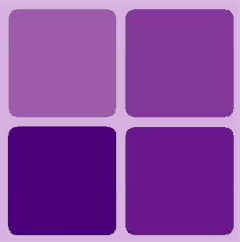

Intellicus Cluster and Load Balancing (Windows)

Intellicus Enterprise Reporting and BI Platform

intellicus
Enterprise Reporting and
Business Insights Platform

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Dated: March 2014

Acknowledgements

Intellicus acknowledges using of third-party libraries to extend support to the functionalities that they provide.

For details, visit: http://www.intellicus.com/acknowledgements.htm

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Introduction

You need to implement Clustering and Load Balancing in the following situations:

- When Intellicus server has to handle significantly heavy load
- To create server failure and recovery mechanism

Clustering

This is a mechanism through which multiple instances of Intellicus server are run and maintained on multiple systems. All these systems form what is known as a Cluster.

Load Balancing

This is a process of balancing load among servers in a cluster. A component known as Load Balancer takes care of this activity.

How it works

Multiple machines are networked to form a cluster. Cluster Report Server is installed and run on all the machines. Load Balancers are installed on one or multiple Machines of network. Load Balancer keeps track of load that each of the cluster report server is having.

Report client first communicates with the Load Balancer. Load Balancer keeps track of loads on each of the cluster server instances. So, based on the Load Balancing algorithms it finds the appropriate cluster server on which request should be forwarded, then it sends the IP of the cluster server to the client. Report client sends request to that cluster report server. This process is repeated for every client request.

This way, load is spread across multiple cluster report servers.

Installation and Configuration

Before going ahead with installation and configuration of load balancing and clustering, you need to:

- Install Intellicus.

Note:

Machine Sharability: This machine needs to be sharable for all machines running server instances.

Repository Database: HSQLDB is not used as repository when Intellicus runs in cluster environment.

- Decide the machines on which Load Balancers will be installed.
- Decide the machines on which Cluster Node (to run Intellicus server instance) will be installed.
- Make sure all the machines are on network.

Installing Load Balancer

Setup of Load Balancer needs to be installed on each of the machine allocated to run Load Balancer.

A double-click on setup icon will launch the installer.

