

Intellicus Cluster and Load Balancer

Installation and Configuration Manual

Intellicus Enterprise Reporting and BI Platform



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Acknowledgements

<http://www.intellicus.com/acknowledgements.htm>

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Introduction

For high performance deployment requirements, Intellicus supports cluster deployment and load balancing.

When reporting performance and availability requirements are more than what a single machine can handle, then you can choose to install more than one copy of Intellicus in the form of a cluster. You can distribute the report processing load and also ensure more availability, in case there is some hardware or software failure.

Report Server Cluster

Report Server Cluster is a mechanism, by which Intellicus servers are deployed and running on multiple machines. Each node in the cluster deploys the executable binaries on respective machines and runs using specific machines' RAM and processors.

A cluster of Intellicus Servers shares a common file system for all types of files and a common data base for repository. Availability of the shared file system has to be ensured by you using NFS or RAID5 mechanisms separately. Availability of common repository database also must be ensured by respective database replication mechanisms.

Load Balancer

Load balancer is a light weight component installed with a cluster to point to each node of the cluster. Load balancer evaluates each request from client applications and selects the most appropriate report server node for that request. For this purpose, Load balancer keeps collecting the current load status (heart beat) of each server in the cluster.

Report Clients

Report client components send each request to Load Balancer. Load balancer allocates appropriate server node for the request, and report client works with that server to get the request served from that node. Each report request, including post view actions like export is completed by a single server (sticky at report request level).

Balancing Algorithms

You can configure load balancer for specific algorithms to use for selecting the servers.

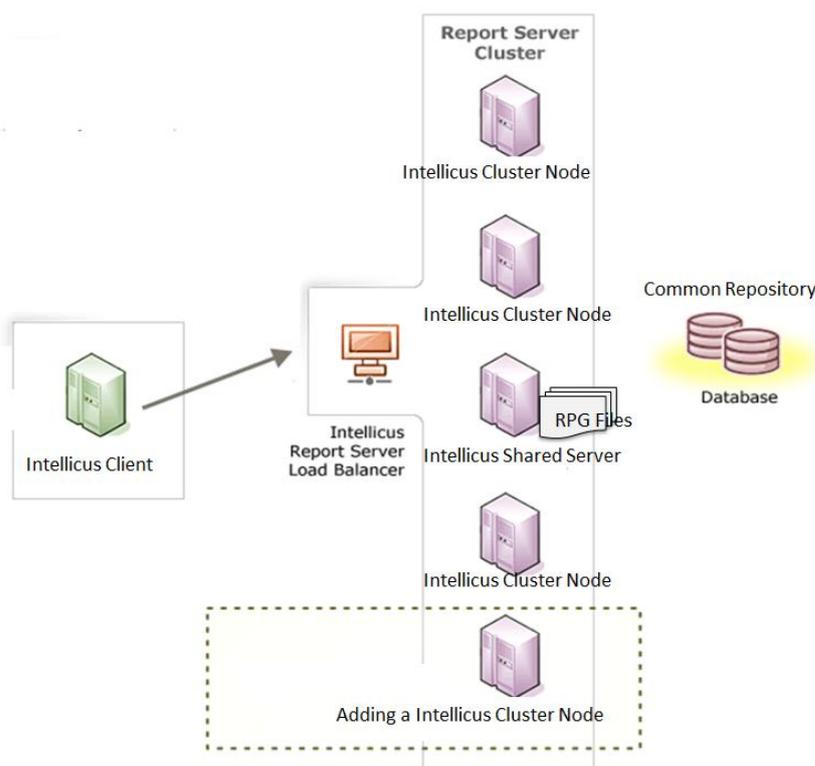
Installation and Configuration

There are 3 steps in installing and configuring an Intellicus Cluster and a Load Balancer.

- 1) Installing Intellicus Shared Setup
- 2) Installing Intellicus Cluster Node(s)
- 3) Installing Intellicus Load Balancer

Architecture

A Cluster with Shared Server and Nodes



Installing Intellicus Shared Setup and Sharing folder

Intellicus shared holds all types of files for the entire cluster. The types of files include configuration files, temp files and report output snapshots.

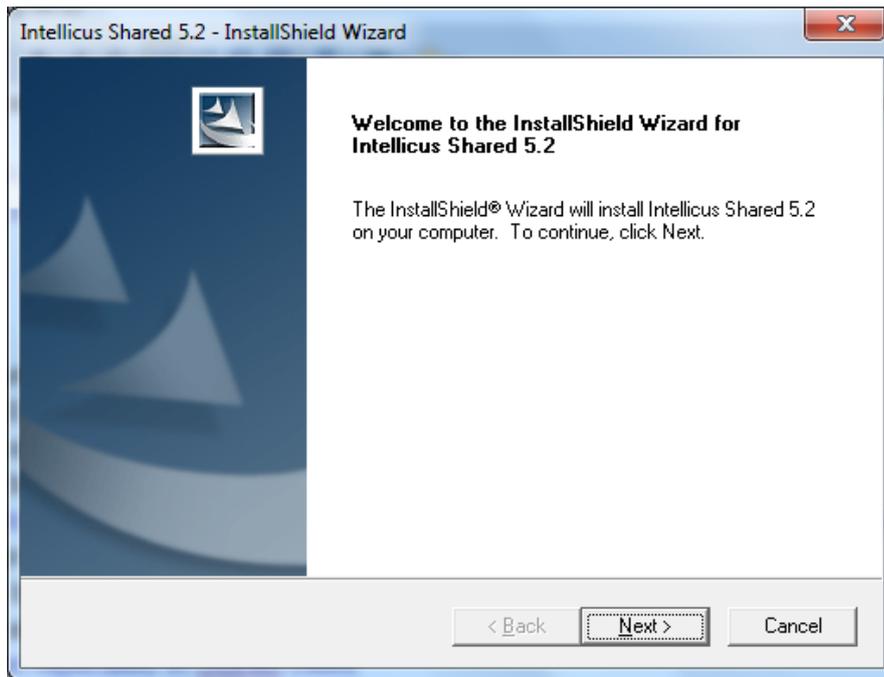
A high speed disk server acts has a good machine for installing Intellicus Shared. Some folders from this machine must be shared and accessible over network from each of the cluster node machines.

