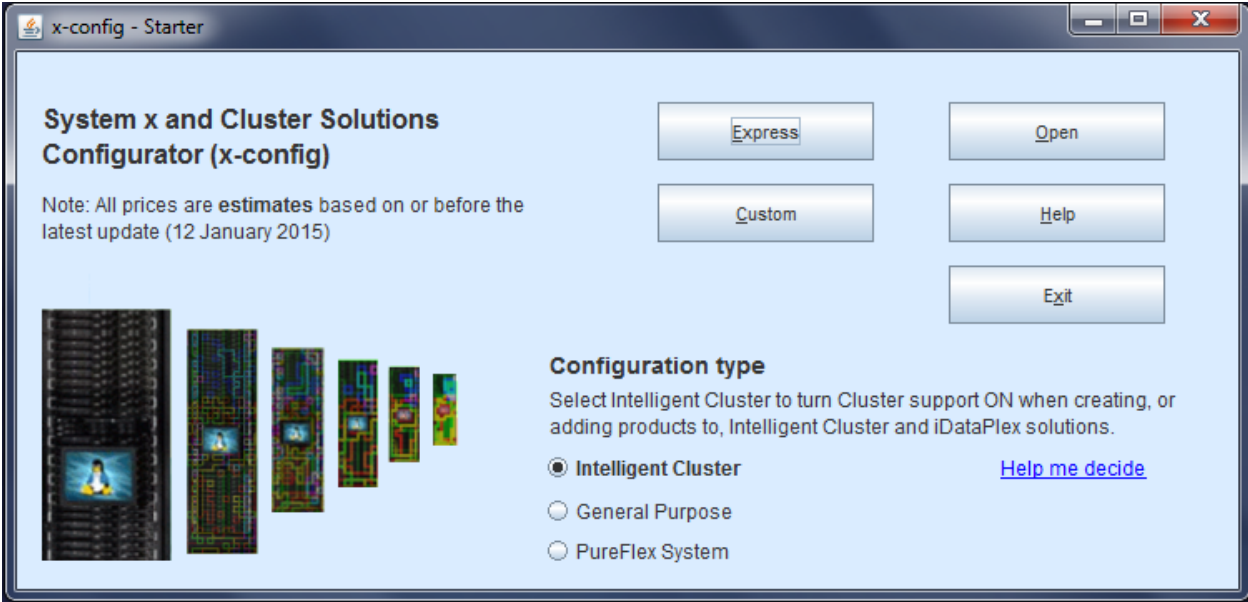


System x and Cluster Solutions Configurator (x-config)

User Guide/Mini-tutorial January 2015



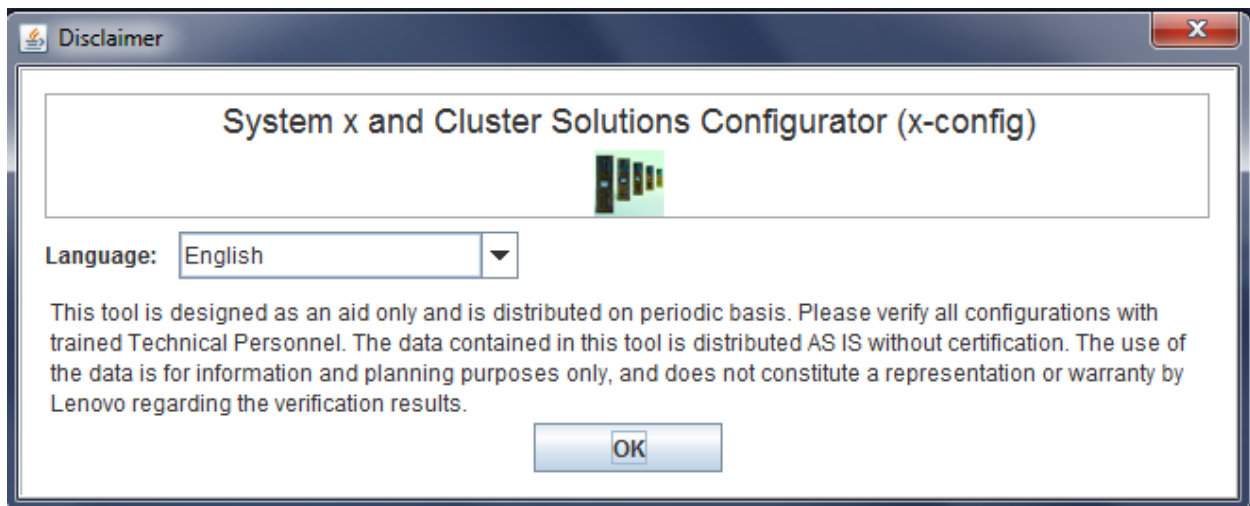
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***Note:** Images in this presentation may be slightly different from production as the configurator is continually updated to reflect new features and product selections.*