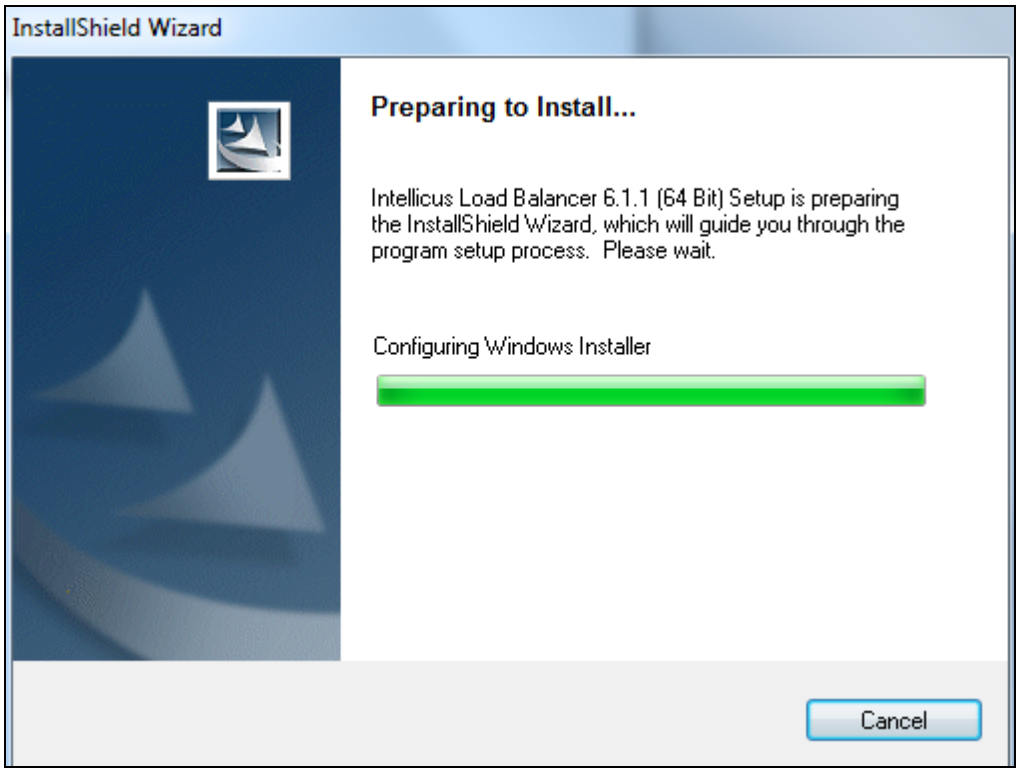

Figure 1: Launching installer

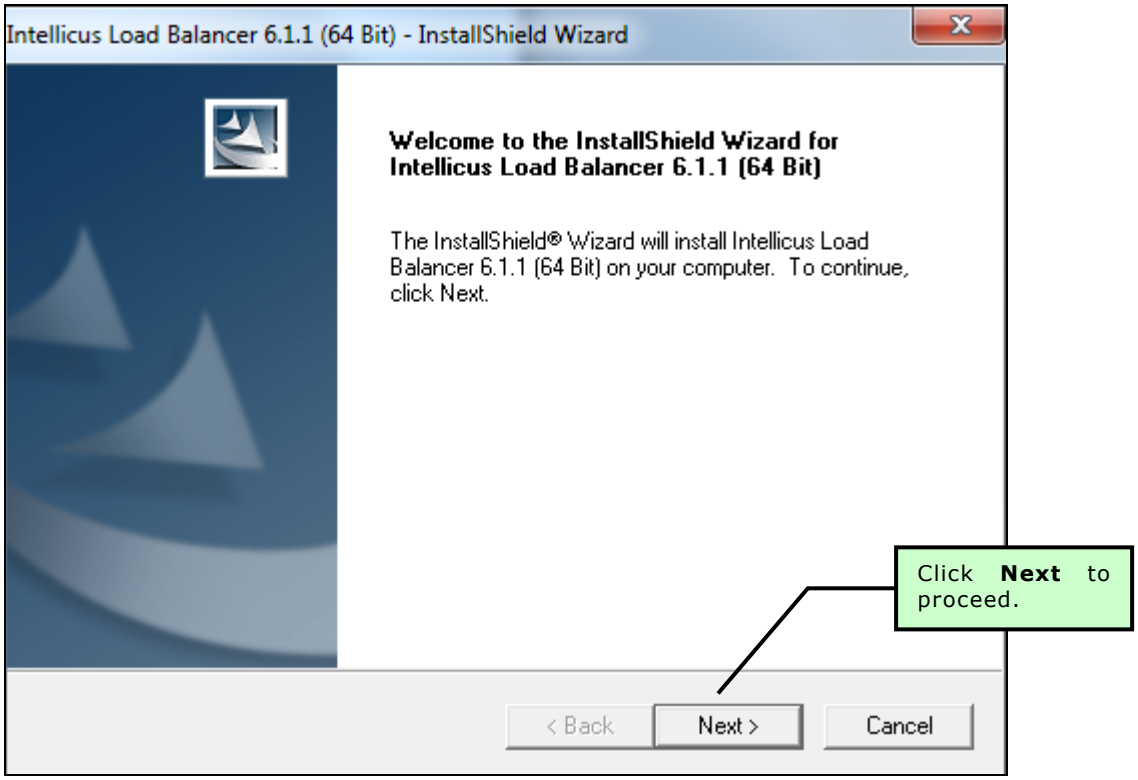

Figure 2: Ready to start

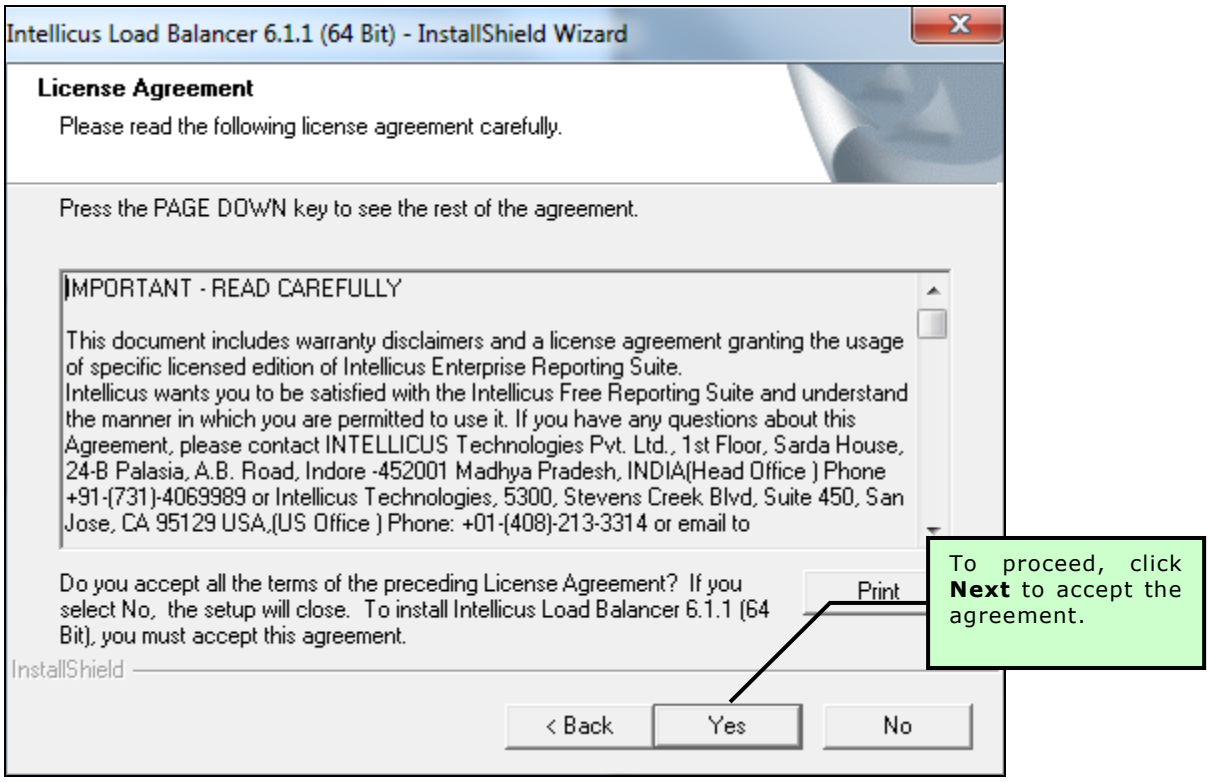

Figure 3: Accepting license agreement

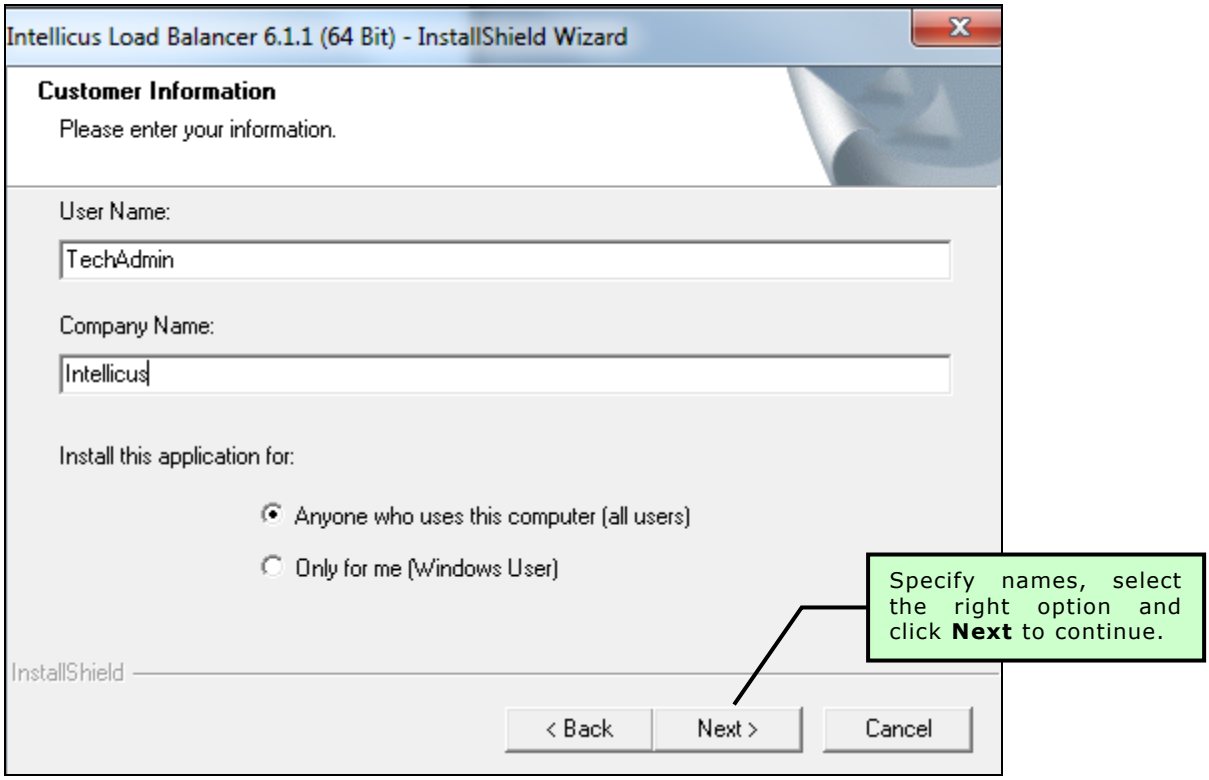

Figure 4: User Information

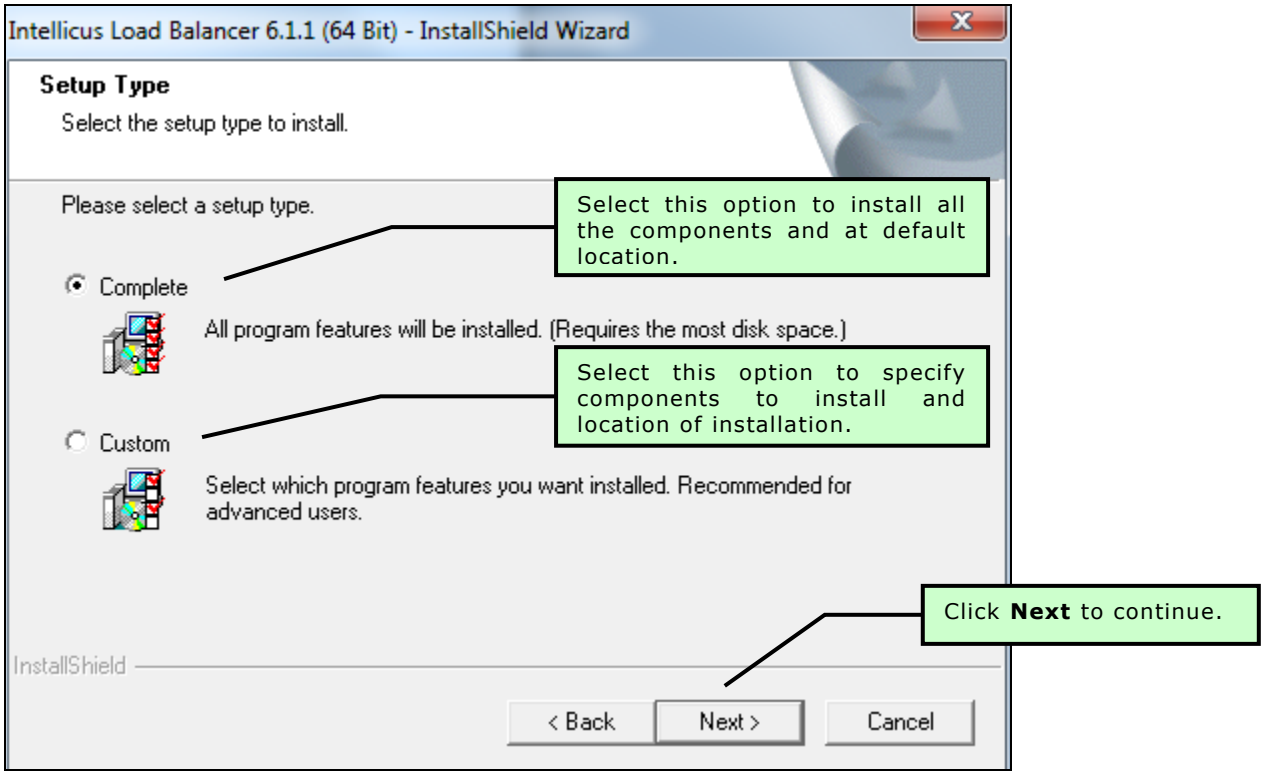

Figure 5: Decide setup type

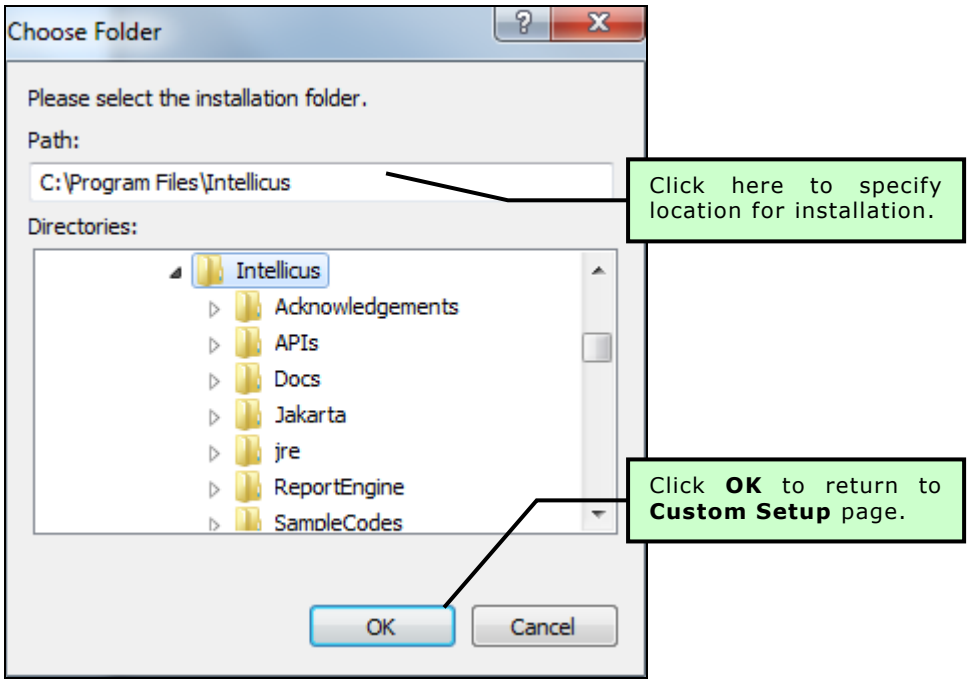

Figure 6: Custom setup: Specifying destination

Click **Next** to continue.