The setup zip is named as: IntellicusShared<OS><Version>.zip

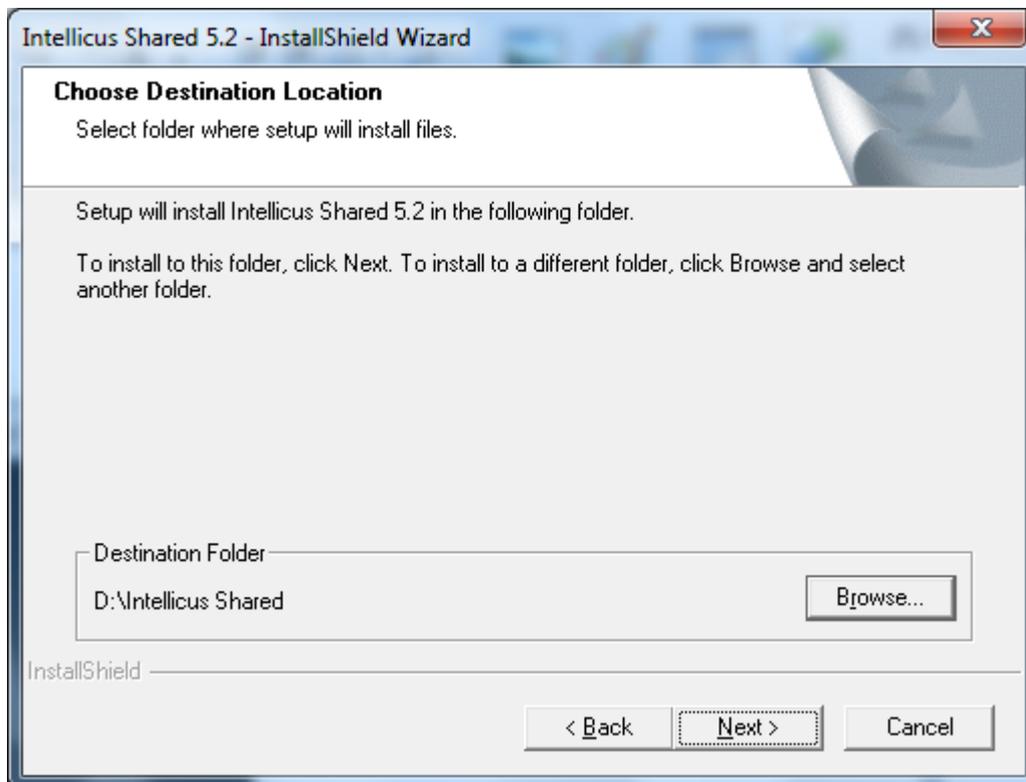
Install Intellicus Shared

Run the setup on the Shared machine.

Installation and Configuration



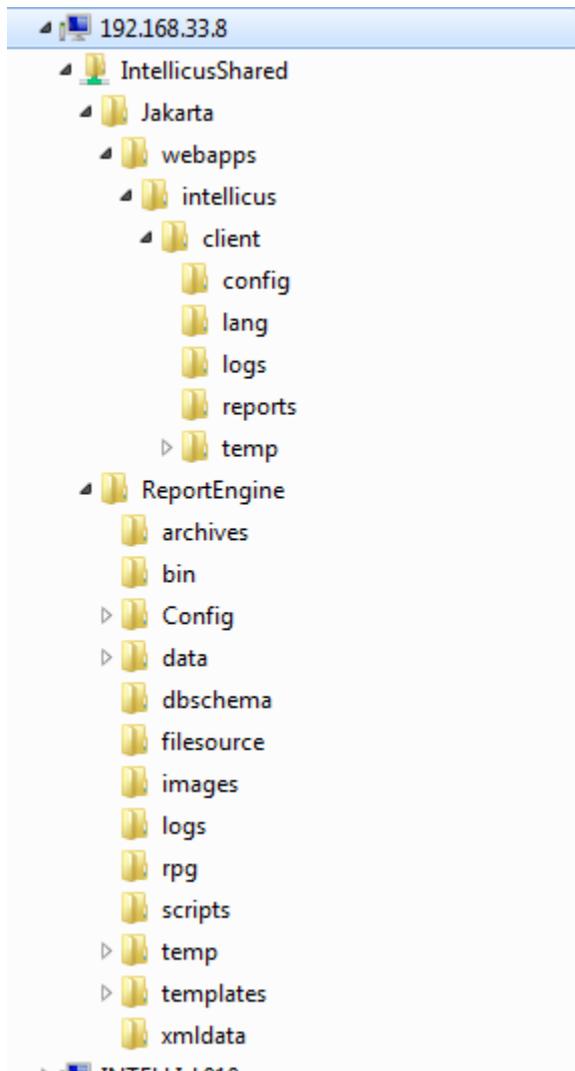
Select the shared folder as target to install.