1. Lenovo disclaimer

x-config displays a disclaimer when first launching, with the following text:
This tool is designed as an aid only and is distributed on periodic basis.
Please verify all configurations with trained Technical Personnel. The data contained in this tool is distributed AS IS without certification. The use of the data is for information and planning purposes only, and does not constitute a representation or warranty by Lenovo regarding the verification results.



The user has the option of selecting the language for the user interface from this screen. Options include:

- Chinese (Simplified)
- Chinese (Traditional)
- English
- French
- German
- Italian
- Japanese
- Korean
- Spanish

2. Getting Started

If using the System x and Cluster Solutions Configurator (x-config) for the first time, this section will show you how to install the program and begin building a new solution. Throughout this guide a solution could be an iDataPlex, Intelligent Cluster, Microsoft Cluster, NeXtScale, or other Integrated Solutions available under Express => No-option solutions => Type => Template. Ensure that “Intelligent Cluster” is selected on the x-config Starter screen.

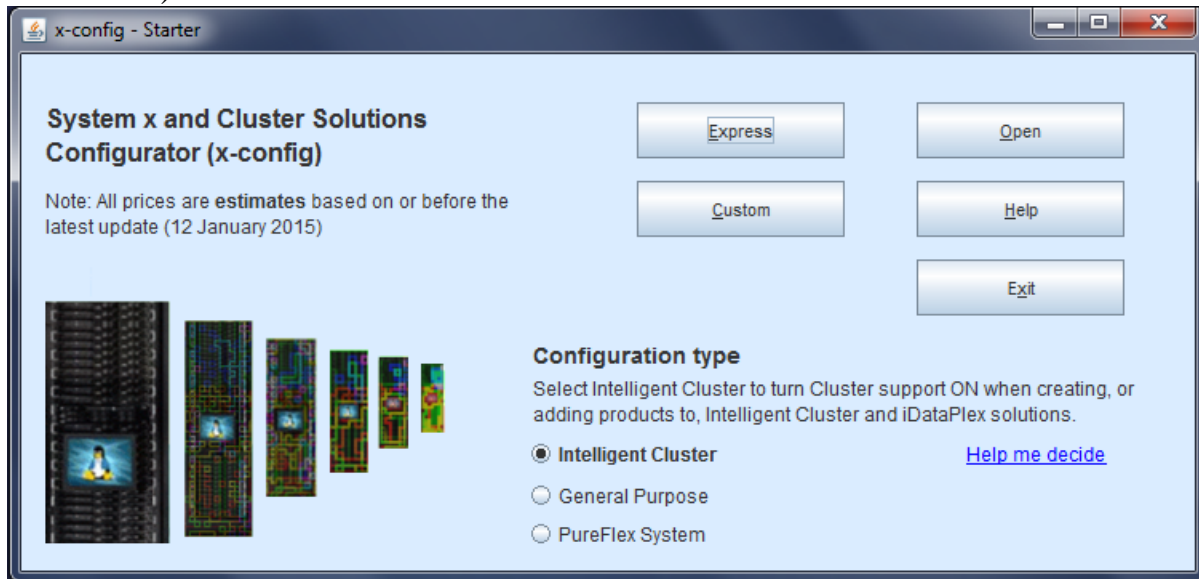
2.1. Online Install / Update x-config via the following URL -