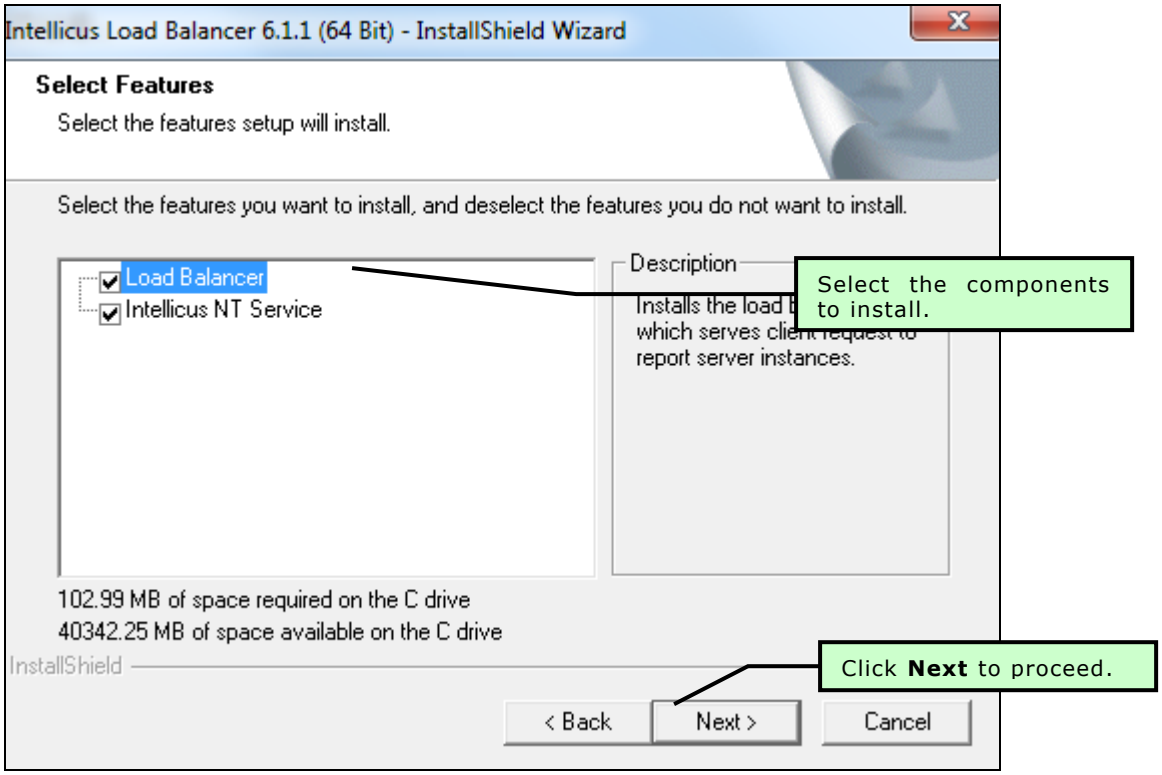

Figure 7: Custom setup > Select the components to install

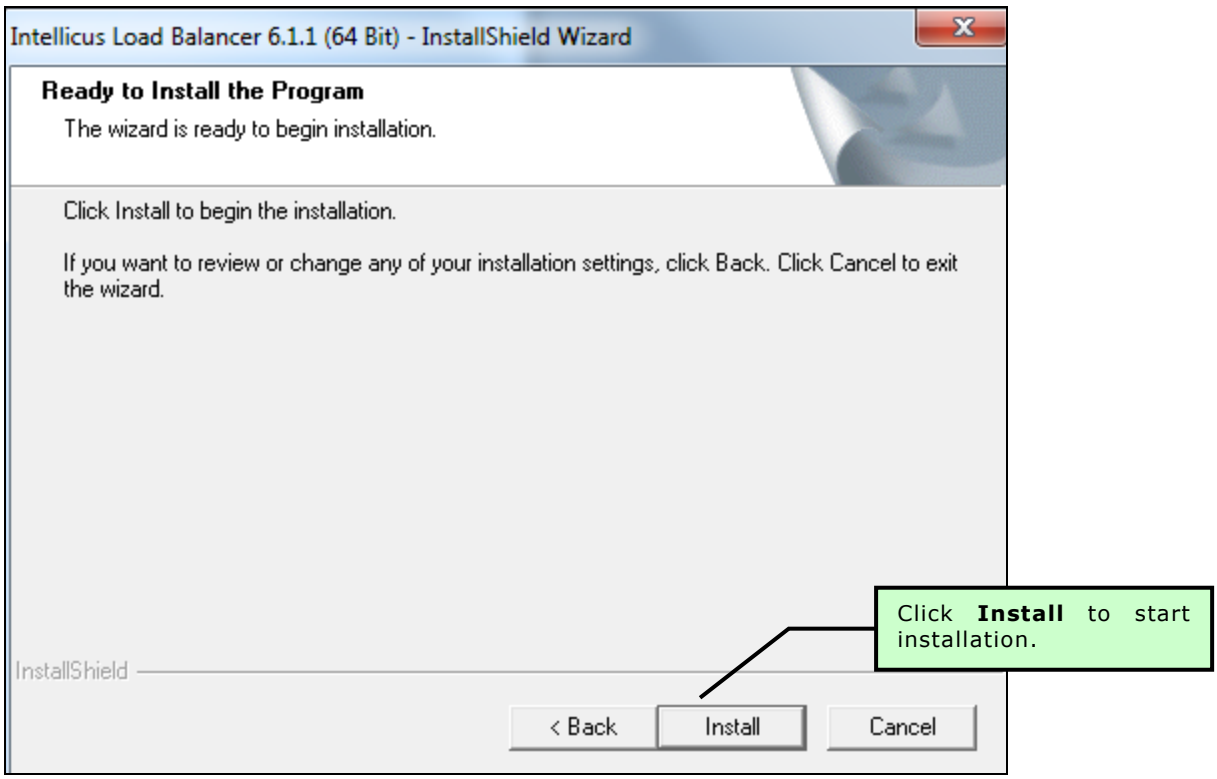

Figure 8: Ready to Install

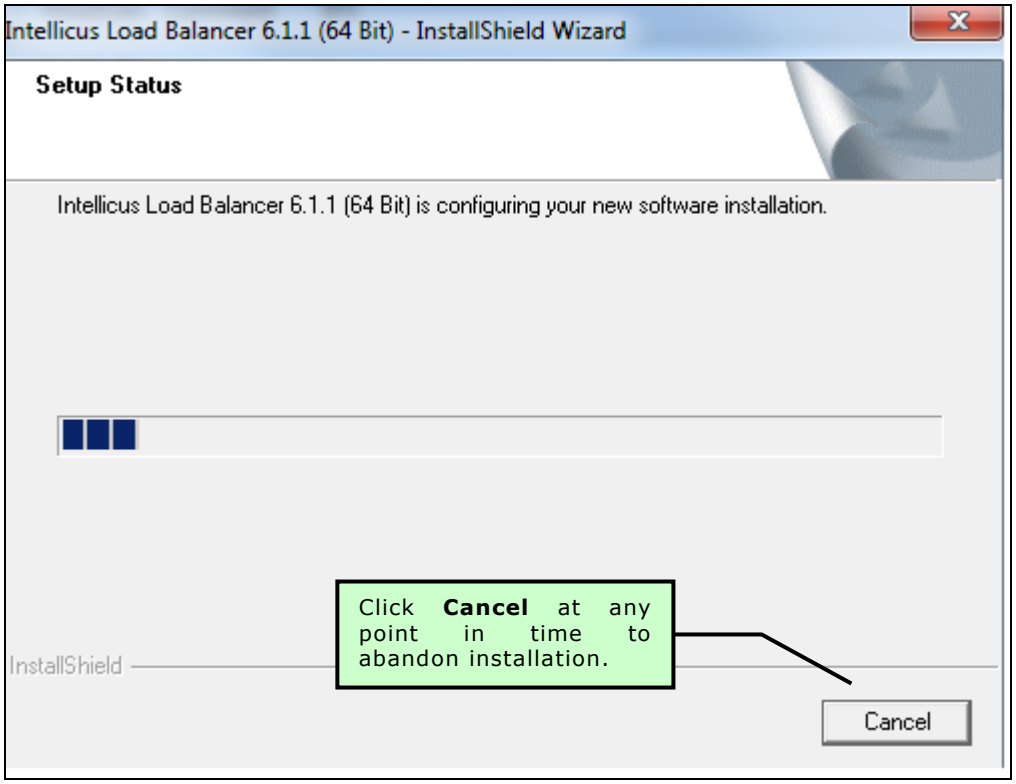

Figure 9: Installation in progress

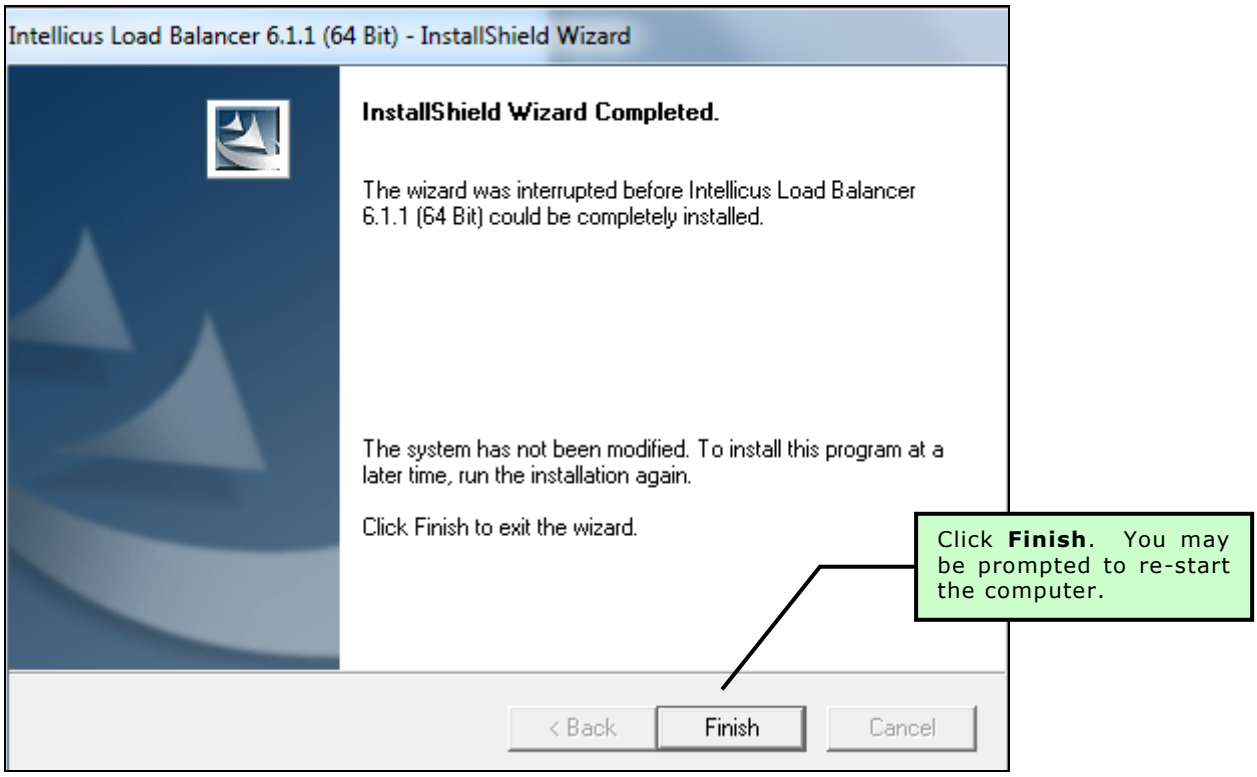

Figure 10: Installation complete

Configure Load Balancer

In multiple Load Balancer setup, one of the Load Balancers will act as the primary load balancer. All other Load Balancers will act as secondary load balancers.

In the event of failure of the primary load balancer one of the secondary load balancers will take the charge of the primary one.

For all the load balancers, carry out the following configuration tasks:

- Specify Cluster Node and Load Balancer related details in RegistryInfo.xml file
- Setup port of the Load Balancer in RegistryConfig.properties file
- Configure report engine

Configurations in RegistryInfo.xml file

Load Balancer setup places file RegistryInfo.xml in \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>
```

Figure 11: Snapshot of RegistryInfo.xml file

You need to specify the following information in this file:

- Specify details of all cluster nodes
- Specify details of this and other load balancers

Cluster Node related information

You need to specify the following information about all the cluster nodes in the cluster:

- **SERVER IP:** The IP address of the cluster node.
- **PORT:** The port at which cluster node will listen.
- **TASK PRIORITY:** Specify a positive integer between 1 and 6 both inclusive. Priority 1, 2 is for Low; 3, 4 is for Medium and 5, 6 is for High.
- **TASK TYPE:** Specify the option 'All'.

- **WEIGHTAGE:** Specify percentage of the load that this cluster node should take.

This information needs to be provided as an entry under SERVER tag. Example:

```
<SERVER IP="192.168.33.115" PORT="50003" TASK_PRIORITY="0"
TASK_TYPE="ALL" WEIGHTAGE="30"/>
```

Specify this information for all the cluster nodes.

Load Balancer related information

You need to specify IP and port of all the load balancers.

- **REGISTRY IP:** IP of the machine where Load Balancer is installed.
- **PORT:** Port at which that Load Balancer will listen.

This information needs to be provided as an entry in REGISTRIES tag. Example:

<REGISTRY IP="192.168.33.115" PORT="60001"/>

Configurations in RegistryConfig.properties file

Load Balancer setup places file RegistryConfig.properties in \LoadBalancer\Config folder.

Load Balancer reads value stored in REGISTRY_LISTENER_PORT property in RegistryConfig.properties file to know the listener port.

Example: REGISTRY_LISTENER_PORT=60000

Modify values of following properties

EMAIL_TO_ADDRESS

An alert through e-mail will be automatically be sent in error conditions like the server shuts down, it reaches not responding state, or goes out of memory. Specify the email ID where the mail should be sent.

EMAIL_FROM_ADDRESS

An alert through e-mail will be automatically be sent in error conditions like the server shuts down, it reaches not responding state, or goes out of memory. Specify the email ID that should appear as "from" in the mail sent.

SMTP_SERVER

An alert through e-mail will be automatically be sent in error conditions like the server shuts down, it reaches not responding state, or goes out of memory. Specify the IP of the SMTP server used to send the mail.

Install Cluster Report Server setup