Sharing the Folder

The target folder shall be shared on network and must be accessible by cluster nodes.

After installation, the target folders look like:



No binaries are installed on this machine.
Start Menu is not added with any items.

Share the folder so that it is accessible for Read and Write access to IEngine.exe process on cluster node machines. If the IEngine process on cluster is executed by a windows service, then service launching user or Administrator of that machine should be given access rights.

Installation and Configuration

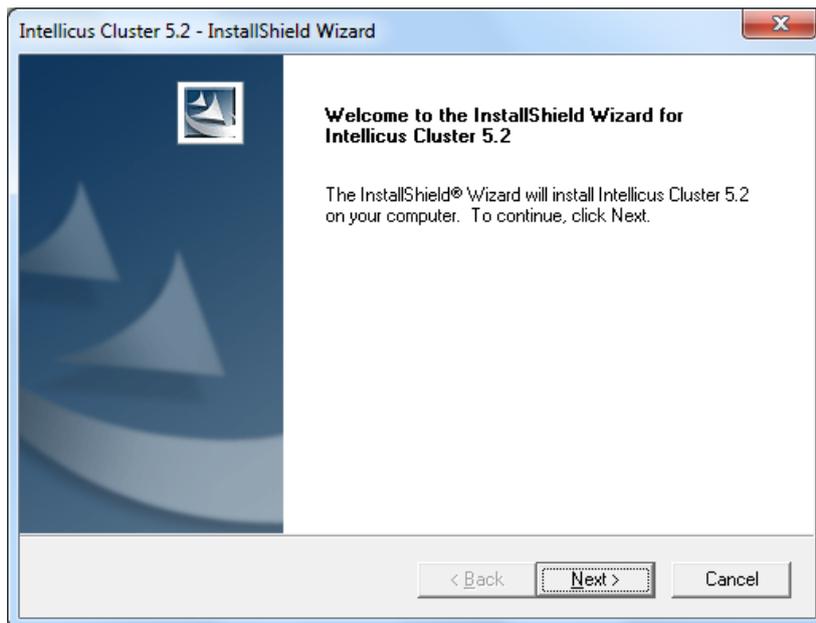
Installing Intellicus Cluster Node and Configuring

Intellicus cluster Node contains all binaries to run an Intellicus Server node, but shares all types of files from the Intellicus shared machine. The types of files include configuration files, temp files and report output snapshots.

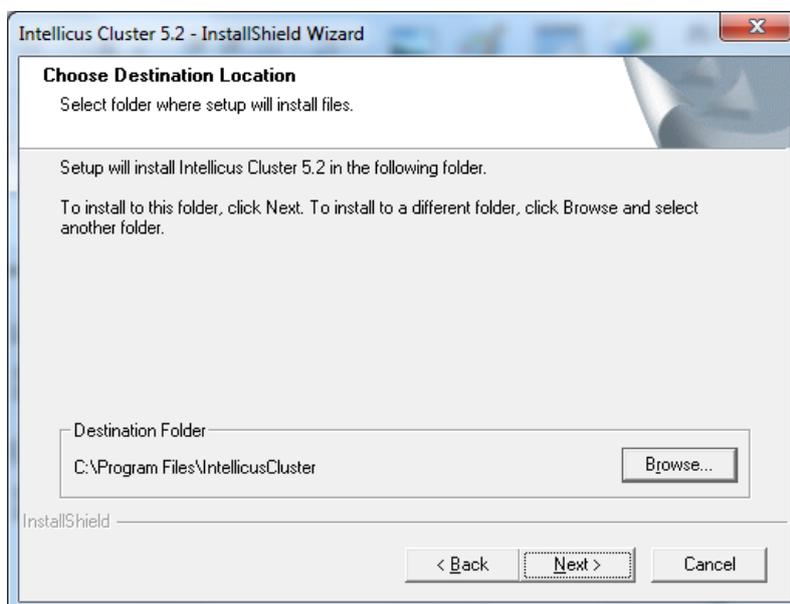
A server with CPU, RAM and good network connectivity with Intellicus Shared server is recommended for installing a node. If the Intellicus Shared Server has sufficient CPU and RAM, it can also host a cluster node.

The setup zip is named as: IntellicusCluster<OS><Version>.zip

Launch the cluster node installer setup on node machine:

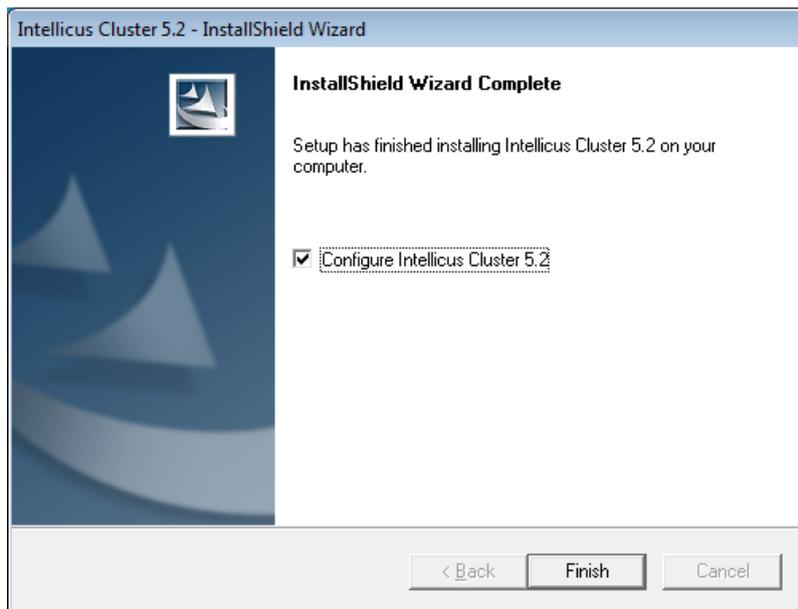


Select the target folder for installing the binaries:

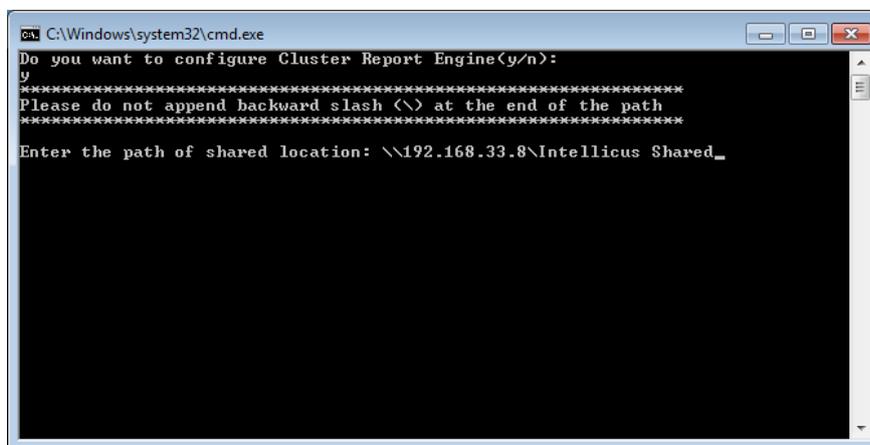


Installation and Configuration

Choose Yes to configure Intellicus Cluster on the Setup Finish Screen:



This will launch a batch file that prompts the network path of Intellicus Shared and configures the local launch files accordingly.



Type-in the network path of the Intellicus Shared folder as shared in the previous stage of Shared component installation. The batch file repeats the prompt for the web server shared path. Type-in the network path. Generally this path is same as Report Engine Shared path unless you manually moved web client configuration files on Intellicus shared machine.

The batch file has now updated the node's configuration files to point the node to the appropriate Intellicus Shared.

Installation and Configuration

```
C:\Windows\system32\cmd.exe
Do you want to configure Cluster Report Engine(y/n):
y
*****
Please do not append backward slash (\) at the end of the path
*****
Enter the path of shared location: \\192.168.33.8\Intellicus Shared
Configuring Intellicus Cluster Report Engine...
C:\PROGRAM~1\INTELL~2\ClusterReportEngine\bin/sed: -e expression #1, char 94: Un
terminated 's' command
C:\PROGRAM~1\INTELL~2\ClusterReportEngine\bin/sed: -e expression #1, char 88: Un
terminated 's' command
Intellicus Cluster Report Engine is successfully configured

Do you want to configure Cluster Web Server(y/n):
y
*****
Please do not append backward slash (\) at the end of the path
*****
Enter the path of shared location: \\192.168.33.8\Intellicus Shared
Configuring Intellicus Web Server...
Intellicus Web Server is successfully configured
Press any key to continue . . .
```

Configuring a Cluster Node

Configuring Connections

All nodes of a cluster need to share and use a common repository database. So, the repository connection for cluster nodes must be a network capable database such as Oracle, MSSQL, and MYSQL etc. Local and in memory databases such as H2 cannot be configured as repository connection for a cluster.

Before installing more nodes to this cluster, change the repository connection to point to an appropriate network enabled database.

The screenshot shows the 'Connections' configuration window. The 'Connections' list on the left includes 'DemoRepositoryDB' and 'Shared_Repository'. The 'Shared_Repository' connection is selected. The configuration for 'Shared_Repository' is as follows:

Connection Name	Shared_Repository		
Provider	MSSQL	com.microsoft.jdbc.sqlserver.SQLServerDriver	
Driver Version	2000	Authentication Mode	SQL Server
Server	192.168.33.10	Port	1433
Database	INTREP	Driver Type	Microsoft
Username	REPO1	Password	*****
URL	***** Mask URL		
Charset Encoding			
Is Default	<input type="checkbox"/>		
Is Repository	<input checked="" type="checkbox"/>		
Read Only (Allow Select clause and Procedure only)	<input checked="" type="checkbox"/>		
Database Time Zone			
Pool Settings	Initial Connection(s) [] Incremental Size []		
	Resubmit Time [] Sec(s) Max. Connections []		
Database Time Zone	Encrypted <input checked="" type="radio"/> Unencrypted <input type="radio"/>		
	Get Configuration File		
Cache	MetaData Cache Purge Frequency [Boot Up]		

Deploying License on a node

Each node generates its license request file in the path: <ClusterInstalledPath>\ClusterReportEngine\bin

Installation and Configuration

A license file must be obtained by submitting this request file to your vendor. The obtained license must be deployed by manually copying to the license file in the path:

<ClusterInstalledPath>\ClusterReportEngine\bin



Note: Separate licenses should be purchased for each report server node

Next node in the cluster

Repeat all above installing and configuring steps for as many nodes planned in the cluster.