<https://www.ibm.com/products/hardware/configurator/americas/bhui/asit/>

Note: x-config requires Oracle SDN JRE Version 6 or higher that can be obtained at the following URL: [Oracle SDN Java SE Runtime Environment 6](#)

2.2. Starter Screen

When starting the application the following screen will appear and present different ways to begin working on a new or existing solution. At any time after entering the configuration mode, the user may return to this screen by selecting the Starter option from the File menu. (*Note:* As indicated via a warning message, exiting a configuration by returning to the Starter screen will destroy any unsaved changes in the solution currently being created or modified.)



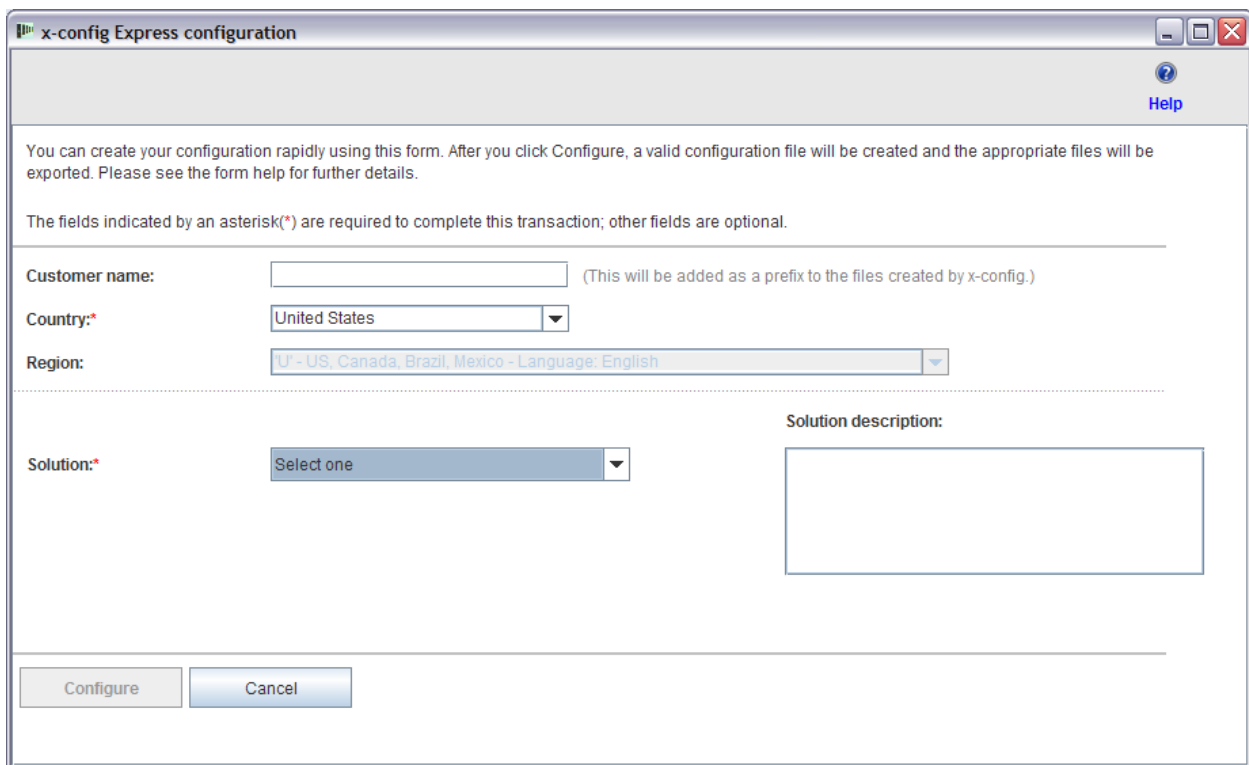
- a) Express – Quickly create a simple solution with limited options
- b) Custom – Create a new solution from scratch
- c) Open – Load a previously saved solution
- d) Help – Get help with basic functions within the tool
- e) Exit – Close x-config

3. Express Configuration

Selecting Express will allow you to quickly configure a solution with limited options.

