen.

```
…..
     "render":
     {
          "port" : 4203,
          "backlog" : 128,
          "timeout" : 60,
          "max_users" : 1,
          "sessiontimeout" : 180,
          "scenetimeout" : 300,
          "max_transfer_buffer_size" : 104857600,
```

```
            "watchdog_timeout": 10,
            "disable_live_rendering": false,
            "disable_viewer_rendering": true,
            "clone_scenes": true,
            "disable_renderer_reuse": false,
            "max_cached_renderers": 10,
            "max_sessions": 0
        },
    …..
```

The highlighted parameters are new since PowerHouse 2.1. These parameters are default and cover the standard basic configuration. In case additional performance or debug investigation is required, the user can tweak the parameters by following the table below

Option	Description	Default
`disable_live_rendering`	The streamer asynchronous buffer is filled and affects the performances. In the case of still rendering, the real-time stream rendering is performed twice, once for the still picture and once for the real-time streaming, **Note**: In case of composer this parameter must be set to false	`false`
`disable_viewer_rendering`	The RenderBackend will not render in the viewport, one rendering time will be saved and the performance is improved by 1/3rd. These parameters will influence the still production, and the real-time streaming of the default value is already set for the max performance. If the user needs to debug what's happening in the backend the parameter can be set to false.	`true`

Option	Description	Default
clone_scenes	The scene once loaded are cloned, this is because the RenderBackend has a global state on the Scene, and therefore if the user wants to have clean settings every time on the scene this will help to have a clean startup every time. This parameter if set to true, will affect the performance of the loading time. The loading time will be increased about 30-60 seconds depending on the scene.	true
disable_renderer_reuse	Caching, still for offline production, if set to true the picture will be cached. This is used to improve the performance for offline production. In case you don't know which application you are going to have as a frontend, leave this parameter untouched.	false
max_cached_renderers	Caching parameters that works in conjunction with the disable_render_reuse flag.	10
max_sessions	After the number of specified sessions, the RenderBackend will kill DeltaGen: If it is used in conjunction with the DGService, DeltaGen will be restarted automatically. Setting this default to 0, means ignoring the number of sessions and DeltaGen will never be killed. **Note**: This works in conjunction with DGService. If the DeltaGen is started in standalone mode leave this parameter with its default settings: 0	0

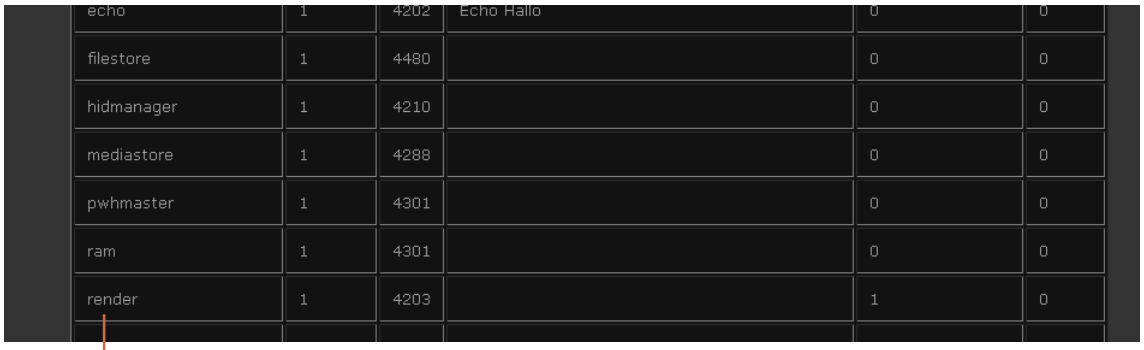
Render Backend How to load the DeltaGen Plugin

When the render parameters have been configured, you can load the RenderBackend plugin for DeltaGen. Shown below are the steps required:

1. Start Deltagen
2. Go to Tools > Modules

3. Click on the browse icon
4. Navigate to <Powerhouse installation Folder>/ bin
5. Select Open RenderBackendPlugin.xml and click Open.
6. In the Modules Dialog there is now an entry PWH Renderbackend.
7. Click "Autoload" and "Unloaded" to activate it.

Now check in the PowerHouse Ram web page under the host resources and you should see the render service available.



Render Service available

Render Backend as a Windows service

Since PowerHouse 2.0.1 there is the possibility to start the RenderBackend (in this case DeltaGen) as a windows service. In order to do this the user has to follow these steps.

1. Install the PWH Render Service
2. Modify the PowerHouse configuration file
3. Copy the DeltaGen ini file in the system user directory
4. Reboot the machine.

The PWH Render service will run as system user, therefore a special wrapper has been built in order to replicate the window desktop token and to give the OpenGL space access to DeltaGen. With the PWH Render service the user will be able to login into the node with the Windows Remote desktop without damaging the DeltaGen process.

1. Install the PWH Render Service

   Open the windows command prompt: Start → cmd

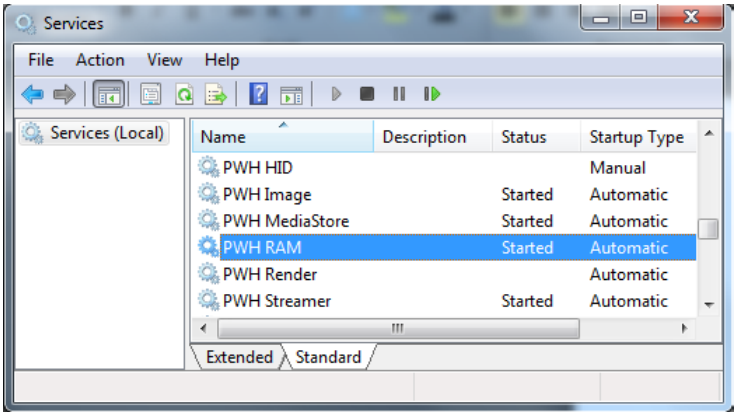
   Go into the PowerHouse bin directory: cd %POWERHOUSE_HOME%/ bin

   Issue the following command: dgservice.exe –i

If the service is correctly installed the following message should appear:

```
Service installed successfully
```

Now you should be able to see the service in the services.msc open it and check.



The service should be in stop state. Do not start the service, you will first need to modify the configuration.

2. Modify the PowerHouse configuration file.

   Before you restart the service you need to modify the configuration file. With your preferred text editor, open the powerhouse.conf file located in the following directory, %POWERHOUSE_HOME%etc; locate the related json DeltaGen section.

```
.....
    "deltagen":
    {
       "location": "c:\\RTTSoftware\\Release11.0\\rttDeltagen.exe ",
        "reserve" : 12,
        "restart_on_crash" : true,
        "create_desktop" : true,
        "username" : "",
        "password" : "",
        "domain" : ""
    }
.....
```

   Modify the location accordingly to your DeltaGen installation path and the ‘reserve’ accordingly to the number of cores available on your machine; the value you should give to ‘reserve’ should be number of

cores – 2 (minus two) because one core is needed for the operating system and one is needed by the PWH Streamer.

Option	Description	Default
location	File system location of DeltaGen executable	none
reserve	Percentage of CPU power which should be reserved for other things than DG	12
restart_on_crash	Restart DG if it crashes	true
create_desktop	Start DG on a separate desktop - no user interaction possible	true
username	Start DG as a different user – Not used	none
password	Start DG as a different user – Not used	none
domain	Start DG as a different user – Not used	none

The PWH Render service will be actived after the next machine reboot.