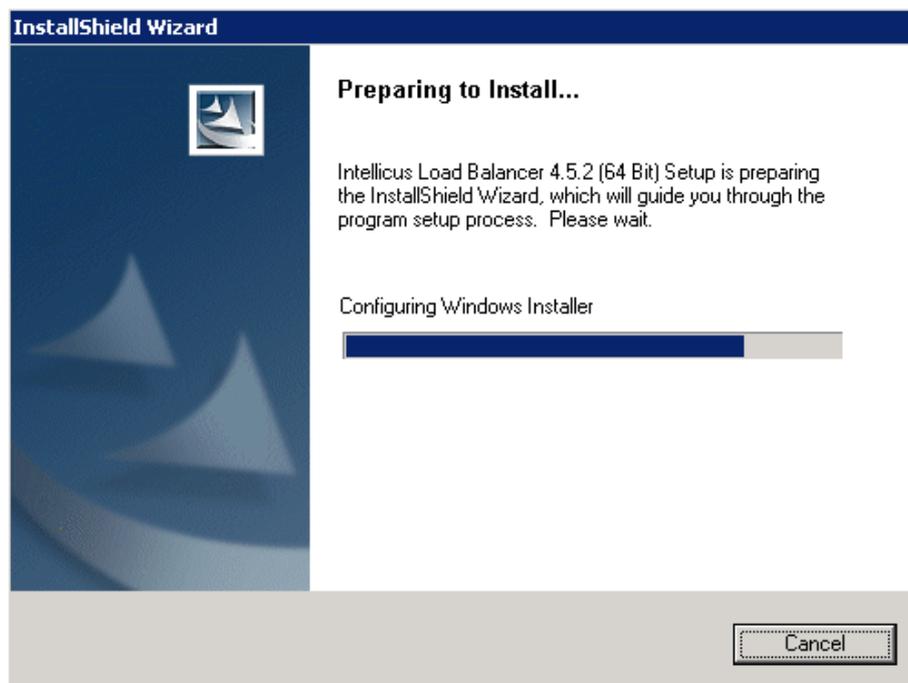
Installing Load Balancer

Intellicus Load balancer is installed with a cluster to point to each node of the cluster. Load balancer evaluates each request from client applications and selects the most appropriate report server node for that request. For this purpose, Load balancer keeps collecting the current load status (heart beat) of each server in the cluster.

A machine on the cluster with most availability should be chose for installing load balancer.

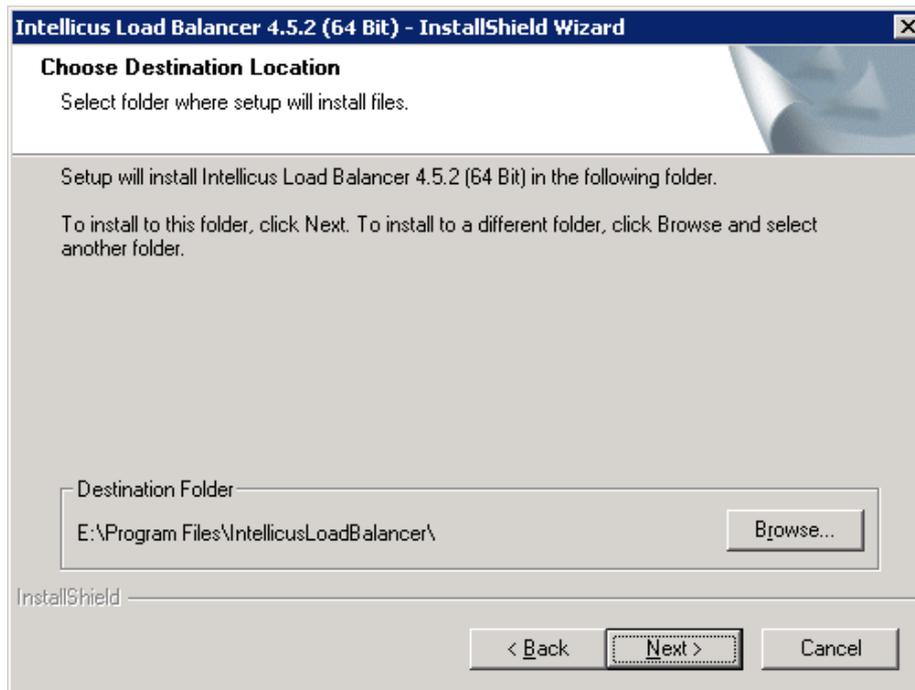
Note that, optionally you can install secondary load balancers on other machines in the network. In case of a non-availability situation of primary load balancer, secondary load balancer takes over the primary load balancer role.