Setup of Cluster Node needs to be installed on each of the machines allocated to run Cluster Node.

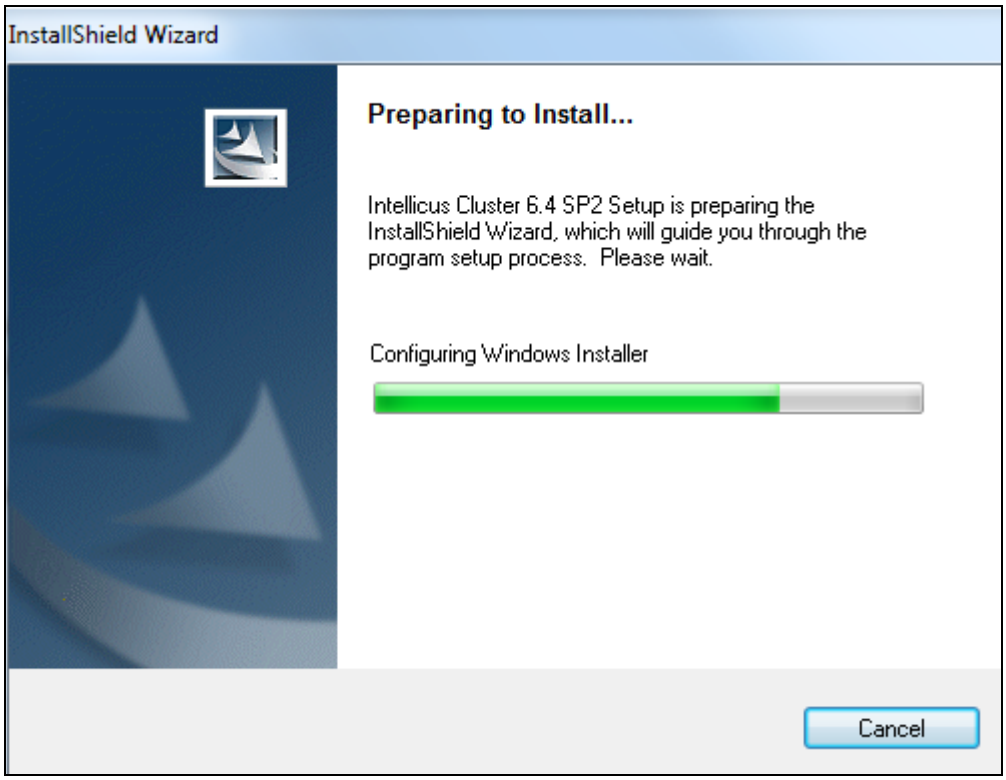

Figure 12: Launching installer

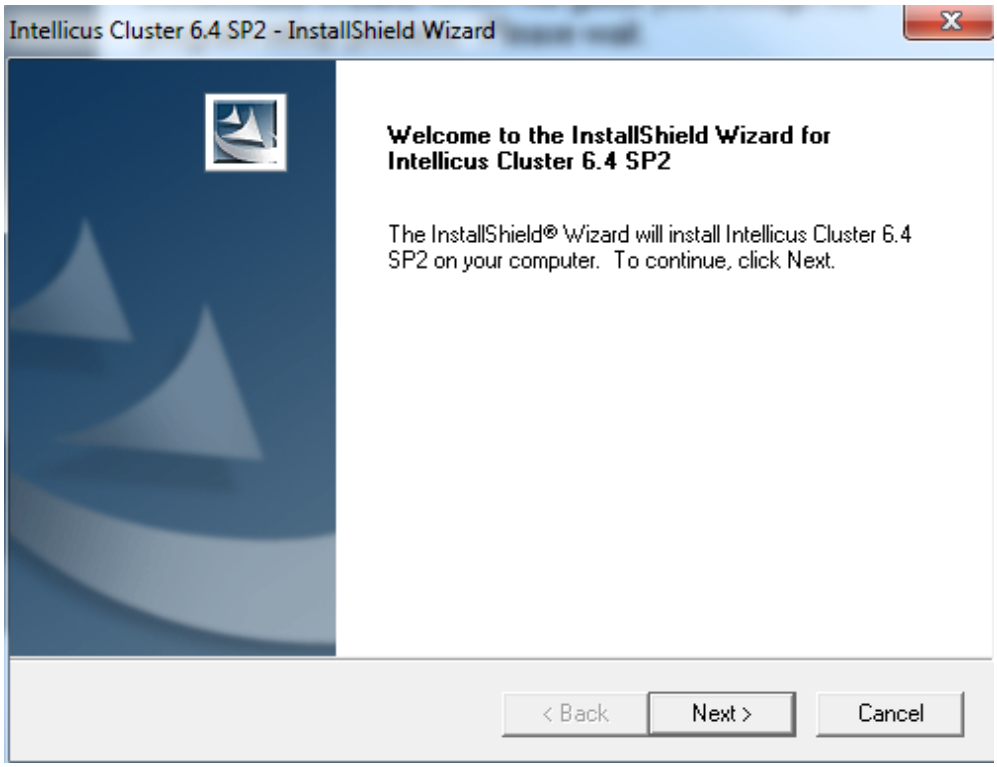

Figure 13: Ready to start

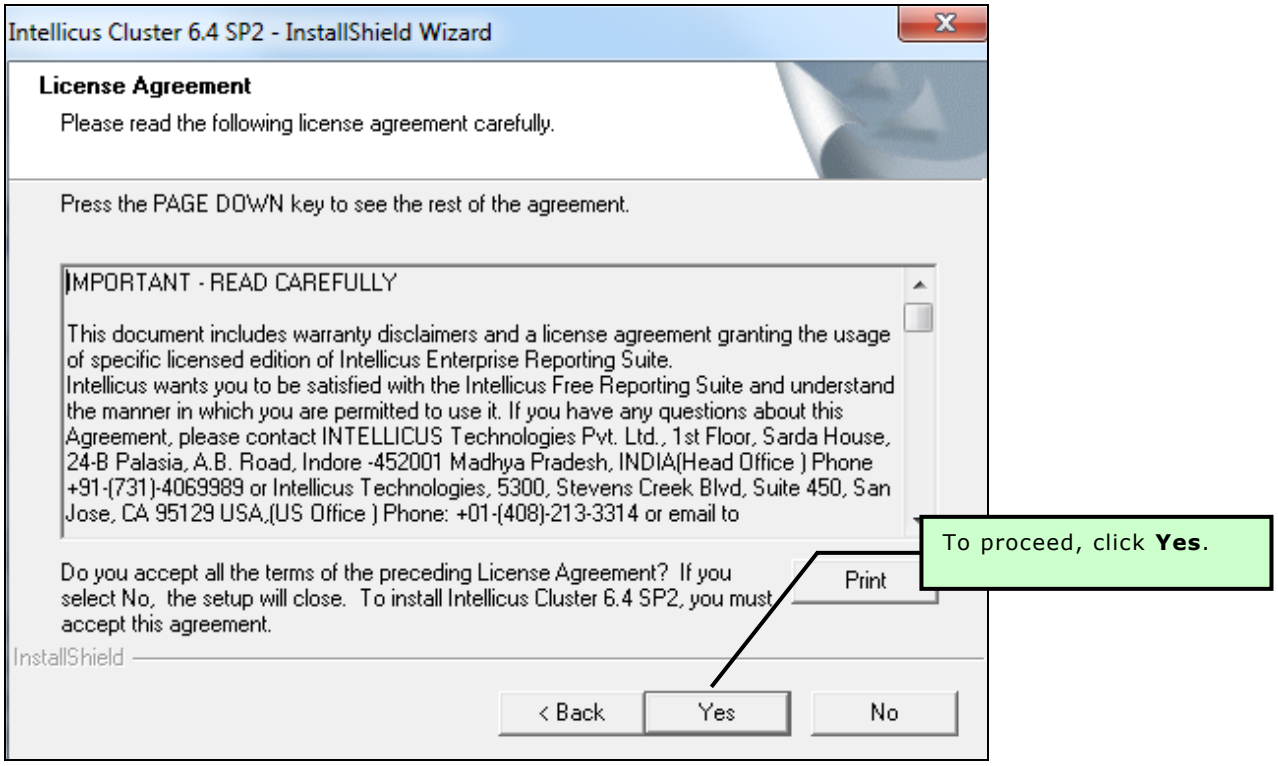

Figure 14: Accepting license agreement

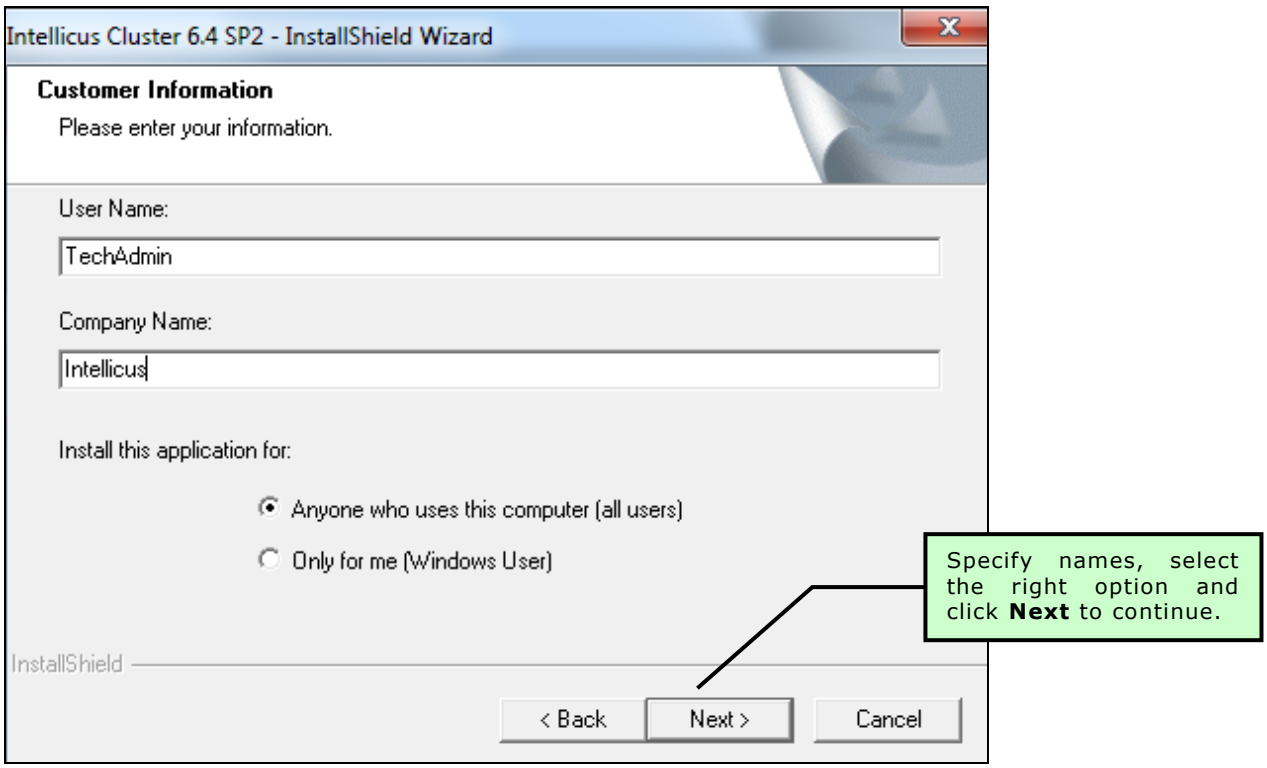

Figure 15: User Information

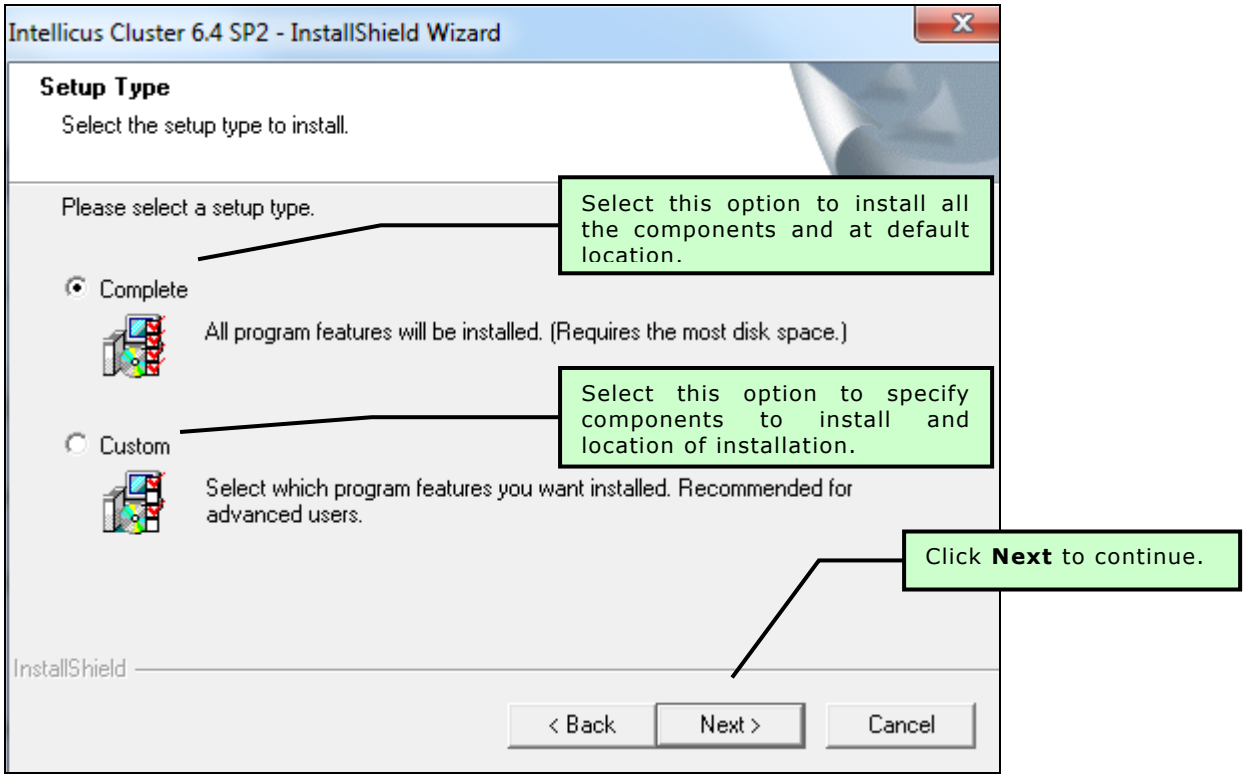

Figure 16: Decide setup type

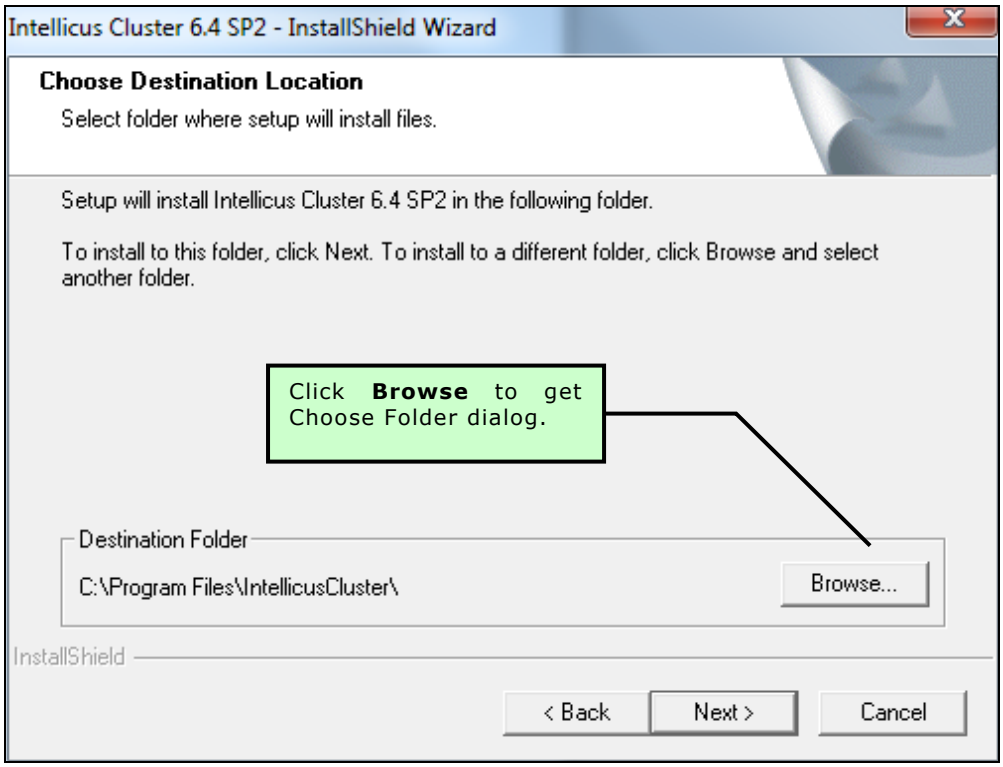

Figure 17: Custom Setup: Click **Browse** to get Choose Folder dialog

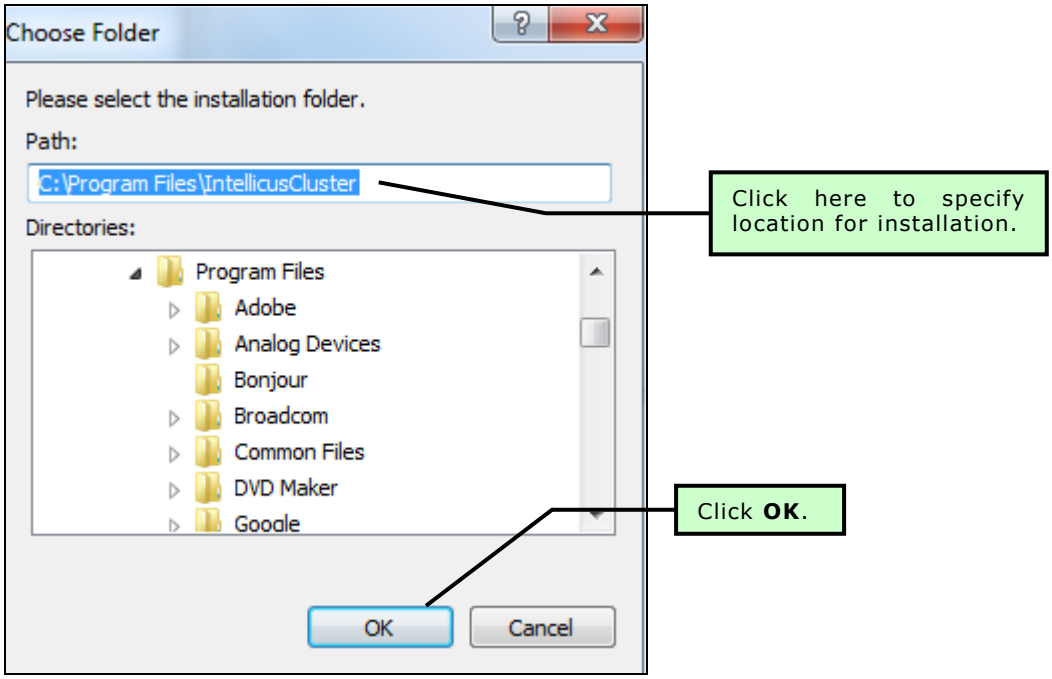

Figure 18: Custom setup: Specifying destination on Choose Folder dialog

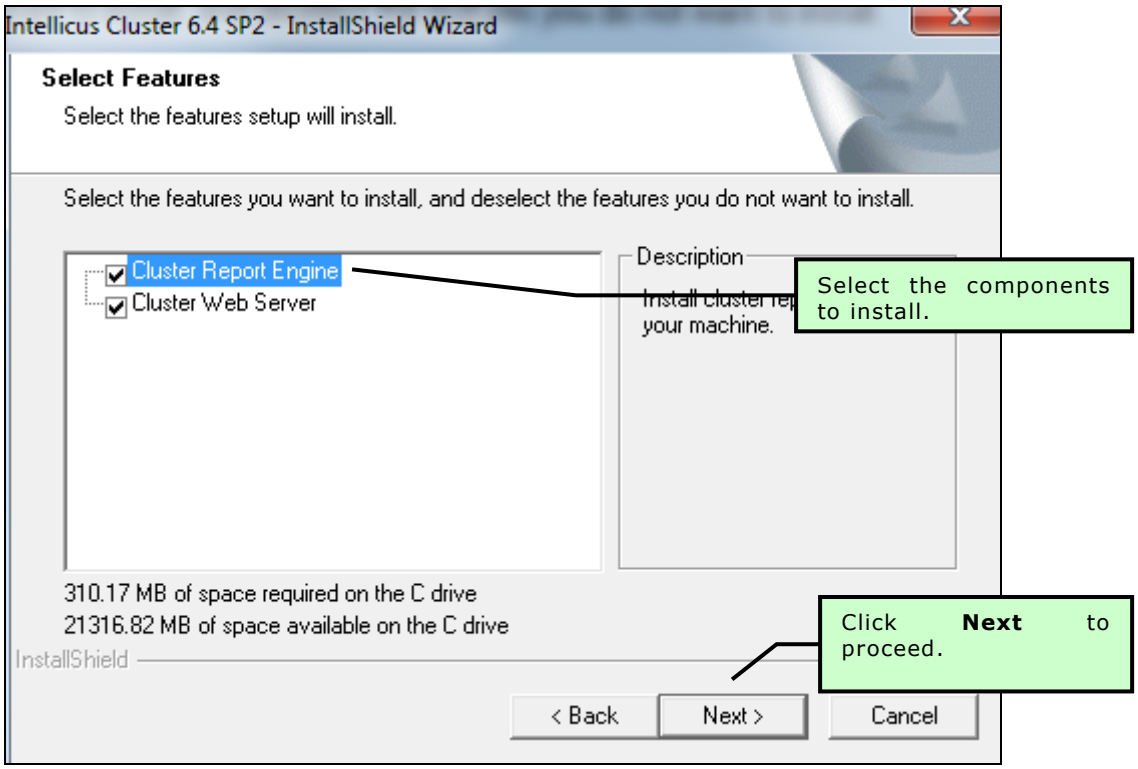

Figure 19: Custom setup > Select the components to install

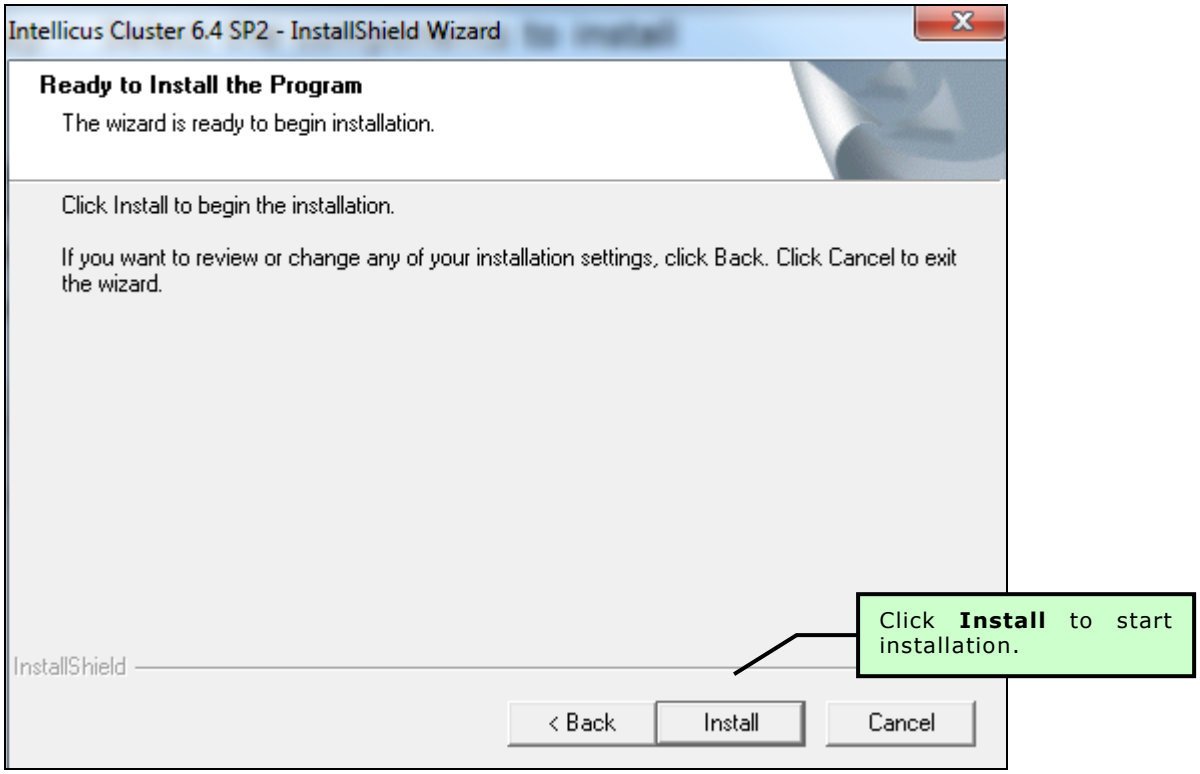

Figure 20: Ready to Install

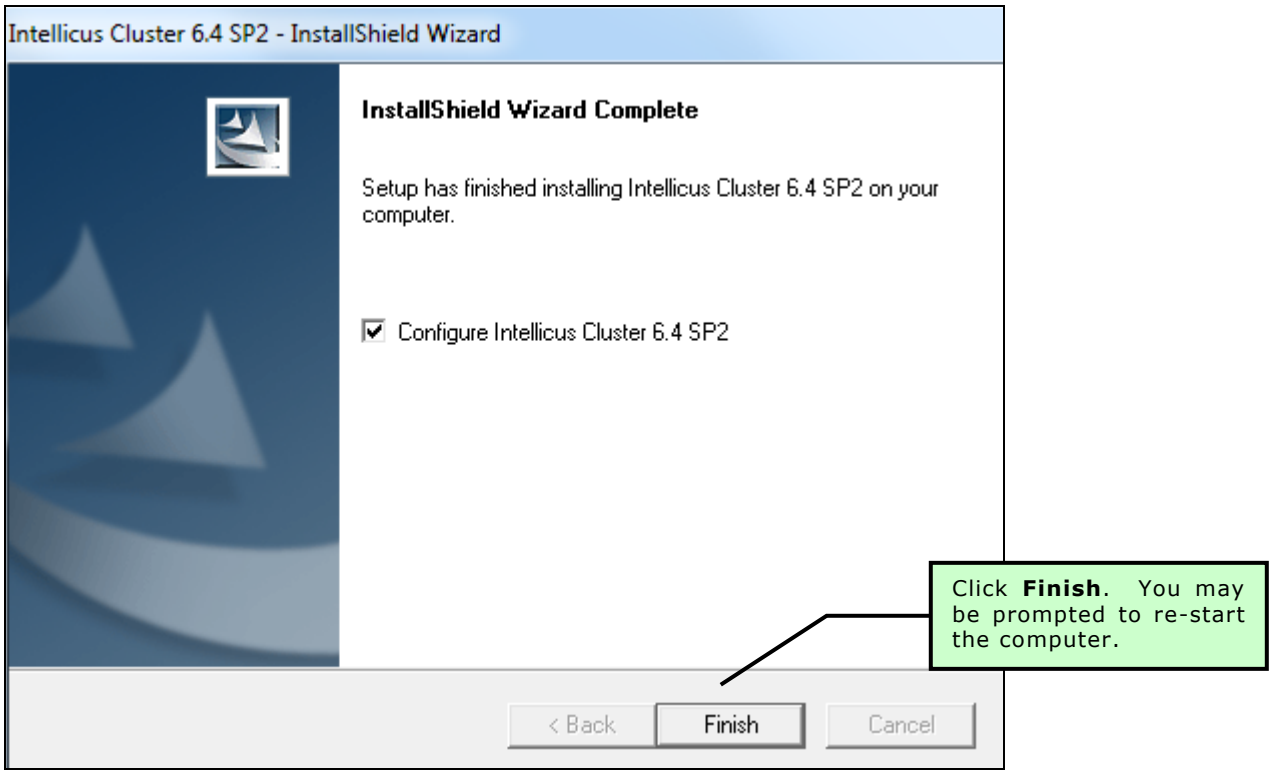

Figure 21: Installation complete

Install Shared Report Server setup

Setup of Shared needs to be installed on each of the machines allocated to run Shared Node.

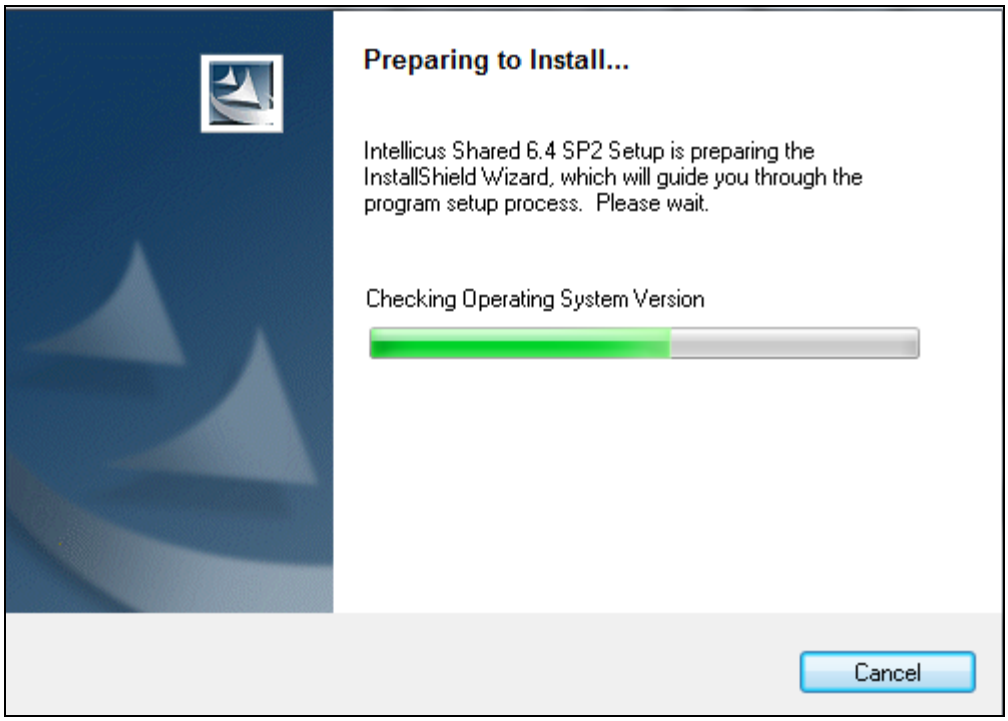

Figure 22: Launching installer

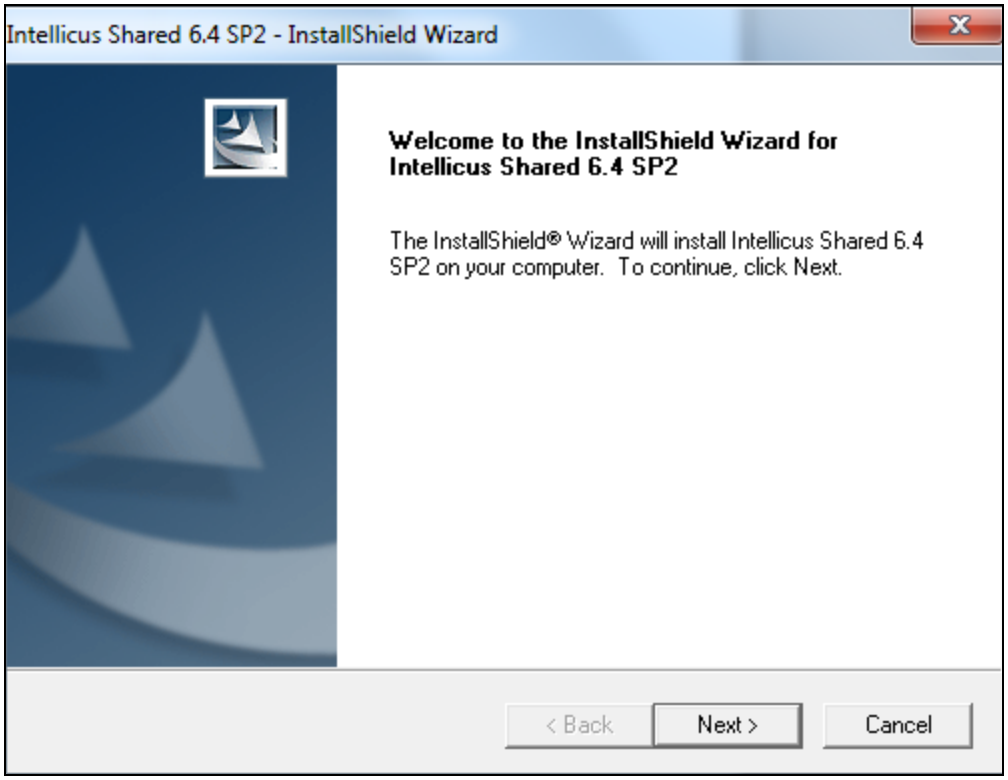

Figure 23: Ready to start

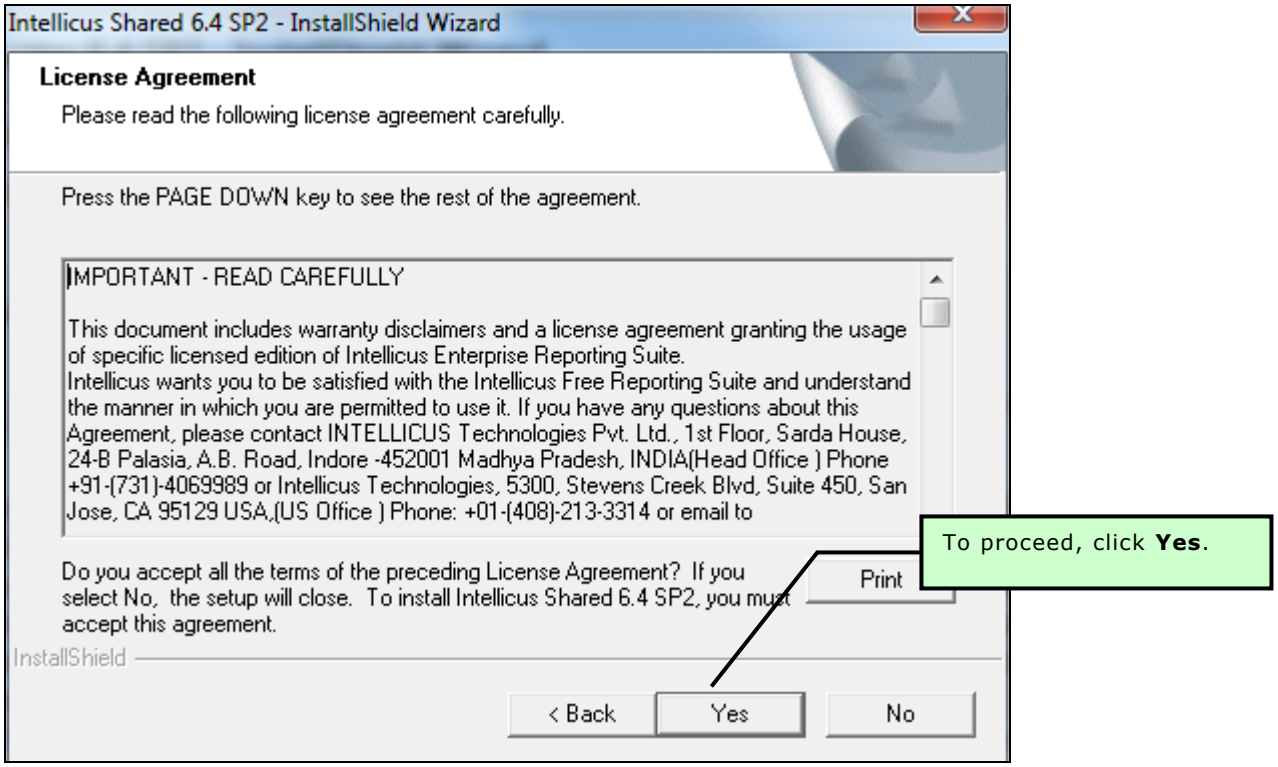

Figure 24: Accepting license agreement

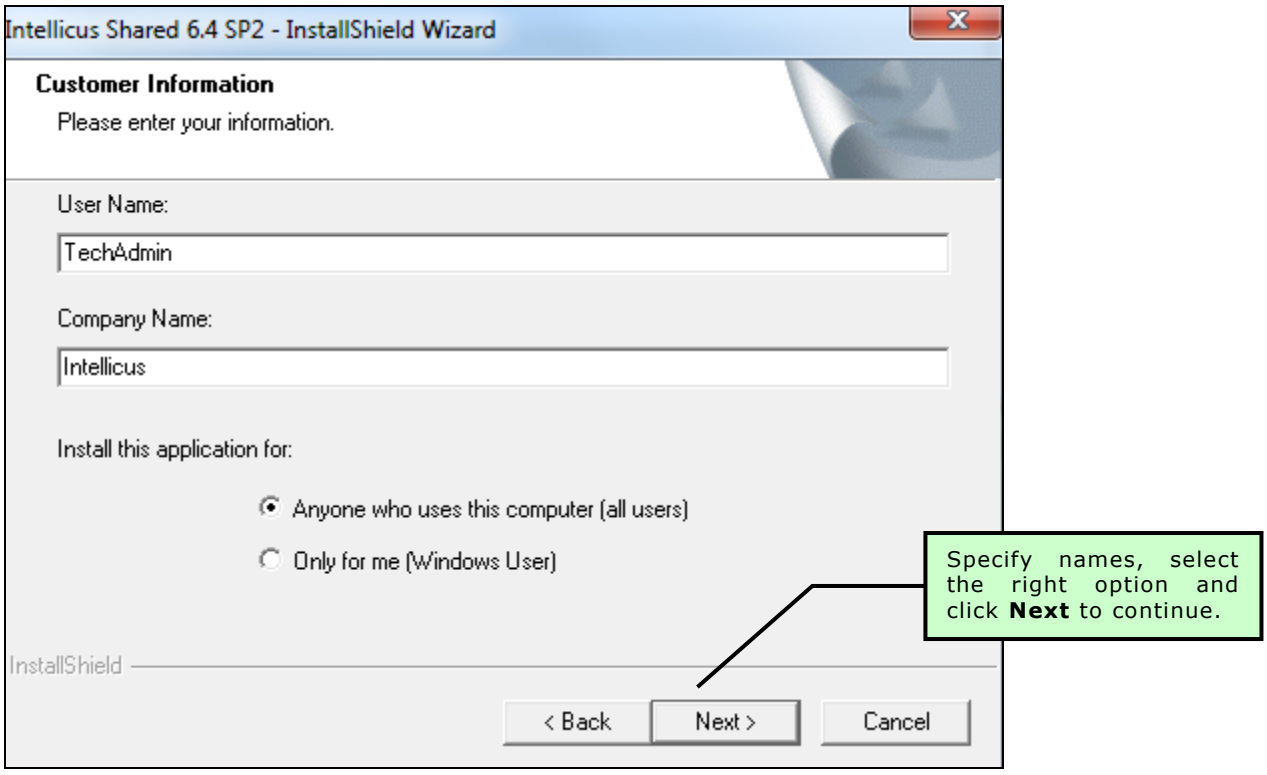

Figure 25: User Information

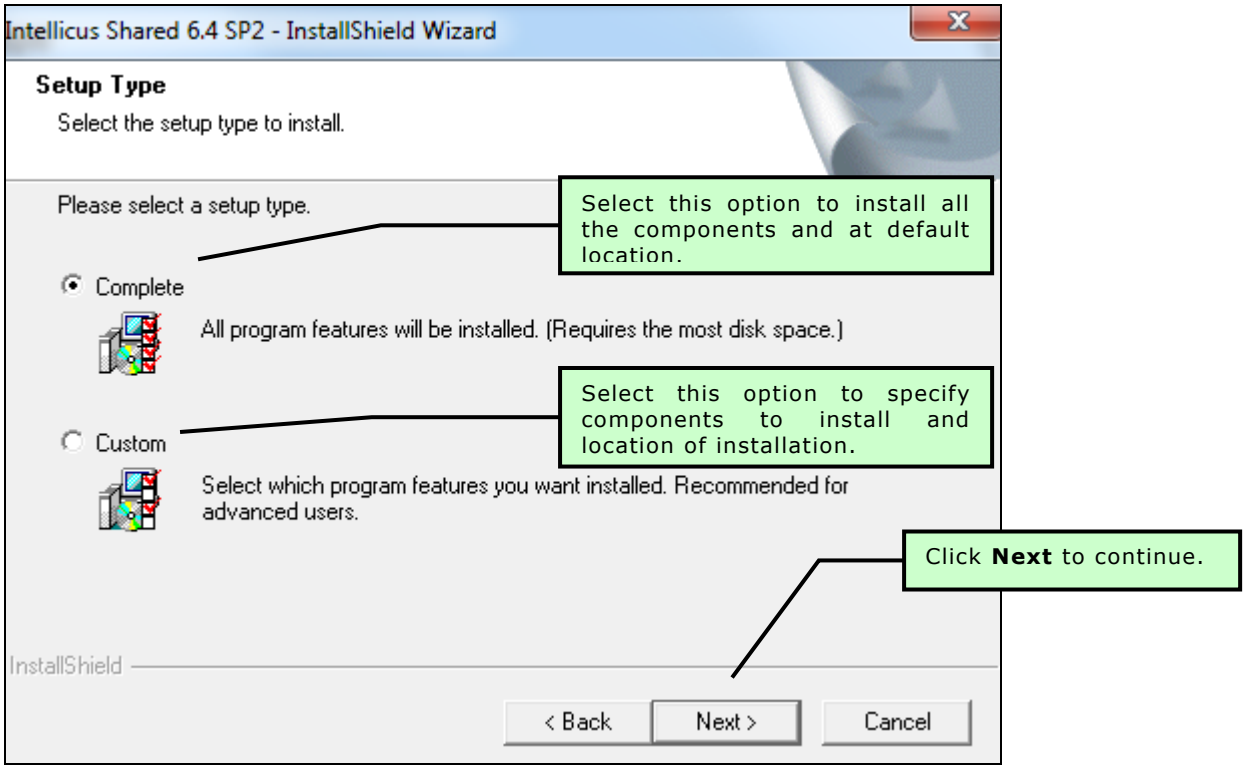

Figure 26: Decide setup type

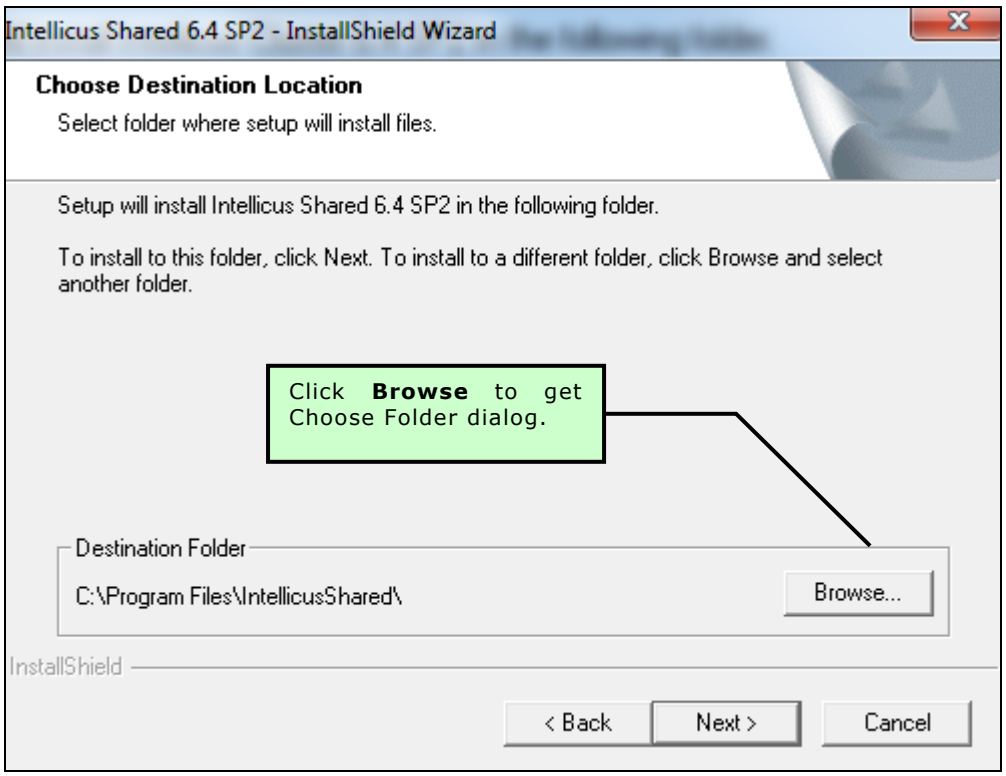

Figure 27: Custom Setup: Click **Browse** to get Choose Folder dialog

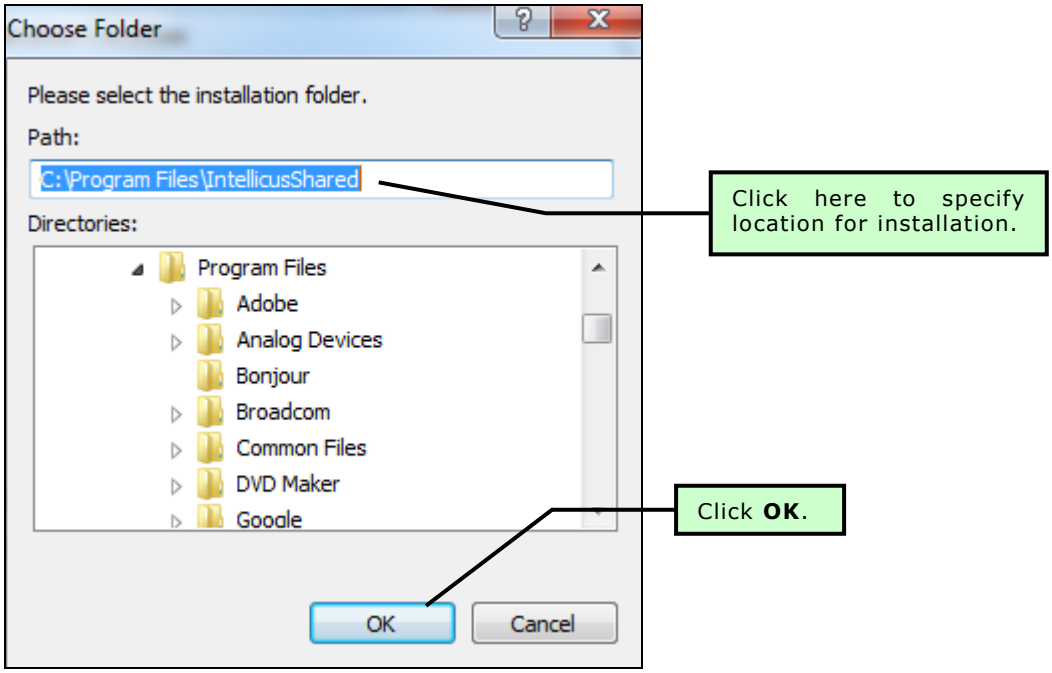

Figure 28: Custom setup: Specifying destination on Choose Folder dialog