3. Copy the DeltaGen ini file in the system user directory

   Once you have setup the PowerHouse configuration file, you need to copy the RTTSoftware\Release11.0 directory under the Local System user profile directory.

   This is the trickiest step because each operating system version has a different location for the Local System user profile.

   For Windows XP x64 the Local system user directory is located here :

   ```
   C:\Documents and Settings\Default User\Application Data\RTTSoftware\Release11.0\
   ```

   For Windows 7 x64 the Local System user directory is located here:

   ```
   C:\Users\Default\AppData\Local\RTTSoftware\Release11.0\
   ```

   For Windows 2008 R2 the Local System user directory is located here:

   ```
   C:\Windows\System32\config\systemprofile\AppData\Roaming\RTTSoftware\Release11.0\
   ```

   In other hands you need to start DeltaGen with your user account, then follow the steps how to load the RenderBackend plugin available at the chapter → *Render Backend How to load the DeltaGen Plugin*, page 16 then close DeltaGen, open the windows explorer and issue the

following path %APPDATA% then you will locate on the following directory

```
C:\user\<username>\AppData\Roaming\
```

You now need to select the RTTSoftware directory and issue CTRL+C and open the above listed Local System profile directory depending on your operating system and issue the command CTRL+V (paste the content copied in the destination directory).

4. Reboot the machine.

   Now you can reboot the machine, if the operation is successful after the reboot you should see on the PWH Ram page the render service available. If not check the Troubleshooting section → *Troubleshooting*, page 31.

Picturebook Composer

In order to install and configure the Picturebook Composer you need to fulfill these preconditions:

1. Have license for Picturebook with PowerHouse functionality (composer)
2. Have a license for DeltaGen
3. Have the software requirements satisfied and your Hardware with the supported O.S. Installed.

Once you have the above pre requisites, you can then move on with the following steps:

1. Install Picturebook
2. Install PowerHouse
3. Generate the Mediastore access password
4. Modify the PowerHouse streamer url configuration
5. Add the mediastore user to picturebook
6. Load the Render Backend plugin in Deltagen

Install Picturebook

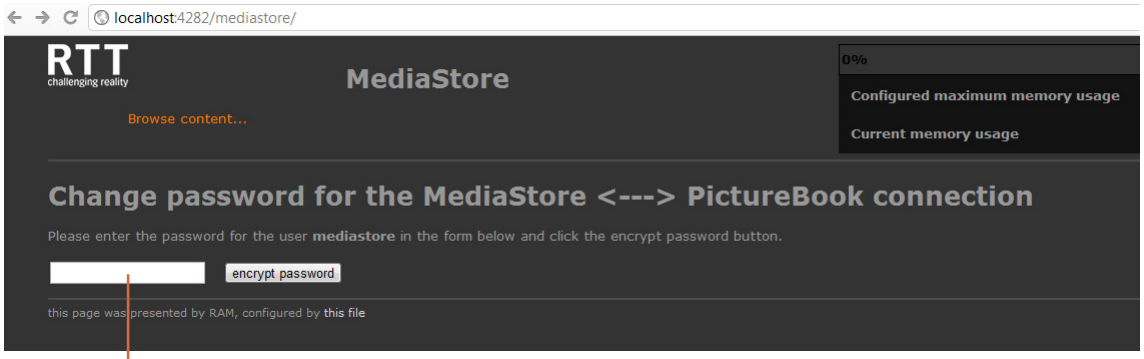
This is out of scope in this manual. Please follow the setup and instruction manual for PictureBook server, how to setup and configure it. “Technical Documentation.pdf” – this is located in the PictureBook server doc folder.

Install PowerHouse

This has been described in this manual at the following section → *Install PowerHouse*, page 8.

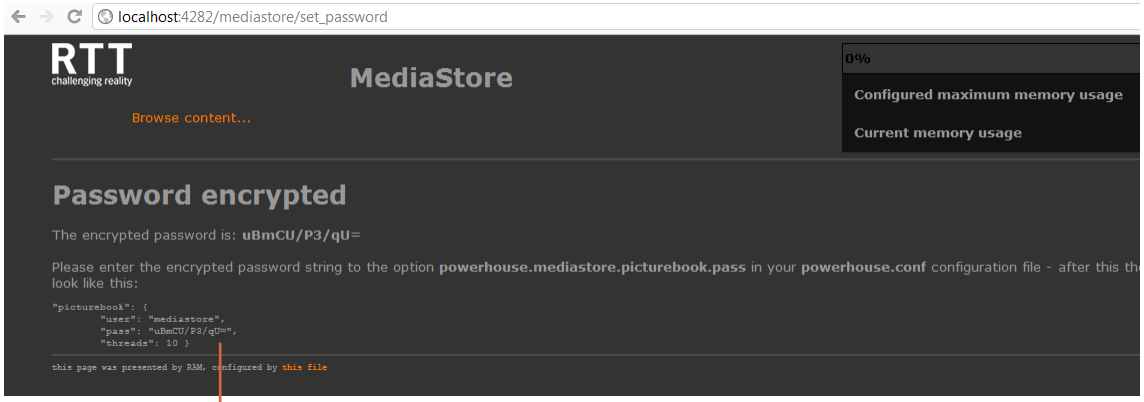
Mediastore access password generation

Mediastore access is granted using encrypted passwords. The password shall be generated at the following URL *http://localhost:4282/mediastore/* on any of the hosts running MediaStore.



Enter the plain text password

Enter the plaintext password for the "**mediastore**" user and click "**encrypt password**". On the next page you'll see the encrypted password which can be put into the configuration.



Encrypted password

This has to be done at least once. The Mediastore credential has to be put into the configuration powerhouse.conf of all nodes running the MediaStore service (all hosts of a PowerHouse cluster). i.e. mediastore powerhouse.conf:

```
.....
        "picturebook":
        {
            "user": "mediastore",
            "pass": "rEgSzrRYtY8x",
```

```
            "threads": 2
        }
    .....
```

In Picturebook server configuration you need to modify the mediastore user password. Since the release of Picturebook v6.5, a new modification has been introduced. The administrator no longer needs to add a specific mediastore user in to Picturebook. Within Picturebook v6.5 the administrator needs only modify the configuration in the Picturebook v6.5 Admin console as shown in the next picture.

Moreover, in Picturebook v6.5 the user can choose another user to modify the configuration file for PowerHouse and Picturebook using the same user name. For instance, instead of a user named ‘mediastore’ we want a user named ‘administrator’. The steps needed to modify to user ‘administrator’ are the following:

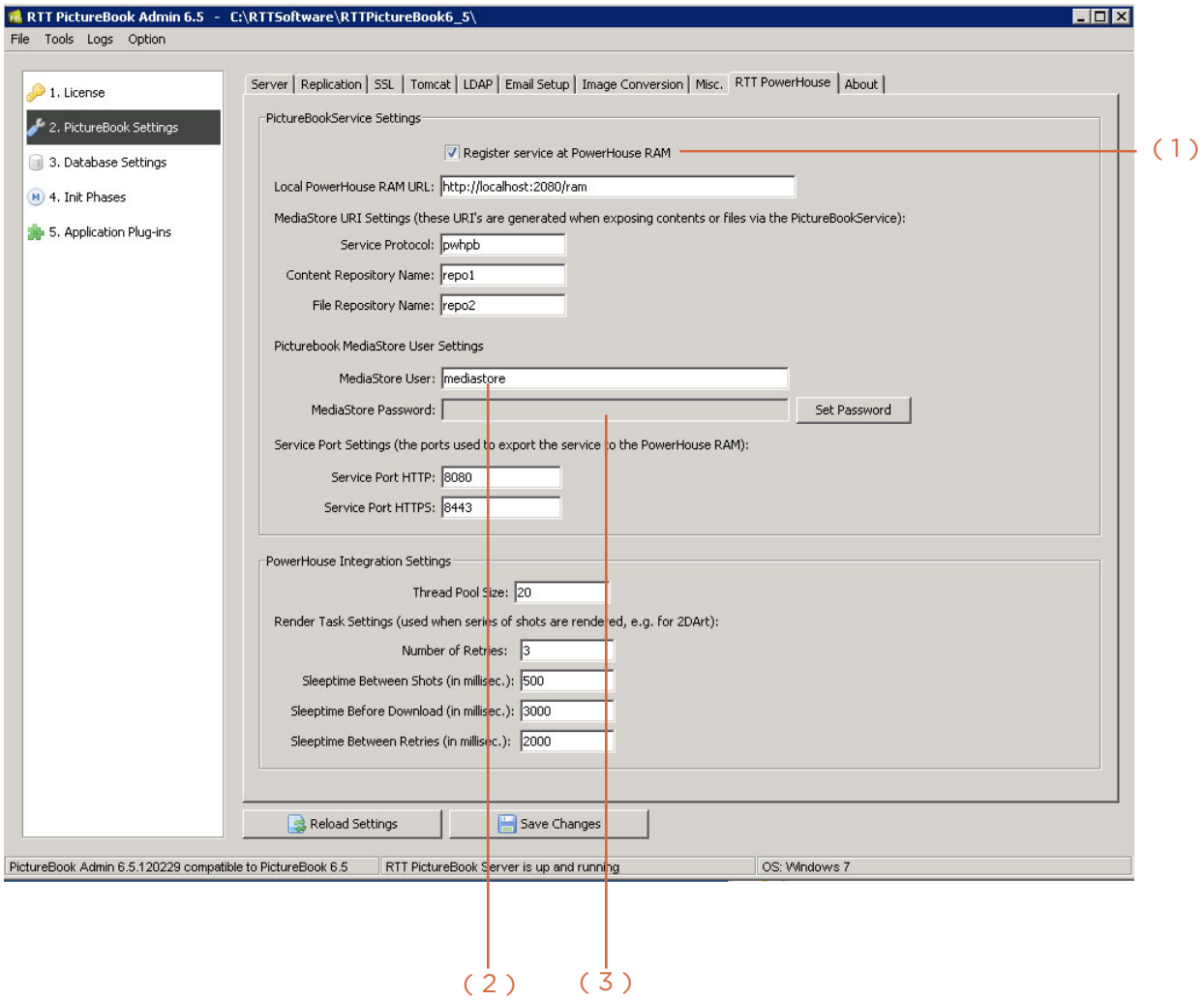
Change the user in PowerHouse config file:

```
"picturebook":
{
    "user": "administrator",
.....
```

Then in the Picturebook v6.5 Admin console, use ‘administrator’ instead of ‘mediastore’. The password generation procedure does not change, and is not been affected from the username change.

Below you can see where the user can be found for the mediastore user parameter.

For PB Composer to work, it needs to be registered at the PowerHouse Ram. To do this, tick the checkbox as shown on the picture below.



(1) Check the flag register service at PowerHouse Ram.

(2) If you want to use another user please change this file accordingly with the PowerHouse configuration file.

(3) Set the password in picturebook using a 'plain text' password.

Modify the PowerHouse streamer url configuration

Once you have modified the powerhouse configuration, you need to save it and restart the services. However, the configuration is still not complete. In order to correctly stream the rendered content to the PB Composer frontend you need to modify the inbound_address in the PowerHouse

configuration file; Identify the stream object in the configuration file and change the inbound_address in order to match the proxy settings.

```
.....
        "stream":
        {
            "port" : 4204,
            "backlog" : 128,
            "timeout" : 60,
            "inbound_address" : "http://<PB-Server-FQDN>:8888"
        },
.....
```

The Url you need to enter in the case of PB Composer is the Fully Qualified Domain Name of your Picturebook server followed by :8888 the streamer port.

The StreamerIpAddress should be changed in order to match the Application server ip, the Hostname can be used, in this case the user has to take care that the machines along the cluster are able to resolve the name correctly. (Use homogeneous configuration parameter i.e. Hostname or ipaddress in every configuration file)

Load the Render Backend plugin in DeltaGen

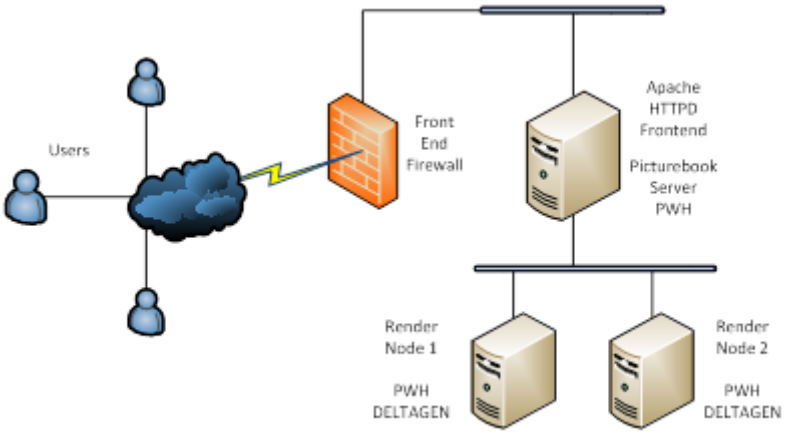
Please refer to this manual at the section → *Render Backend How to load the DeltaGen Plugin*, page 16.

Picturebook Composer and general topic

After the above steps the user should be able to use the PB Composer. However there is no standard use case for the PB Composer setup environment, each IT environment has its own infrastructure and safety measure. What we can list here is the most generic case, that has to be adapted each time by an experienced System Administrator in order to match the required security requirements the Company impose.

Suggested configuration for a DMZ

Below is depicted the most generic configuration about a DMZ setup. We can see the two network levels; the first level is related to the connection to the external firewall the second level is related to the Render Backend.



The above configuration is the suggested configuration in order to overcome the most common security problem and to avoid trouble related to the Picturebook Flash frontend Sandboxing.

The solution to the above described problem is to install and configure an Apache HTTPD web server as frontend for Picturebook Server.

Below you will find the following steps to install the above depicted configuration.

Apache HTTPS frontend

The user can setup the Apache Fronted for standard HTTPS. HTTP, is strongly discouraged in the open internet environment due to the plain text communication for password and login. Therefore we will explain how to install the Apache server and configure it for the HTTPS. Adding an Apache HTTPD server as frontend will also increase the HTTPS performances.

Apache and SSL Configuration

In order to setup the described environment, the user has to follow these steps and use this Software:

1. Install Apache server
2. Install Openssl package
3. Install mod_jk-1.2.30-httpd-2.2.3.so

See the Appendix for download details.

Install the Apache web server on the Picturebook server, then install the VC+ redistributable, followed with the openssl package. The openssl package is used only to generate the certificate; no other particular integration with Apache is needed because Apache already has the ssl module included into the distribution.

The next step is to generate the certificate. In a windows environment you have to follow these steps:

```
cd C:\OpenSSL-Win32\bin
openssl genrsa 1024 > server.key
openssl req -new -x509 -nodes -sha1 -days 365 -key server.key >
server.crt
openssl x509 -noout -fingerprint -text < server.crt > server.info
type server.crt server.key > server.pem
```

Use as CN the Picturebook server machine name; otherwise the certificate will not be correctly installed on the browser side.