The setup zip is named as: IntellicusLoadBalancer<OS><Version>.zip



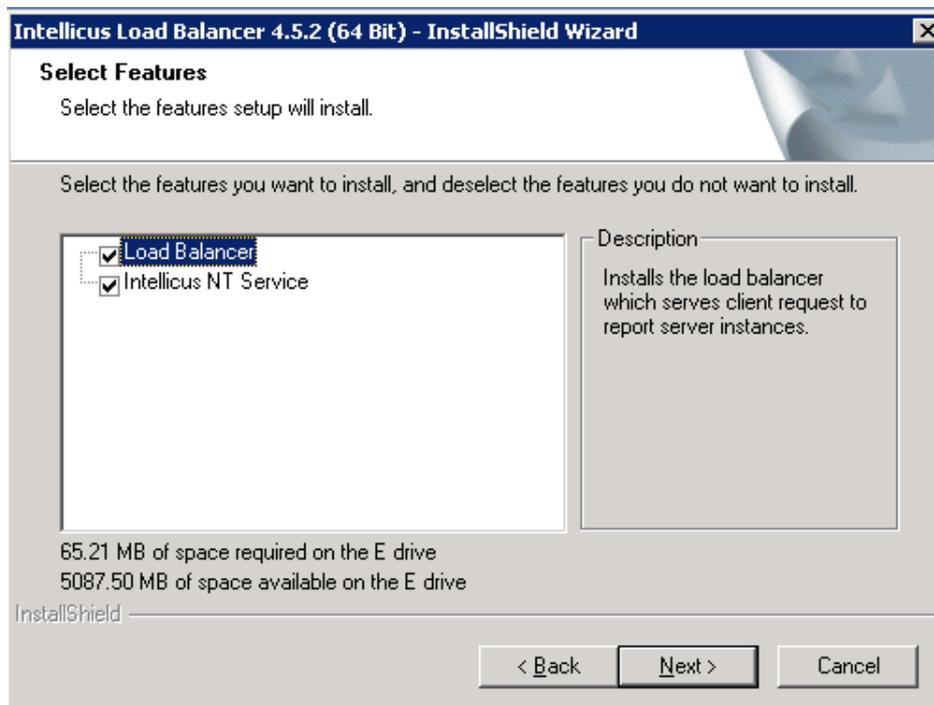
Installation and Configuration

Select the target folder to install the load balancer binaries.



The load balancer installer also contains Intellicus Service. If you are installing load balancer on a dedicated machine where no nodes are installed, then you may need the service component to start the load balancer as a NT Service.

If you are installing load balancer on a node machine, which already has Intellicus Service installed then you can skip installing this feature now. This document explains steps to add load balancer to the Intellicus service.



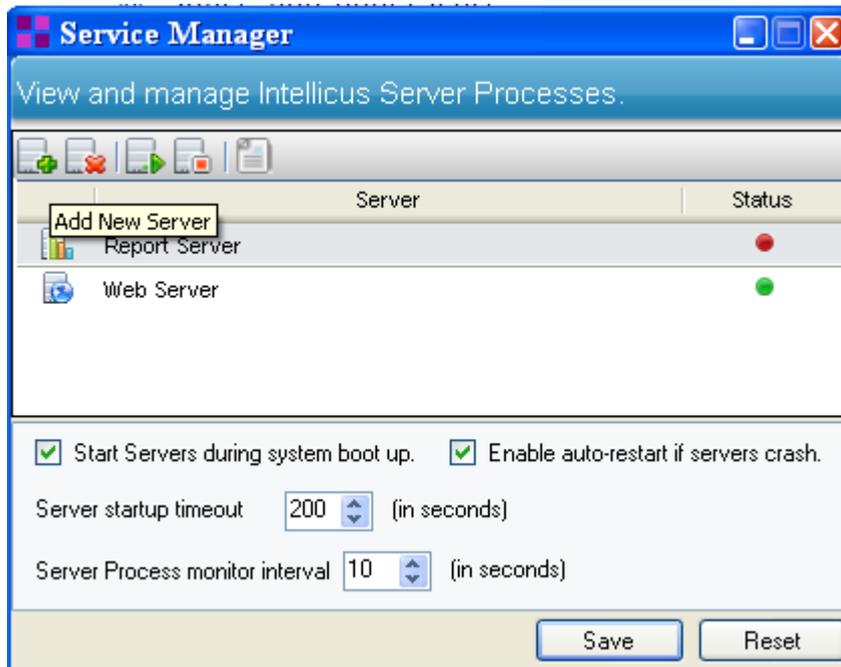
Installation and Configuration

Adding Load Balancer server to Intellicus service

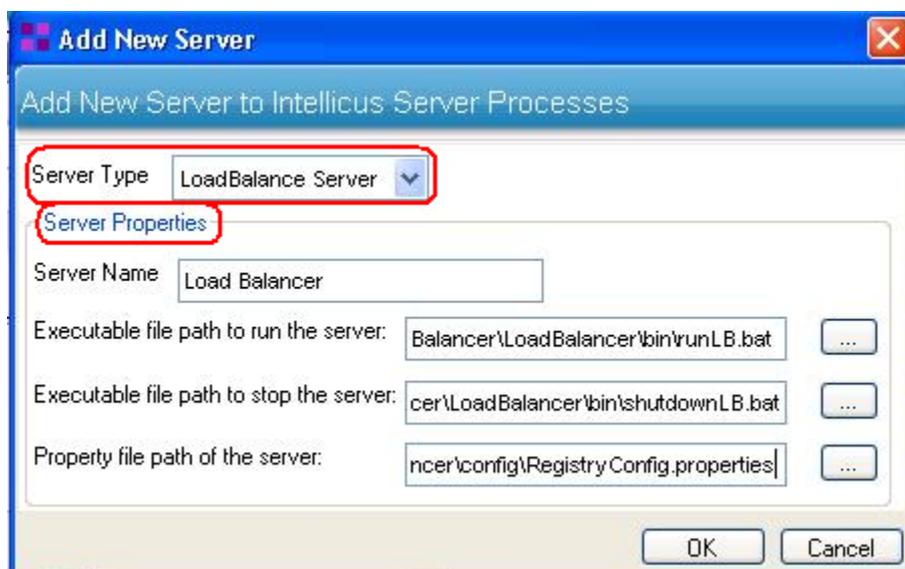
Adding a load balancer to the Service Manager helps the load balancer to start automatically when a windows machine boots up. Service manager also helps in automatically re-starting a load balancer if it gets down un-expectedly.