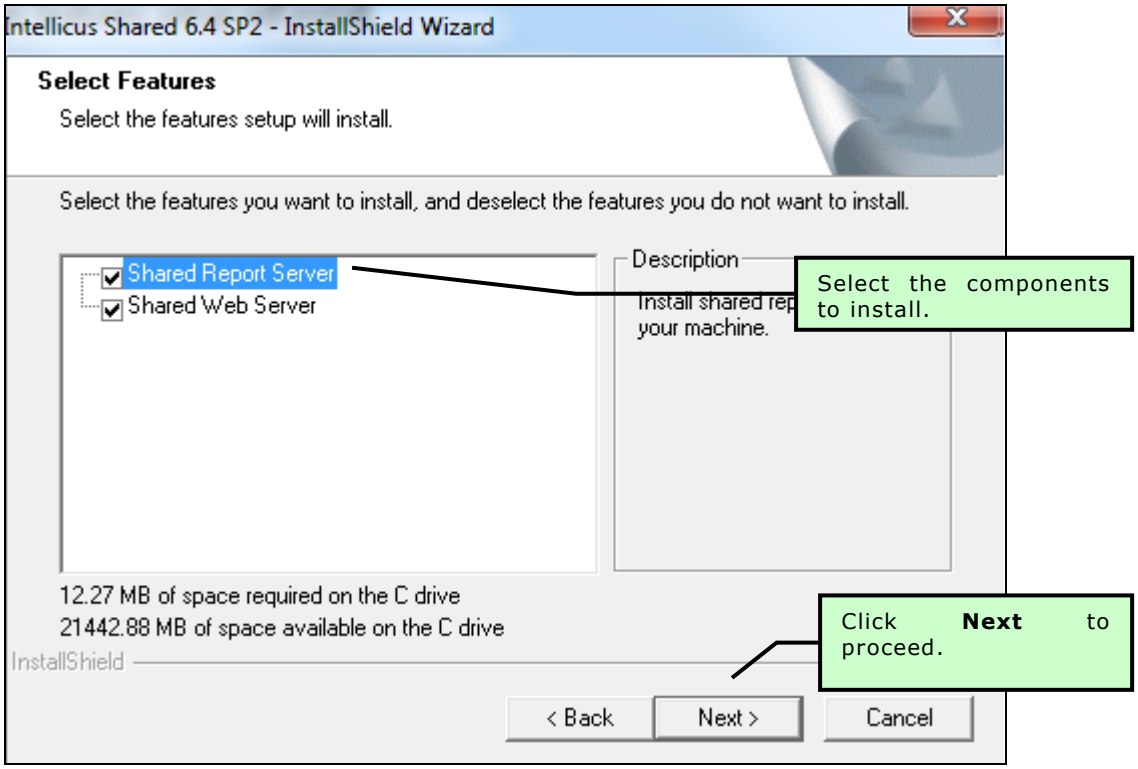

Figure 29: Custom setup > Select the components to install

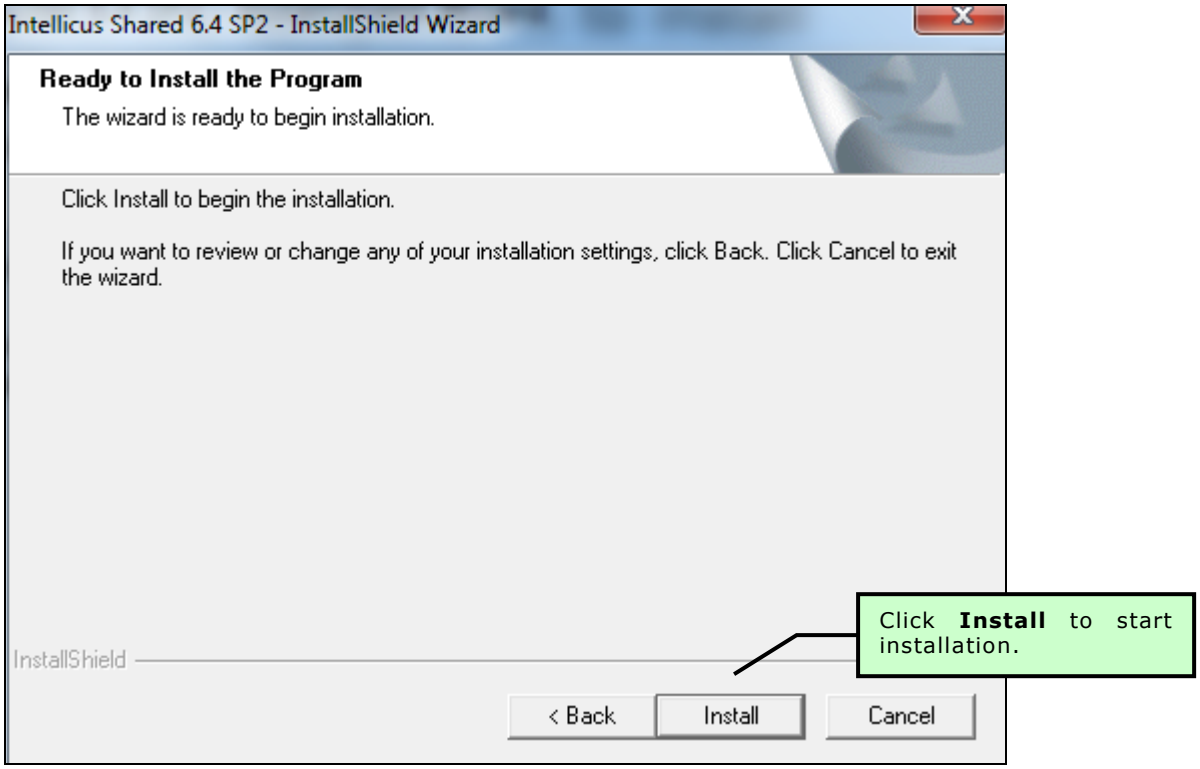

Figure 30: Ready to Install

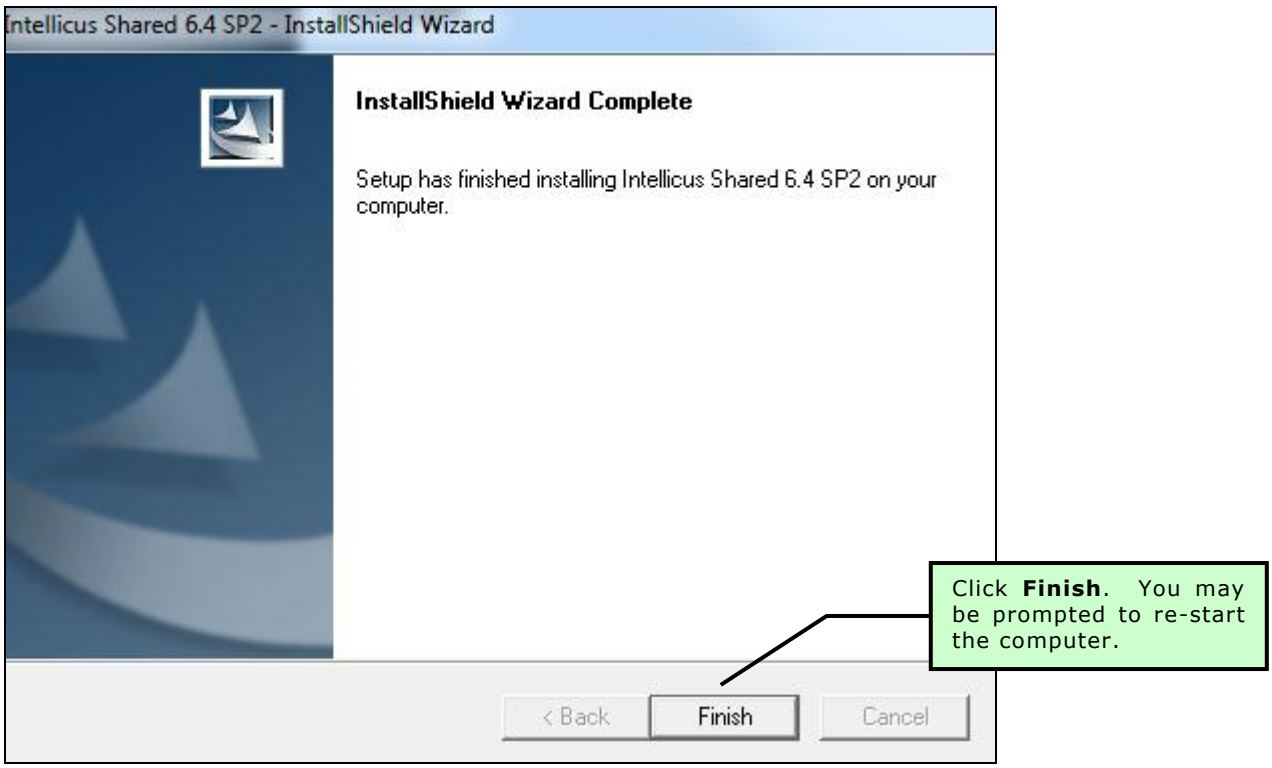

Figure 31: Installation complete

Configure each of the Cluster Report Servers

For all the cluster nodes, carry out the following configuration tasks:

- Set path of report server in cluster.properties file
- Set the port of the Cluster node in cluster.properties file
- Set schedule preferences in cluster.properties file
- Make changes in run.bat file

Path and IP information of Intellicus Report server is set in cluster.properties file. This file is at path IntellicusCluster\ClusterReportEngine\cluster folder.

Configurations in cluster.properties file

Cluster Report Server setup places file cluster.properties in IntellicusCluster\ClusterReportEngine\cluster folder.

Modify values of following properties

REPORT_ENGINE_FOLDER

In REPORT_ENGINE_FOLDER property, specify the location where Shared Intellicus Report Server is installed.

For example:

REPORT_ENGINE_FOLDER=//servers/IntellicusShared/ReportEngine

Here, "servers" is machine name on which Intellicus Report Server is installed.

REPORT_ENGINE_FOLDER= \\\\192.168.33.65\\IntellicusShared\\ReportEngine

Here, 193.45.34.24 is IP on which Shared Intellicus Report Server is installed.

Port

In LISTENER_PORT property, specify the port at which this cluster node will listen.

For example:

LISTENER_PORT = 50001.

DEPLOYMENT_TYPE

Specify STANDALONE if Intellicus is running as standalone. Specify CLUSTERED if Intellicus is running in the form of a cluster.