Once the certificate is generated the user has to copy the following files into the Apache configuration directory. Files to be copied:

server.crt

server.key

server.pem

Apache configuration directory:

```
C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf
```

When Apache is to be installed onto a 64bit machine the software will be located into "Program Files (x86)" directory, the Apache does not correctly understand the path, so the user has to create a link in the root "c:\Apache2.2" and modify accordingly the configuration files.

Download mod_jk-1.2.30-httpd-2.2.3.so and copy the mod_jk-1.2.30-httpd-2.2.3.so into the Apache2.2/modules directory .

The next step will be to modify the Apache configuration file, there we will include the proxy directives and the httpd-ssl configuration file. The Apache config file is httpd.conf located into

```
C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf
```

This has to be modified, adding at the end the following sections:

To proxy the streamer we use the http proxy module:

```
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so
<IfModule proxy_http_module>
  ProxyPass /streamer/ https://<StreamerIpAddress>:8888/
  ProxyPassReverse /streamer/ https://<StreamerIpAddress>:8888/
</IfModule>
```

The user has to change the <StreamerIpAddress> accordingly with the ip address of the Picturebook server; the user can also use the Hostname. In any case remember that the DNS must be setup correctly on all cluster's machines.

To proxy the ajp requests we use the mod_jk module:

```
LoadModule jk_module modules/mod_jk-1.2.30-httpd-2.2.3.so
JkWorkersFile conf/worker.properties
JkLogLevel error
JkMountCopy On
JkMount     /picturebook* worker1
```

Add the following file in the Apache2.2/conf for the workers:

```
# Define 1 real worker using ajp13
worker.list=worker1
```

```
# Set properties for worker1 (ajp13)
worker.worker1.type=ajp13
worker.worker1.host=localhost
worker.worker1.port=8009
```

Comment out the following entry

```
# Secure (SSL/TLS) connections
Include conf/extra/httpd-ssl.conf
```

And load the ssl_module commenting out the following entry in the configuration file:

```
LoadModule ssl_module modules/mod_ssl.so
```

The user has to modify the http configuration file in order to match the Apache2.2 path; identify the Inter-Process section and change accordingly with your Apache directory link.

```
#   Inter-Process Session Cache:
#   Configure the SSL Session Cache: First the mechanism
#   to use and second the expiring timeout (in seconds).
SSLSessionCache         "dbm:C:/Apache2.2/logs/ssl_scache"
SSLSessionCache        "shmcb:C:/Apache2.2/logs/ssl_scache(512000)"
SSLSessionCacheTimeout  300
```

Then change the virtual host section in httpd-ssl.conf and add the JkMountCopy On and

```
…
JkMountCopy On
…
```

Modification needed on the PowerHouse configuration

The user after the above settings also has to modify the powerhouse configuration file. The modification consists in the inbound_address. This should match with the external FQDN address for the Picturebook.

The inbound_address has to match the external exposed FQDN and the streamer Apache proxy address. The streamer in this case is forwarded toward a https proxy, therefore the inbound_address has to point the https url exposed from the Apache httpd server.

```
.....
        "stream":
        {
            "port" : 4204,
            "backlog" : 128,
```

```
            "timeout" : 60,
            "inbound_address" : "https://<PB-Extern-FQDN>/streamer"
        },
.....
```

The above configuration has to be applied to all nodes on the cluster.

Troubleshooting

Network Tweaks

In order to avoid a huge amount of time waiting for a connection and to keep the TCP/IP stack from taking all resources on the computer, there are different parameters that control how many connections it can handle. Shown below is what is reported the registry entries the user shall apply. Cut and paste the paragraph below in a file called TcpTweaks.reg and double click on it.

```
Windows Registry Editor Version 5.00


[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters]
"TcpTimedWaitDelay"=dword:0000001e
"MaxFreeTcbs"=dword:00000fa0
"MaxHashTableSize"=dword:00000fa0
"MaxUserPort"=dword:00002710
```

Multicast Troubleshooting & Configuration

The Multicast communication channel used on the pwh cluster are listed in the configuration file under the following json object (the PWH configuration file is reachable under the following path %POWERHOUSE_HOME%etc/powerhouse.conf)

Locate the rpc section and modify the parameters as per your needs. Note that the exposed default parameters on the configuration file are only 3. Host, backend and reservation. The other parameters are hidden. Shown below you can find the complete configuration discovering the hidden parameters. This example configures the 5 multicast groups to the 239.0.0

net addresses. You can choose the appropriate groups allowed from your IT infrastructure.

The multicast groups listed here below are an example. You can find the default value at the following paragraph → *Port list used in PowerHouse Context*, page 45.

```
"rpc": {
    "log_level": "NOTICE",
    "max_age": 5,
    "max_retries": 5,
    "max_load": 0.55,
    "max_cpuload": 101,
    "host": {
        "channel": "239.0.0.10"
    },
    "backend": {
        "channel": "239.0.0.11"
    },
    "reservation": {
        "channel": "239.0.0.12"
    },
    "election": {
        "channel": "239.0.0.13"
    },
    "block": {
        "channel": "239.0.0.14"
    },
    "resolver": {
        "port": 4301,
        "timeout": 2
    },
    "heartbeat_delay": 3
}
```

The multicast communication along the PowerHouse cluster is used to transfer short messages between the nodes, No heavy load traffic and no data streaming is performed between the nodes.

Shown below depicts how the services are communicating with each other and it describes the multicast group function.

Multicast communication between RAMs is used to transport datagrams related to:

_ Host Information -> 239.0.0.11

_ Block Information -> 239.0.0.14

_ Master Protocol Information -> 239.0.0.13

Multicast communication from Service Point of view is used to publish information related to:

_ Backends (service name, i.e. Mediastore, Render, etc...) -> 239.0.0.13

_ Payloads for backends (payload type, i.e. Picturebook repo=repo1 repo=repo2) -> 239.0.0.11

_ Block goes directly through the localhost (i.e. RAM locally block the service)

The multicast listener uses a predetermined port to bind the listener to the group, the port is specified fromm the user in the configuration file under the rpc json section.

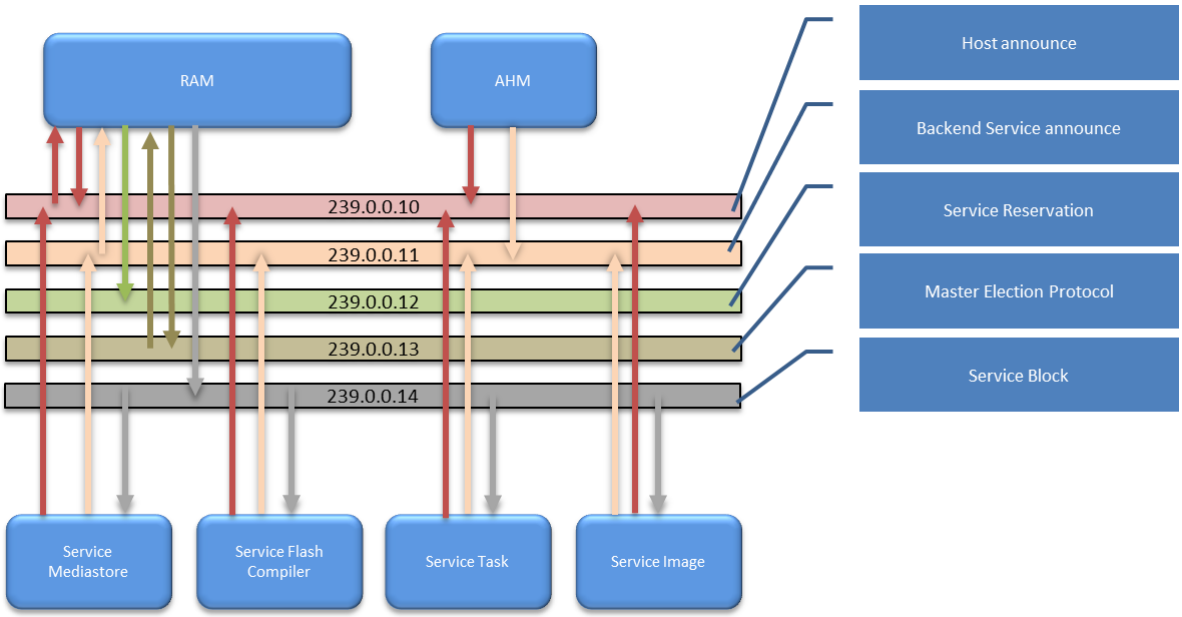
The communication between the SeCl (service client) and the services uses the following protocols:

_ Httprpc

_ Http

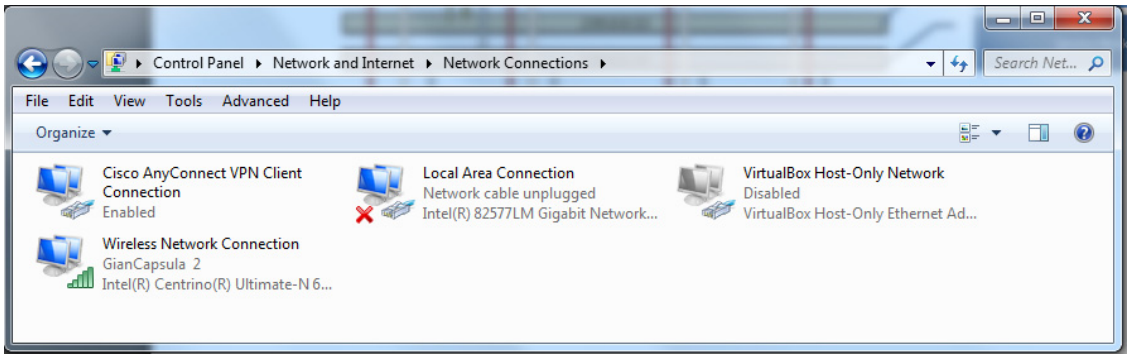
_ Https

The multicast communication in PowerHouse cluster is IGMP Snooping sensitive, this means if the IGMP Snooping or filtering is activated the PowerHouse cluster might not work correctly due to the optimization of Snooping. IGMP snooping is the process of listening to Internet Group Management Protocol (IGMP) network traffic. IGMP snooping, as implied by the name, is a feature that allows a network switch to listen in on the IGMP conversation between hosts and routers. By listening to these conversations the switch maintains a map of which links need which IP multicast streams. Multicasts may be filtered from the links which do not need them. In a PowerHouse cluster case, we need an unswitched multicast communication due the PowerHouse Master Election protocol that needs to check simultaneously the availability of the cluster node.



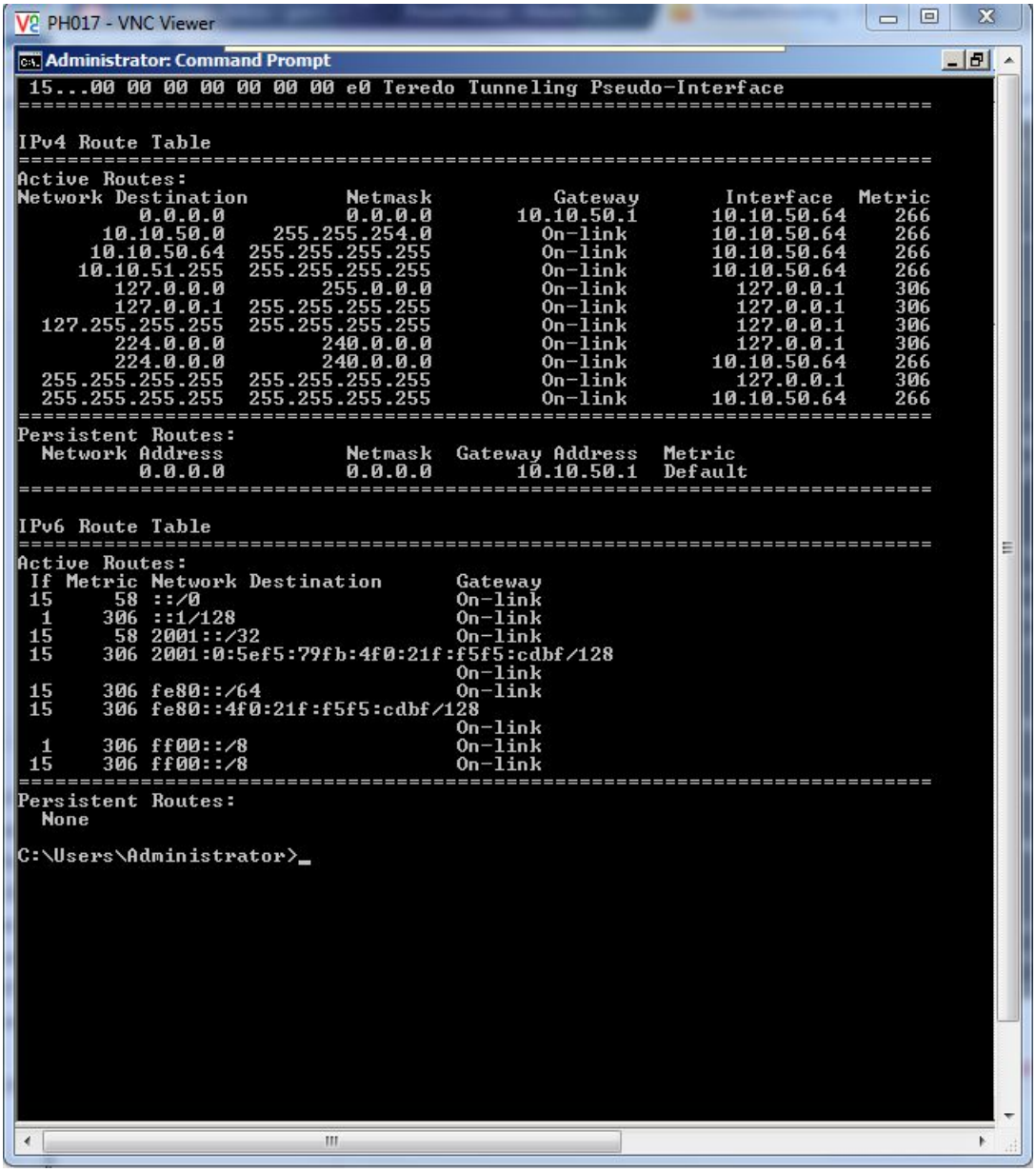
Network helper multiple NICS

If your system has more than one NIC, you may also run into some issues regarding multicast routing.



First of all you should discover which one of your interfaces is used to connect to the remote RAM instance. Then check your routing table by using the windows command shell.