Open Intellicus Service Manager Dialog from start menu:

Click Add () button to add a new server:



You need to provide following information while adding a Load Balancer:



Load balancer properties for Service Manager Add dialog:

Property	Value	Comments
Server Type	Report Server Load Balance Server	Load Balance server = To add a Load balancer to this Service Manager
Server Name	Type in Name	A unique name for Service Manager to identify this Load Balancer.
Executable file to run the Load Balancer	File path	File that the service will execute to startup the Load Balancer. <installPath>\IntellicusLoadBalancer\LoadBalancer\bin\runLB
Executable file path to stop the Load Balancer	File path	File that the service will execute to stop (shutdown) the Load Balancer. <installPath>\IntellicusLoadBalancer\LoadBalancer\bin\shutdownLB
Property file path of the Load Balancer	File Path	Property file to load during start of this load balancer <installPath>\IntellicusLoadBalancer\LoadBalancer\config\RegistryConfig.properties

Specify the information and click OK.

To save the changes, click save button on Service Manager Dialog.

Configuring Load Balancer

Point the Client to Load Balancer

First thing to do after installing the load balancer is to point your Intellicus client to the load balancer component instead of pointing it to the Report Engine.

Steps to point Client to Load balancer

- 1) Open Client.properties
- 2) Add an entry with name REGISTRIES
- 3) Set IP Address and listening port of load balancer
By default, load balancer listens on 60000 port

Point the load balancer to all nodes in the cluster

Pointing the load balancer to cluster nodes or adding nodes to the cluster can be done using portal screen or by editing load balancer configuration file.

Editing load balancer Configurations file

Load Balancer can be configured using RegistryInfo.xml files in <Installfolder>\LoadBalancer\Config folder.

```
<REGISTRYINFO>
  <REGISTRIES>
    <REGISTRY IP="192.168.33.115" PORT="60001"/>
    <REGISTRY IP="192.168.33.115" PORT="60000"/>
  </REGISTRIES>
  <SERVERS>
    <SERVER IP="192.168.33.115" PORT="50000" TASK_PRIORITY="6" TASK_TYPE="ALL" WEIGHTAGE="30"/>
    <SERVER IP="192.168.33.115" PORT="50001" TASK_PRIORITY="4" TASK_TYPE="ALL" WEIGHTAGE="0"/>
    <SERVER IP="192.168.33.115" PORT="50002" TASK_PRIORITY="2" TASK_TYPE="ALL" WEIGHTAGE="30"/>
    <SERVER IP="192.168.33.115" PORT="50003" TASK_PRIORITY="0" TASK_TYPE="ALL" WEIGHTAGE="30"/>
  </SERVERS>
  <CONFIG SVR_PING_TIME="30" REG_PING_TIME="3" TASK_PRIORITY_TYPE="NONE" ALLOCATION_TYPE="ROUNDROBIN"
</REGISTRYINFO>
```

Configuration Tags in Registry XML

TAG	ATTRIBUTES	Comments
REGISTRIES/ REGISTRY	IP	IP = IP ADDRESS of Machine on which secondary/backup load balancer is running
REGISTRIES/ REGISTRY	PORT	PORT = Network Port of secondary/backup load balancer
SERVERS/ SERVER	IP	IP = IP ADDRESS of machine on which a Intellicus cluster node is running
	PORT	PORT = Network Port of Intellicus cluster node
	TASK_PRIORITY	0 = This Report Server is configured to take all priority tasks 2 = This Report Server is configured to take priority 2 (Medium) tasks and above only 4 = This Report Server is configured to take priority 4 (High) tasks and above only 6 = This Report Server is configured to take priority 6 (Critical) tasks only
	TASK_TYPE	ALL = This server is configured to take all type of tasks. OTHERS???
	WEIGHTAGE	Enter relative number in ratio to load, this server should take. The percentage load of this server will depend on this number given for other servers too.

Installation and Configuration

		You can make a node BACKUP NODE by setting weightage = 0. Such node will take requests only when all other nodes are down.
CONFIG/	SERVER_PING_TIME	In seconds Heart beat frequency to collect load and live status from each report server node
	TASK_PRIORITY_TYPE	Weight Only = Share the load on servers irrespective of their current load based on given weightage. Server Health Only = Share the load based on servers current load irrespective of weightage given.
	ALLOCATION_TYPE	Shortlisting of servers after applying the weightage and current load is based on Random or Round Robin selection

Managing the cluster from portal UI

When a portal is connected to a load balancer, you can see a "Cluster" tab in Administration->Configure Menu option.