3.1 Example: View of the iDataPlex Express configuration screen

An iDataPlex solution allows for 2 – 84 nodes (in pairs). You can also create a Solution using either an iDataPlex integrated rack, Standalone chassis with iDataPlex rail kits, or Standalone chassis with Enterprise rail kits.



The screenshot shows a window titled "x-config Express configuration". The window contains a "Help" button in the top right corner. Below the title bar, there is a paragraph of text: "You can create your configuration rapidly using this form. After you click Configure, a valid configuration file will be created and the appropriate files will be exported. Please see the form help for further details." Below this text is another line: "The fields indicated by an asterisk(*) are required to complete this transaction; other fields are optional." The form fields are: "Customer name:" with a text input field and a note "(This will be added as a prefix to the files created by x-config.)"; "Country:*" with a dropdown menu showing "United States"; "Region:" with a dropdown menu showing "U - US, Canada, Brazil, Mexico - Language: English"; "Solution:*" with a dropdown menu showing "Select one"; and "Solution description:" with a large text area. At the bottom of the window are two buttons: "Configure" and "Cancel".

3.2 Example of an iDataPlex solution using Express configuration

The screenshot displays the IBM Express Configuration software interface. The window title is 'x-config - C:\Users\Bill\Desktop\CS_JBM_20131210164929.cse'. The menu bar includes 'File', 'Preferences', 'Wizards', 'Rules', 'Actions', 'View', and 'Help'. The toolbar contains 'Save', 'Export', 'Undo', and 'Redo'. The status bar shows 'Total List Price: 657,570 USD' and 'Configuration Availability: Ships in 20 business days or less'. The 'About the configuration' panel indicates the solution is not FastPath compliant. The 'Integrated products' panel shows 'Racks', 'Items', and 'Non-racked items' tabs, with 'Rack_AUTO_85' selected. The 'Rack view/update' panel shows a diagram of a rack with 43 slots, each containing a 'Planar_Main' component. The 'Item view' panel shows details for 'Chassis_2185', including its base list price, installed options, services, and auto adds. The total rack price is 24,545 USD.

- After selecting your choices on the Express Solution Configuration screen you will be prompted to save the configuration file (.cse).
- This will also create the TMF .cfr and TMF .xls files.
- SOVA will automatically be invoked to verify the configuration.
- The resulting file name contains 'Customer name_date/time stamp', and will be preceded with 'CS' for Custom Solution.

3.3. Express => No-option solutions => Type => Template

To create integrated solutions that are not listed in the **Solution** pick list, select “No-option solutions”. The **Type** picklist will display high level configuration options, and the **Template** picklist will display options for starting points for the selected configuration type. Using a template will create a solution with server, storage, networks, and other such options already defined.

The screenshot shows the 'x-config Express configuration' window. It contains a form with the following fields and values:

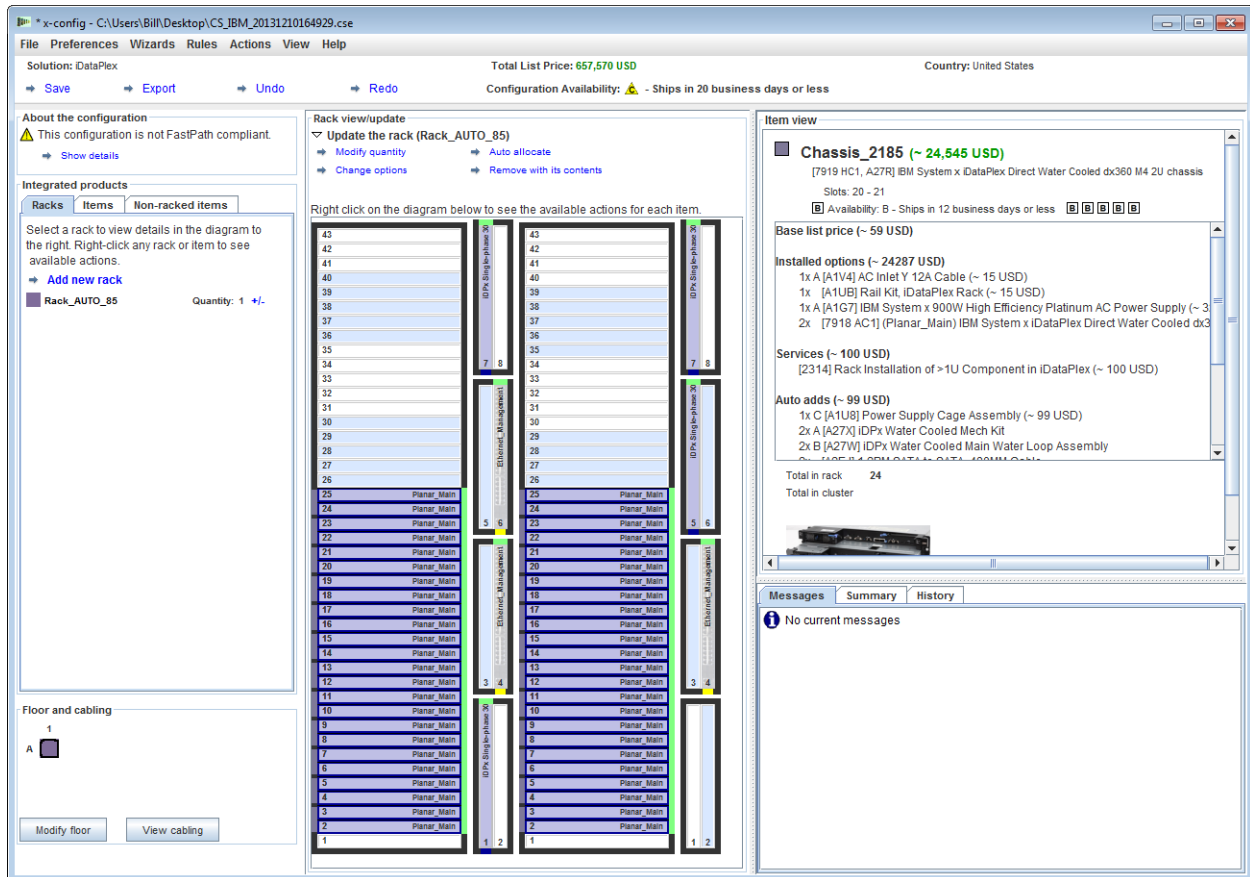
- Customer name:** (empty text box) (This will be added as a prefix to the files created by x-config.)
- Country*:** United States (dropdown menu)
- Region:** 'U' - US, Canada, Brazil, Mexico - Language: English (dropdown menu)
- Solution*:** No-option solutions (dropdown menu, highlighted with a red box)
- Type*:** Application Ready Solutions (dropdown menu, highlighted with a red box)
- Template*:** (dropdown menu with a list: Select one, Select one, Algo_large_Next_v1.3.cse, Algo_medium_Flex_v1.11.cse, highlighted with a red box)

There is also a **Solution description:** text area containing the text: "No-option solutions have no user configurable settings."

At the bottom left, there are two buttons: "Configure" and "Cancel".