Z:\>route print



At the end of the list you can see the multicast routes (i.e. target 224.0.0.0) and at the end of each line you can see the interface metric for this routing entry. When a packet is sent, the routing entry with the lowest metric is used first. In the example above this means that all multicast packages are sent via the interface bound to 10.10.55.66 which is the Gigabit Ethernet Interface. If the wrong interface has the highest priority (respectively the lowest metric) you have two options to change this:

1. Change the interface metric of the appropriate NIC.
2. Open the settings dialog for the NIC used to connect to the RAM, select the TCP/IP protocol properties and click the button "Advanced..."

3. Uncheck the box "Automatic metric" and enter an interface metric which is lower than the metric of the other interface.
4. Create special multicast routes for RAM.

   _ RAM uses 5 different multicast addresses to communicate

   _ 225.10.10.10 – to broadcast host information

   _ 225.10.10.11 – to broadcast backend information

   _ 225.10.10.12 – to broadcast reservations

   _ 225.10.10.13 – to broadcast master election protocol

   _ 225.10.10.14 – to broadcast service block

   Open a command shell and execute the following commands to create persistent routes to send the multicast packages via the correct interface - replace <INTERFACE_IP> by the IP address of the NIC

   _ Z:\>route -p add 225.10.10.10 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 225.10.10.11 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 225.10.10.12 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 225.10.10.13 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 225.10.10.14 mask 255.255.255.255 <INTERFACE_IP>

   In this case you avoid spreading the multicast traffic to the other network interface.

   The above configuration reflects the default configuration, in case you have changed the standard port you need to configure the right multicast group in your routing table, this means that instead of “route –p add 225.10.10.10 ... “ you need to use your custom address.

   Reflecting the groups used in the chapter → *Multicast Troubleshooting & Configuration*, page 31 I.E:

   _ Z:\>route -p add 239.0.0.10 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 239.0.0.11 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 239.0.0.12 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 239.0.0.13 mask 255.255.255.255 <INTERFACE_IP>

   _ Z:\>route -p add 239.0.0.14 mask 255.255.255.255 <INTERFACE_IP>

Low Disk Space impact on Mediastore

Mediastore service is a memory greedy process; this is used as a temporary store for the assets, for example when the user accesses an asset through the RTT Compose (2D Art, or AH) the asset will be temporary loaded to the mediastore and served to the RenderBackend. The memory usage depends on the assets size.

In the case of assets that are less than 400 Mb the HW memory can be sized around min 4GB and 8GB, in the case of assets that are bigger that 900Mb, the memory should be equal or greater than 16GB.

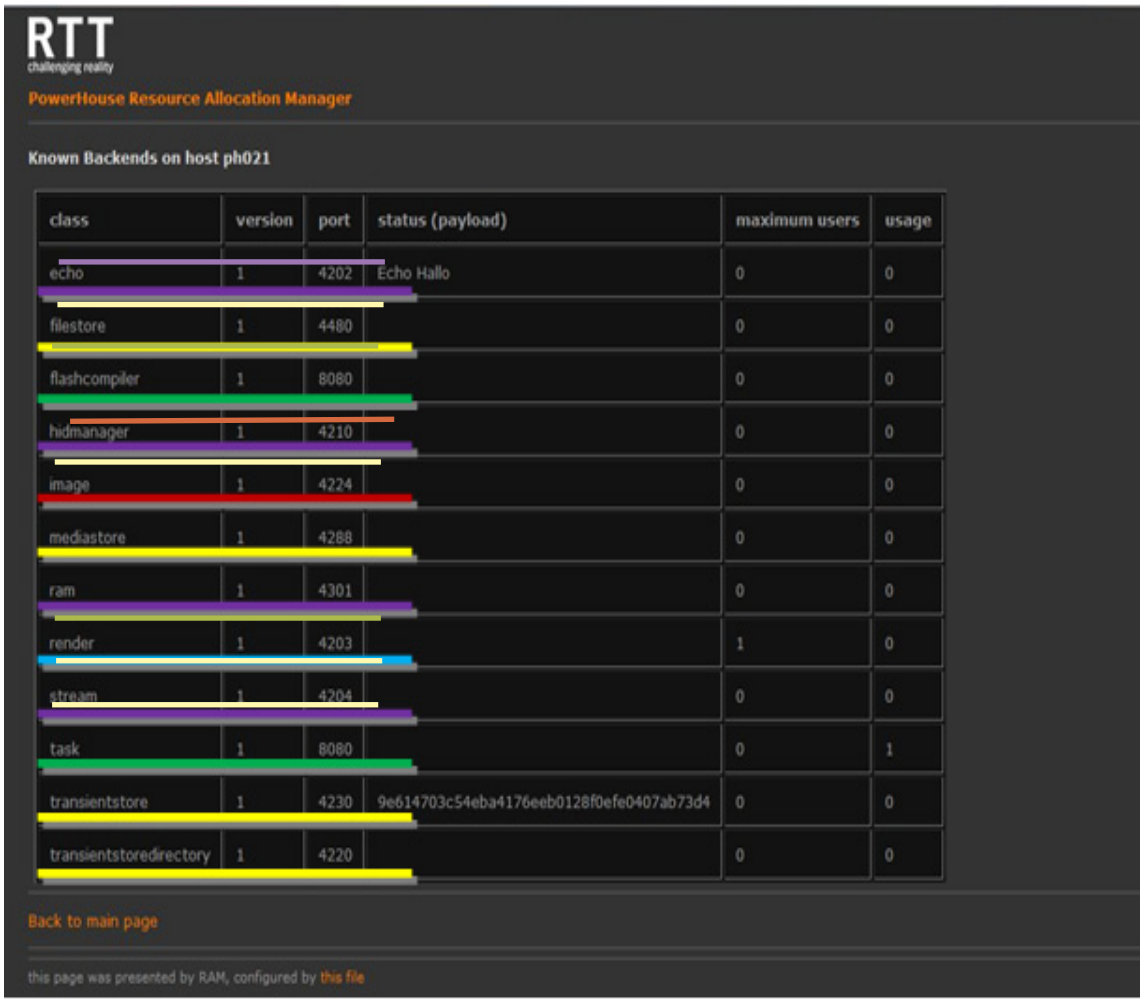
If the user does not have enough space on the drive C: the tidloader temppath has to be moved to another drive i.e. D: if not we can experience a virtual memory problem in DeltaGen. (Virtual Memory problem)

If possible, keep the Picturebook data repository in a physical disk different form the C:\\. and possibly dedicated only to the storage of the picturebook data. This will improve the data throughput, avoiding disk resource sharing.

General issues

Shown below is a checklist table listed with the basic information, and the references between the checklist and the services for possible troubleshooting.

PowerHouse Resource Allocation Manager Page, shown in the picture below underlines the services, and in the next table are referenced per service category, and therefore relative troubleshooting is available.