The screenshot displays the portal configuration interface. At the top right, it indicates 'Currently running 0 of 2 servers'. The 'Report Servers' section contains a table with columns: Report Servers, Port, Task Priority, Task Type, Weightage, %, Status, and Remove. Two servers are listed: 127.0.0.1 (Port 50000, HIGH priority, ALL task type, 50 weightage, 50%) and 98.167.22.1 (Port 50001, MEDIUM priority, ALL task type, 50 weightage, 50%). The 'Load Balancer' section shows a single entry for 127.0.0.1 with Port 60000 and a green status indicator. The 'Settings' section includes 'Server Health Refresh Rate' (30 secs), 'Load Balancer Refresh Rate' (3 secs), and checkboxes for 'Servers: At', 'Weightage: Use', and 'Allocation' (set to ROUNDROBIN).

Report Server Actions

Action	Behavior	Comments
ADD (+) button	Adds a new row to the servers list.	Enter Report Server Cluster Node properties and save. Immediately the new node becomes part of this

Installation and Configuration

		cluster.
Status	Red Green	Red = Node is down, and not available Green = Node is functional and accessible
Remove	Removes current row from servers list	The node is now not part of this cluster. This action doesn't stop that node from keep running independently.
Save		Save the changes

Report Server Properties

Property	Values	Comments
Server	IP	IP = IP ADDRESS of machine on which a Intellicus cluster node is running
PORT	PORT Number	PORT = Network Port of Intellicus cluster node
TASK_PRIORITY	LOW MEDIUM HIGH CRITICAL	LOW = This Report Server is configured to take all priority tasks MEDIUM = This Report Server is configured to take priority 2 (Medium) tasks and above only HIGH = This Report Server is configured to take priority 4 (High) tasks and above only CRITICAL = This Report Server is configured to take priority 6 (Critical) tasks only
TASK_TYPE	ALL	ALL = This server is configured to take all type of tasks.
WEIGHTAGE	Number	Enter relative number in ratio to load, this server should take. The percentage load of this server will be calculated automatically based on this number given for other servers too. You can make a node BACKUP NODE by setting weightage = 0. Such node will take requests only when all other nodes are down.

Load Balancer Actions

Action	Behavior	Comments
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Installation and Configuration

ADD (+) button	Adds a new row to the Load balancer list.	Enter secondary load balancer properties and save.
Status	Red Green	Red = Secondary load balancer is down, and not available Green = Secondary load balancer is available for failover
Remove	Removes current row from load balancer list	The secondary load balancer is now not part of this cluster.

Load Balancer Properties

Property	Values	Comments
Server	IP	IP = IP ADDRESS of machine on which a Secondary load balancer is running
PORT	PORT Number	PORT = Network Port of Intellicus Secondary load balancer. By default Intellicus load balancer listens on port 60000

Settings

Property	Values	Comments
Server Health Refresh Rate	Seconds	30 is default. Set reasonable value between 10 - 100 seconds. This is the maximum time taken for failover server to activate.
Load balancer Refresh Rate	Seconds	3 is default. Set reasonable value between 2 - 60 seconds This is the maximum time taken for secondary load balancer to activate and become primary
Servers At	Exact Priority Up to Priority	Exact Priority = Each Report Server will take request of specific priority only. Up to Priority = Each Report Server will take request of specified priority or above.
Weightage: Use	Weight Only Server Health Only	Weight Only = Share the load on servers irrespective of their current load based on given weightage. Server Health Only = Share the load based on servers current load irrespective of weightage given.
Allocation	Random	Shortlisting of servers after

Installation and Configuration

	Round Robin	applying the weightage and current load is based on Random or Round Robin selection
--	-------------	---

Load Balancer General Configuration

A Load balancer also has its own configuration file `RegistryConfig.properties` in `<Installfolder>\LoadBalancer\Config` folder.

Load balancer general configuration properties:

Property	Values	Comments
REGISTRY_LISTENER_PORT	Network number Port	Default is 60000 You can set an alternate port number. This number will be required in Intellicus Client configuration to point to this load balancer
EMAIL_TO_ADDRESS	Email ID/ Email Alias	An Email alert will be automatically sent in cluster failure conditions like a server down or Server not responding. Specify the email ID where the mail should be sent.
EMAIL_FROM_ADDRESS	Email ID/	The Email alert will carry from address as mentioned here
SMTP_SERVER	Email Server	Specify the IP of the SMTP server that can be used to send the mail.

Handling cluster failure

Secondary Load Balancer

The client can point to more than one load balancer installed in the cluster. In case a load balancer becomes unavailable, then client will automatically start pointing to load balancer that has assumed primary load balancer.

Fallback Report Server

Additionally, the client's configuration to point a report server still exists in parallel. This enabled client to fall back to directly request reports from this report server, in case of a cluster failure.

Launching load balancer

To start manually, select

Start > Program Files > Intellicus > IntellicusLoadBalancer > Start Load Balancer



Note: In case of multiple load balancers, the first to start assumes primary load balancer role. If primary load balancer fails, a secondary load balancers will become primary load balancer.

Installation and Configuration

To stop manually, select

Start > Program Files > Intellicus > IntellicusLoadBalancer-> Stop Load Balancer

Support

For problems with installation, configuration or while using the application, you may email a description of the problem to support@intellicus.com, with your contact details and full details of the problem.

Although we have taken care to capture and incorporate all aspects of Intellicus Reporting Tool in the documents, if you find any inconsistencies or discrepancies please inform us on documents@intellicus.com.

Website

<http://www.Intellicus.com>

Our website is updated periodically with the product updates, white papers, product extensions, press releases and much more.

FTP

<ftp://ftp.Intellicus.com>

You can download the product upgrades and sample reports from this site.