Default: CLUSTERED
Example: DEPLOYMENT_TYPE=CLUSTERED

Making changes in run.bat

In run.bat file specify the path where Shared Intellicus Report Server is installed. This is set in line under REPORT_ENGINE_FOLDER. For example,

REPORT_ENGINE_FOLDER=//servers/ReportEngine

Here, "servers" is machine name on which Shared Intellicus Report Server is installed.

For example, REPORT_ENGINE_FOLDER= \\193.45.34.24\Shared\IntellicusShared\ReportEngine
Here, 193.45.34.24 is IP on which Intellicus Report Server is installed.

Making changes in shutdown.bat

In shutdown.bat file specify the path where Shared Intellicus Report Server is installed. This is set in line under REPORT_ENGINE_FOLDER. For example,

REPORT_ENGINE_FOLDER=//servers/ReportEngine

Here, "servers" is machine name on which Shared Intellicus Report Server is installed.

For example, REPORT_ENGINE_FOLDER= \\193.45.34.24\Shared\IntellicusShared\ReportEngine

Here, 193.45.34.24 is IP on which Intellicus Report Server is installed.

Configure each of the Cluster Web Servers

For all the cluster web server nodes, carry out the following configuration tasks:

- Set path of report server in ReportClient.properties file
- Make changes in run.bat file

Configure portal Property file

When clustering and load balancing is installed, portal needs to point to load balancers instead of pointing to report server.

This change is made in ReportClient.properties file available on machine on which Shared Intellicus Client (portal) is installed.

When Intellicus is installed in Jakarta, this file is placed at path:

```
IntellicusShared\Jakarta\webapps\intellicus\client\config\ReportClient.properties .
```

Change values of following properties:

REGISTRY_ENABLED

Set this property to TRUE. For example:

REGISTRY_ENABLED=TRUE

REGISTRIES

Specify all IP and port of all the load balancers separated only by semi colon (no space).

Example:

REGISTRIES=201.90.56.23:60000; 201.90.88.95:60002; *

Save the file after making changes.

Configure run.bat file

Modify run.bat file (IntellicusCluster\Jakarta\bin) to set the path to read ReportClient.properties

```
set                                                PROPERTY FILENAME="-
DIntellicus.propertyfilepath=\\192.168.33.65\Shared\IntellicusSha
red\jakarta\webapps\intellicus\client\config\ReportClient.propert
ies"
```

How Property values are used

When value of REGISTRY_ENABLED is FALSE, it is assumed that clustering does not exist and client sends request to the IP specified in REPORT_ENGINE_IP property.

When value of REGISTRY_ENABLED is set to TRUE, client sends request to the 1st load balancer IP specified in REGISTRIES property.

If that load balancer is not available, client sends request to next load balancer in the list.

At a time multiple load balancers may be active. IP needs to be specified only by primary load balancer.

If the load balancer that client communicates with is not the primary load balancer, then it provides IP of the primary load balancer to the client. (So that from next time all the client requests should go to primary load balancer).

The client then checks if the load balancer IP provided exists in the list specified in REGISTRIES property.

Note: If the IP exists or it does not exist but list also has *, client sends the request to that load balancer. If it does not exist in the list; and list does not have *, then the client fallsback to the IP specified in REPORT_ENGINE_IP property.

When client sends request to the primary load balancer, It provides IP of the server where the client should send this request.

Now that the client know server IP, it sends the request to that server.

Running sequence

There is no predefined running sequence. Any of the components can be started or stopped at any time.

To run load balancer

If the machine is re-started after setup and service was also installed during installation, it will automatically start the load balancer.

As one of the results of successful installation, the setup creates a short cut in the start menu:

Start > Programs > Intellicus > Start Load Balancer

Follow this path to click Start Load Balancer to launch the Load Balancer.

Note: The load balancer that boots first, becomes primary load balancer. If primary load balancer fails, any of the secondary load balancers will become primary load balancer.

To stop load balancer

From Start menu

As one of the results of successful installation, the setup creates a short cut in start menu:

Start > Programs > Intellicus > Stop Load Balancer

Click **Stop Load Balancer** to stop the Load Balancer.

From Service Icon

This is applicable when Service was also installed during installation, is currently running and Load Balancer was started by Service.

1. Right-click the Service icon. A context-menu appears.
2. Click the **Stop Load Balancer** option.

Service will stop the Load Balancer.

To run Cluster node

As one of the results of successful installation, the setup creates a short cut in the start menu:

Start > Programs > Intellicus > Start Cluster Report Server

Follow this path to click Start Cluster Report Server to launch the Load Balancer.

To stop cluster node

From Start menu

As one of the results of successful installation, the setup creates a short cut in the start menu:

Start > Programs > Intellicus > Stop Cluster Report Server

Click **Stop Cluster Report Server** to stop the cluster report server.

Load Balancer page on Portal

When Intellicus deployed in a cluster is up and running, all further changes can be made in the environment from the **Cluster** page on Portal.

To get the **Cluster** page, click **Administration** menu pad > **Configure** option > **Cluster** tab.

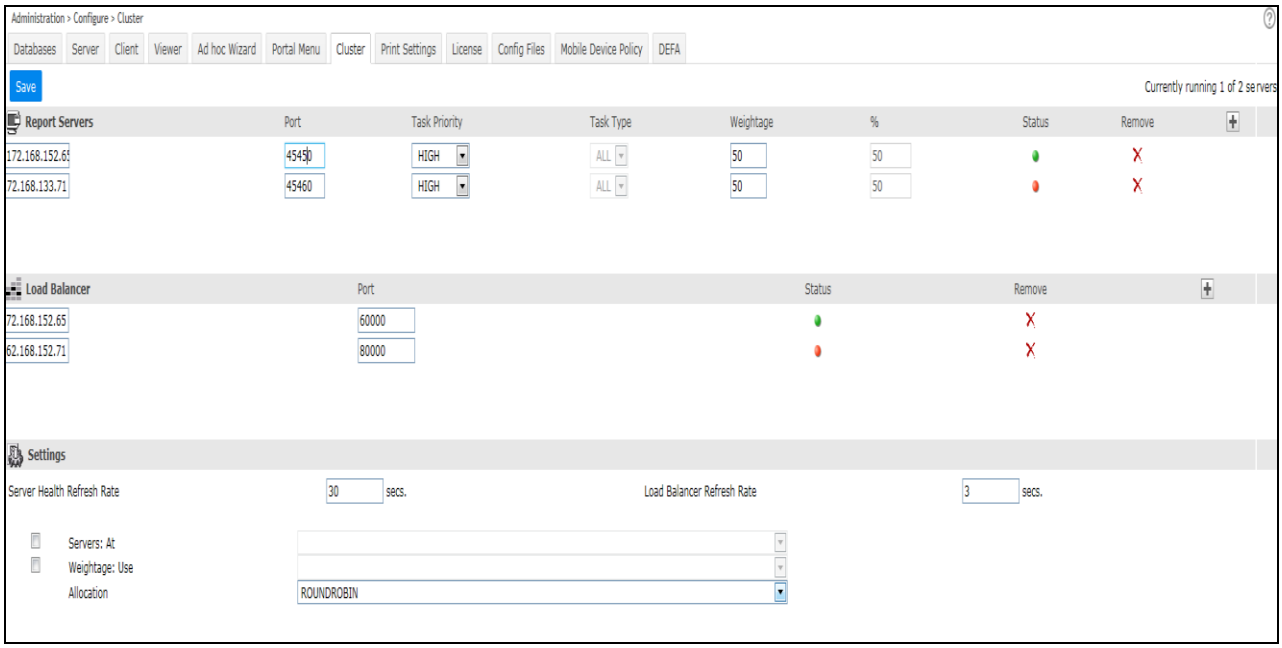

Figure 32: Cluster page on Portal

Use this page to Configure

- Cluster nodes (Report Servers)
- Load Balancers
- Settings

The information being set here is updated in the respective files on all cluster nodes, load balancers and client machines at a regular interval.

Cluster Nodes (Report Servers)

You can do following activities related to report servers:

- Add a server
- Remove a server
- Change server properties

Adding a server

1. Click icon appearing on the right side of the tab header.
2. Specify values in the empty row that is added at the end of the list.
3. Click **Save** button to save the information.

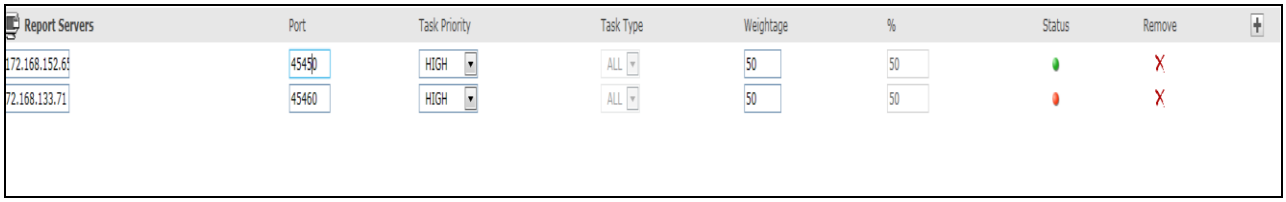

Figure 33: Adding a server in cluster

Details on Report Servers tab

- **Report Servers:** IP of the server.
- **Port:** Port at which the server is running.
- **Task Priority:** Set a value among **High**, **Medium** and **Low**.
- **Task Type:** In present version of Intellicus is it set at **ALL** and cannot be changed.
- **Weightage:** A positive integer indicating the number of tasks (out of all the requests) that should be allocated to this server.
- **%:** Weightage is auto-converted into percent and placed here.
- **Status:** A red icon indicates that that the server is presently down. A green icon indicates that the server is presently up.
- **Remove:** Click the button to remove this server.

Changing properties of server

To change any of the information, replace the existing values with new values for a server and click **Save** button.

Removing a server

1. Click the button on respective server row.
2. To proceed with the deletion, click **OK**.
3. Click **Save**.

Selected server is removed.

Load Balancers

You can do following activities related to load balancers:

- Add a load balancer
- Remove a load balancer
- Change load balancer properties

Adding a load balancer

1. Click icon appearing on the right side of the tab header.
2. Specify values in the empty row that is added at the end of the list.
3. Click **Save** button to save the information.

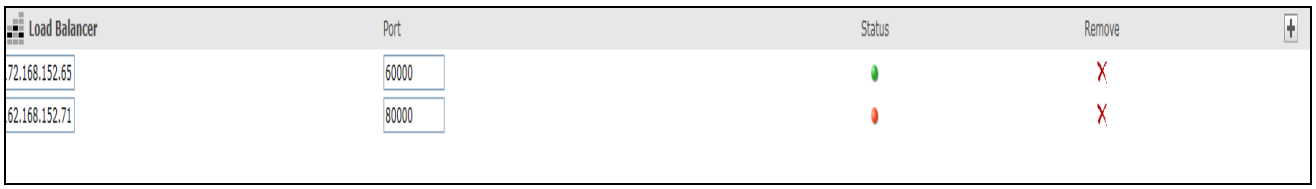

Figure 34: Adding a Load Balancer

Details on Load Balancer tab

- **Load Balancer:** IP of load balancer.
- **Port:** Port at which the load balancer is running.
- **Status:** A red icon indicates that that the load balancer is presently down. A green icon indicates that the load balancer is presently up.
- **Remove:** Click the button to remove this load balancer.

Changing properties of load balancer

To change any of the information, replace the existing values with new values for a load balancer and click **Save** button.

Deleting load balancer

1. Click the button on respective load balancer row.
2. To proceed with the deletion, click **OK**.
3. Click **Save**.

Selected load balancer is removed.

Settings

These settings are applicable to all Load balancers and Cluster nodes. The values set here decides the way load balancing will take place in this deployment.

Figure 35: Settings on Cluster page

Details on Settings tab

- **Server Health Refresh Rate:** The time interval after which primary load balancer will check if all the servers are in running state or not and the load that they are handling.
- **Load Balancer Refresh Rate:** The time interval after which load balancer will check if all the load balancers are up or not.
- **Servers: At:** Check this check box and select *Exact Priority* to allocate tasks set for respective server. Select *Upto Priority* to allocate tasks set for the set category and higher.
- **Weightage: Use:** Select this checkbox and select *Specified Weight Only* to allocate tasks as per set weightage. Select *Server Health Only* to allocate tasks based on server health (actual load on respective server).
- **Allocation:** Select the way tasks should be allocated to servers. Select *Random* to allocate tasks as per random logic. Select *Round robin* scheduling to allocate tasks one by one to servers.

After making changes click **Save** button to save the changes.