RTT
challenging reality
PowerHouse Resource Allocation Manager
Known Backends on host ph021
class
version
port
status (payload)
maximum users
usage
echo 1 4202 Echo Hallo 0 0
filestore 1 4480 0 0
flashcompiler 1 8080 0 0
hidmanager 1 4210 0 0
image 1 4224 0 0
mediastore 1 4288 0 0
ram 1 4301 0 0
render 1 4203 1 0
stream 1 4204 0 0
task 1 8080 0 1
transientstore 1 4230 9e614703c54eba4176eeb0128f0efe0407ab73d4 0 0
transientstoredirectory 1 4220 0 0
Back to main page
this page was presented by RAM, configured by this file

Per Service troubleshooting

Color Ref.	Service Name	Meaning	Check
	ram, echo, stream, hidmanager	These services are related to “PWH RAM” if those services are not present on the host page means that the RAM is not started correctly.	Check if there is network connectivity Check (in case of multiple network cards available on the machine) the routing table for the multicast addresses Check if the multicast group 239.0.0.X is available on the network (switching layer) Check if the firewall on the node is correctly configured (deactivated) Check if the powerhouse.conf present under the following path %POWERHOUSE_HOME/etc% is available and is a valid json structure.
	flashcompiler, task	These services are deployed on the Tomcat server and this will be published on the host page only if the tomcat is started.	Check if the tomcat address is used from another services (port 8080 should be free) Check if the database is reachable from the network.
	image	This service is “PWH Image” and can only be started if the “PWH RAM” is started	Check if the “PWH RAM” is started and if any other services are using the port 4224, check the firewall rules if are blocking the port 4224 Check if the powerhouse.conf present under the following path %POWERHOUSE_HOME/etc% is available and is a valid json structure.
	mediastore, filestore, transienstore, transientdirectory	These services are related to “PWH Mediastore” if those services are not present on the host page means that the mediastore services is not started, and can only be started if the “PWH RAM” is started	Check if the “PWH RAM” is started and if any other service is using the port 4220,4230,4288,4480 Check the firewall rules if are blocking the above mentioned port Check if the powerhouse.conf present under the following path %POWERHOUSE_HOME/etc% is available and is a valid json structure. Check that Zabbix server is started and is reachable.

Color Ref.	Service Name	Meaning	Check
	render	This service is related to “PWH Render”, this service can be started independently form “PWH RAM”. The program related to this service is Deltagen	Check if the licenses for Deltagen are available. Check if the port 4203 is not blocked by the firewall.

Installation Checklist

Description	Check	Test Result
dns name the machine shall have the dns correctly set	ping the machine from each other with fqdn name and ip	the machines have to reply correctly
install the redistributable package on the render node and on the PB server	check in the Control Panel/Add Remove Program if the redistributable are installed - redistributable needed for PWH are :	-
the pwh installation has to be done on all the cluster node - PB - Render Node	start the installer for the proper architecture 64 bit	the correct PWH release is 2.5 release
backup the PWH configuration after the initial setup	-	-
configure the PB multicast address in order to avoid the overlap with other existing cluster, this has to be done on all render nodes	check if the render nodes are active. check pointing the render node ram http://render_node_ip_address:2080/ram/	the user will see the correct Ram web page - black page with RTT logo on the top left corner
restart the PHW services on all the machines PB server and render nodes	check the services are properly running looking at the powerhouse ram http://render_node_ip_address:2080/ram/	number of backend in the ram pwhmaster will be 9 and in the render node shall be 7
generate the mediastore password and configure the mediastore entry in the configuration: http://render_ip_address:4282/mediastore/	check that the password generated is correctly entered and there are no trailing spaces	the password should be present on all the machines running a mediastore instance
configure the streamer inbound_address in the PWH configuration, it shall point to the PB machine name	check that the inbound_address is correctly written, it should be as: "http://picturebook_machine_name:8888"	the inbound_address should be reachable from the web browser
install along the render node the DG release 9.5.1 load the render backend plugin in DG	check that the renderbackend plugin is correctly loaded	number of backend in the ram pwhmaster will 9 and in the render node shall be 8

Description	Check	Test Result
restart the Cluster	check the services are properly running looking at the service console and look at the ram http://render_node_ip_address:2080/ram/	number of backend in the ram pwhmaster shall be 9 and in the render node shall be 8
install picturebook following the installer, during the installation checkbox on the postgreSQL	after the installation check that postgreSQL is installed as a service and the user account for PostreSQL has the correct credential to start the service, in case the PostgreSQL service is down Picturebook WILL NOT START	ping the postgreSQL port using the PB admin program
install the license	check the given hostid and the machine number are that one installed on the machine. When the user installs the license any active check on the license are performed, the check is done when the picturebook is started	check against the mac address and the host name, the host name shall contain only allowed chars. The _ is not and allowed char.
Configure PB as service	check that the service is correctly installed and check the service sequence.	the correct startup sequence is PWH before PB sc \\localhost stop PWH Mediastore sc \\localhost stop PWH Streamer sc \\localhost stop PWH Ram sc \\localhost stop Tomcat6 sc \\localhost start PWH Ram sc \\localhost start PWH Mediastore sc \\localhost start PWH Streamer sc \\localhost start Tomcat6
Configure PB mediastore user	create an account with mediastore access and add the plain text password to this user, then apply the PWH checkbox, mediastore user shall be a PWH user	count the password char and double check that the password is correctly entered. You can login with the mediastore user in PB

Troubleshooting Checklist

Problem Issue	Possible Cause	Fix
PowerHouse installation completed successfully but services are not starting	The configuration sintax is wrong, missing " or , in the Json object	validate the configuration sintax, and in case restore the backup configuration double checking the sintax correctness

Problem Issue	Possible Cause	Fix
"	The redistributable packages are not correctly installed	Install the redistributable packages
"	The network is not plugged	Plug the network interface in Hub or switch
"	The service startup sequence is not respected	Sequence the services as follow: sc \\localhost stop PWH Mediastore sc \\localhost stop PWH Streamer sc \\localhost stop PWH Ram sc \\localhost stop Tomcat6 sc \\localhost start PWH Ram sc \\localhost start PWH Mediastore sc \\localhost start PWH Streamer sc \\localhost start Tomcat6
Powerhouse does not see the picturebook service on the RAM	The service startup sequence is not respected	Sequence the services as follow: sc \\localhost stop PWH Mediastore sc \\localhost stop PWH Streamer sc \\localhost stop PWH Ram sc \\localhost stop Tomcat6 sc \\localhost start PWH Ram sc \\localhost start PWH Mediastore sc \\localhost start PWH Streamer sc \\localhost start Tomcat6
"	A firewall block the port related to the PWH and PB services	Check the windows firewall and check the logs. Deactivate the firewall and allow the port related to PWH and PB
Picturebook url is not reachable. Server connection refused	The postgreSQL is not started	Check the postgreSQL log, user has the admin rights to start the service, in case the machine is connected to the domain check the local user policies are not affected from the domain policies
	The PB Tomcat does not start	Check the PB log, check the tomcat port (8080) in case the port is already in use from another local service
Failed to load asset 00000000_0000 appear after few a seconds	The mediastore credential is wrong	Check the PB logs against wrong user logging, check the correctness PWH configuration password against the PWH mediastore password generator.
	The mediastore service is not started	Check the PWH service along the cluster at least one mediastore instance shall run along the cluster - restart the services
	The mediastore service is started	Check the machine load and reduce the thread numbers. Increase the max_cpu load to 100 on the PWH conf - restart the services

Problem Issue	Possible Cause	Fix
	The mediastore service is started - machine overloaded	Check the machine CPUs usage, and Memory usage, mediastore is a memory and cpu greedy service, reduce the number of threads and if multiple machine are available i.e. many render nodes deactivate the mediastore on the PB server and use other mediastore instances.
Failed to load asset 00000000_0000 appear after a few minutes	The session (PWH) expired and the asset is not anymore loaded in DG	Check the session timeout, if the asset take more that the session timeout, this will lead to a cut off behavior, DG will close the scene and the content is not anymore available, change the session timeout in PWH config to overcome the loading time of the asset
Secl already in use failed to init pwh content	The render nodes are busy	Check if the render node is busy using the PWH RAM web interface. In case the user browser is crashed when loading the asset the secl will be not freed until the user session expires . 30 minute tomcat session timeout
Error #2032 - or Security Error #2028	There is a mismatch between the host ip address and dns name - DMZ - DNS forwarding	Check the correctness of the DNS naming and the ip addresses, in case of dns forwarding install the Apache proxy - the instruction to install apache are provided in a separated document - RTT - RTTPowerHouseShortInstallNote.doc
Picturebook is not saving the rendered still images on the file store, the rendered jobs are lost	Problem is that the certificate is wrong or the pdata file system is not correctly mounted	Check the pdata file system is correctly mounted and check the certificate - this has to be generated accordingly with the fully qualified host name. i.e. hostname.domain.com - if it's a self signed cert shall also be signed from a certification authority (i.e. VeriSign)
PowerHouse installation completed successfully but services are not starting	The configuration sintax is wrong, missing " or , in the Json object	validate the configuration sintax, and in case restore the backup configuration double checking the sintax correctness
"	The redistributable packages are not correctly installed	Install the redistributable packages
"	The network is not plugged	Plug the network interface in Hub or switch

Problem Issue	Possible Cause	Fix
"	The service startup sequence is not respected	Sequence the services as follow: sc \\localhost stop PWH Mediastore sc \\localhost stop PWH Streamer sc \\localhost stop PWH Ram sc \\localhost stop Tomcat6 sc \\localhost start PWH Ram sc \\localhost start PWH Mediastore sc \\localhost start PWH Streamer sc \\localhost start Tomcat6
Powerhouse does not see the picturebook service on the RAM	The service startup sequence is not respected	Sequence the services as follow: sc \\localhost stop PWH Mediastore sc \\localhost stop PWH Streamer sc \\localhost stop PWH Ram sc \\localhost stop Tomcat6 sc \\localhost start PWH Ram sc \\localhost start PWH Mediastore sc \\localhost start PWH Streamer sc \\localhost start Tomcat6
"	A firewall block the port related to the PWH and PB services	Check the windows firewall and check the logs deactivate the firewall and allow the port related to PWH and PB
Picturebook url is not reachable. Server connection refused	The postgreSQL is not started	Check the postgreSQL log, user has the admin rights to start the service, in case the machine is connected to the domain check the local user policies are not affected from the domain policies
	The PB Tomcat does not start	Check the PB log, check the tomcat port (8080) in case the port is already in use from other local service
Failed to load asset 00000000_0000 appear after a few seconds	The mediastore credential is wrong	Check the PB logs against wrong user logging, check the correctness PWH configuration password against the PWH mediastore password generator.
	The mediastore service is not started	Check the PWH service along the cluster at least one mediastore instance shall run along the cluster - restart the services
	The mediastore service is started	Check the machine load and reduce the thread numbers. Increase the max_cpu load to 100 on the PWH conf - restart the services
	The mediastore service is started - machine overloaded	Check the machine CPUs usage, and Memory usage, mediastore is a memory and cpu greedy service, reduce the number of threads and if multiple machine are available i.e. many render nodes deactivate the mediastore on the PB server and use other mediastore instances.

Problem Issue	Possible Cause	Fix
Failed to load asset 00000000_0000 appear after a few minutes	The session (PWH) expired and the asset is not anymore loaded in DG	Check the session timeout, if the asset take more that the session timeout, this will lead to a cut off behavior, DG will close the scene and the content is not anymore available, change the session timeout in PWH config to overcome the loading time of the asset
Secl already in use failed to init pwh content	The render nodes are busy	Check if the render node are busy using the PWH RAM web interface. In case the user browser is crashed when loading the asset the secl will be not freed until the user session expires . 30 minute tomcat session timeout
Error #2032 - or Security Error #2028	There is a mismatch between the host ip address and dns name - DMZ - DNS forwarding	Check the correctness of the DNS naming and the ip addresses, in case of dns forwarding install the Apache proxy - the instruction to install apache are provided in a separated document - RTT - RTTPowerHouseShortInstallNote.doc
Picturebook is not saving the rendered still images on the file store, the rendered jobs are lost	Problem is that the certificate is wrong or the pdata file system is not correctly mounted	Check the pdata file system is correctly mounted and check the certificate - this has to be generated accordingly with the fully qualified host name. i.e. hostname.domain.com - if it's a self signed cert shall also be signed from a certification authority (i.e. VeriSign)

Port list used in PowerHouse Context

Port used from PowerHouse services

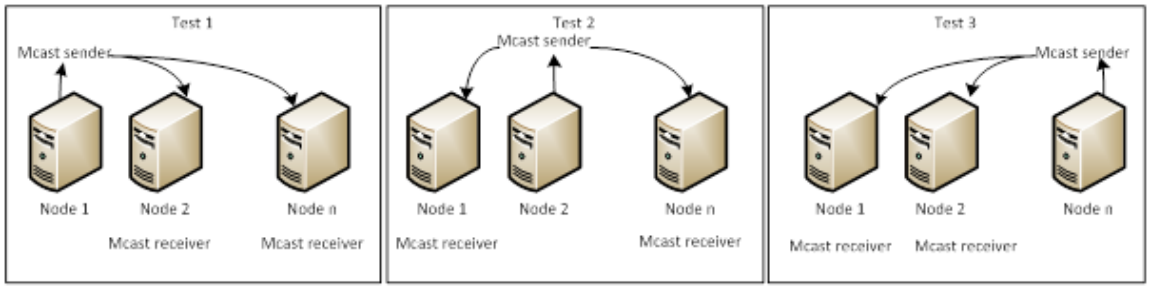
Service	Description	Port Number	Protocol
Ram	Remote announce	4301	Udp
Ram	Ram web page	2080	Tcp
Mediastore	Httprpc	4230	Tcp
Mediastore	Httprpc	4220	Tcp
Mediastore	Mediastore web page	4282	Tcp

Service	Description	Port Number	Protocol
Mediastore	Httprpc	4480	Tcp
Image	Httprpc	4224	Tcp
Hid	Httprpc	4211	Tcp
Hid	Httprpc	3080	Tcp
Hid	Httprpc	4210	Tcp
Streamer	RTSP server port	554	Tcp/Udp
Streamer	Streamer Server	8888	Tcp
Streamer	Streamer web Server htdoc	2083	Tcp
Ahm	Httprpc	2084	Tcp
Hmi	Httprpc	4212	Tcp
Ram	Httprpc	4301	Tcp
Ram	Httprpc	4201	Tcp
Ram	Httprpc	4202	Tcp
Renderbackend	Httprpc	4203	Tcp
Ram	Httprpc	4204	Tcp
Zabbix Proxy	Zabbix proxy publisher	10051	Tcp/Udp
Task	Httprpc	8080	Tcp
FlashCompiler	Httprpc	8080	Tcp

Common Multicast groups used by PowerHouse services

Multicast Group	Description	Port Number	Protocol
225.10.10.10	Host announce	3333	Udp
225.10.10.11	Backend Service announce	3333	Udp
225.10.10.12	Service reservation	3333	Udp
225.10.10.13	Master election protocol	3333	Udp
225.10.10.14	Service block	3333	Udp

In order to check if the multicast group in your network is open, you can use a multicast test sender and receiver. This utility is provided by Microsoft at the following link: *http://technet.microsoft.com/en-us/library/cc787891(v=ws.10).aspx.* Alternatively, you can search in the Microsoft Library for “Ip Multicasting Tools”. You will usually need to test the multicast communication in both directions, as depicted below.



oduldummy