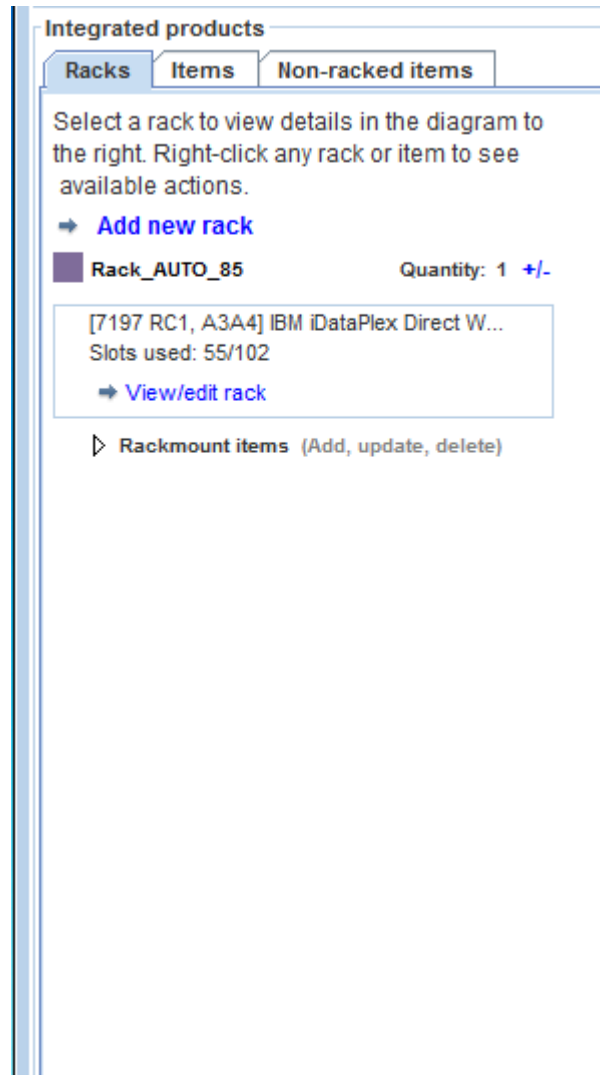
4. Creating / Modifying a Solution

The solution configuration interface appears after creating a new solution or opening an existing one. From this screen, the user can fully customize nearly every aspect of a solution. In the following example the iDataPlex solution was created via the Express mode.



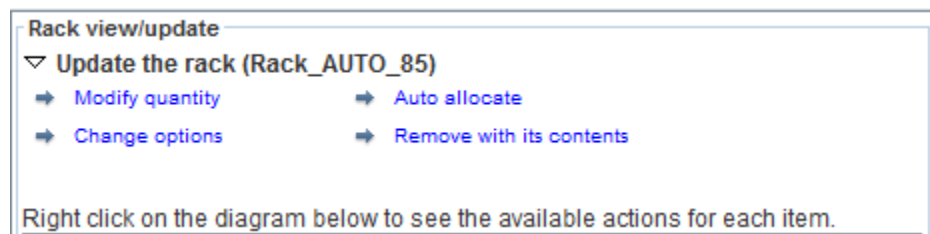
- As items are added, modified, or removed, the networking and racking rules will automatically be applied and x-config will dynamically insert the appropriate number of switches, select the required length of cabling, and select the appropriate power supplies and rack power distribution. The lower right of the screen shows current **Messages**. Additionally, a cluster **Summary** will display statistics about the current state of the entire cluster. At any point, the user can revert to a previous state of the cluster from the **History** tab and view actions previously performed on the cluster.

4.1. Cluster Level Rack Actions



- All current racks are shown on the **Rack List** on the left side of the screen.
- To create a new rack, click on the **Add New Rack** selection at top of rack list.
- To show this rack in the inspection widow, right-click on the rack and select **Inspect Rack**.
- To change rack options, such as options, label, or label color identifier, right-click on the rack and select **Change Rack Options**.

- To update the quantity of a rack, right-click on the rack and select **Update Rack Quantity**.
- To duplicate a rack into a new rack using the same options and filled with the same items, right-click on the rack and select **Duplicate Rack**.
- To remove a rack, right-click on the rack and select **Remove Rack**.
- Some of the above actions are also available at the top of the Rack View/Update for the rack currently shown in the center of the screen, as shown in the image below.



4.2. Item Level Rack Actions

- All current and available items display in the Item List on the left side of the screen.
- Left-clicking on a rack from the Racks List will bring the item into the Rack View, where the user can manually place, edit, or delete any item in that rack.
- Highlighting an item will show its details in the Item View on the right side of the screen. The Item View also shows network lines visually indicating network connections, and an action menu for that item shown in the order: Edit, Duplicate, Remove

Edit | Duplicate | Remove



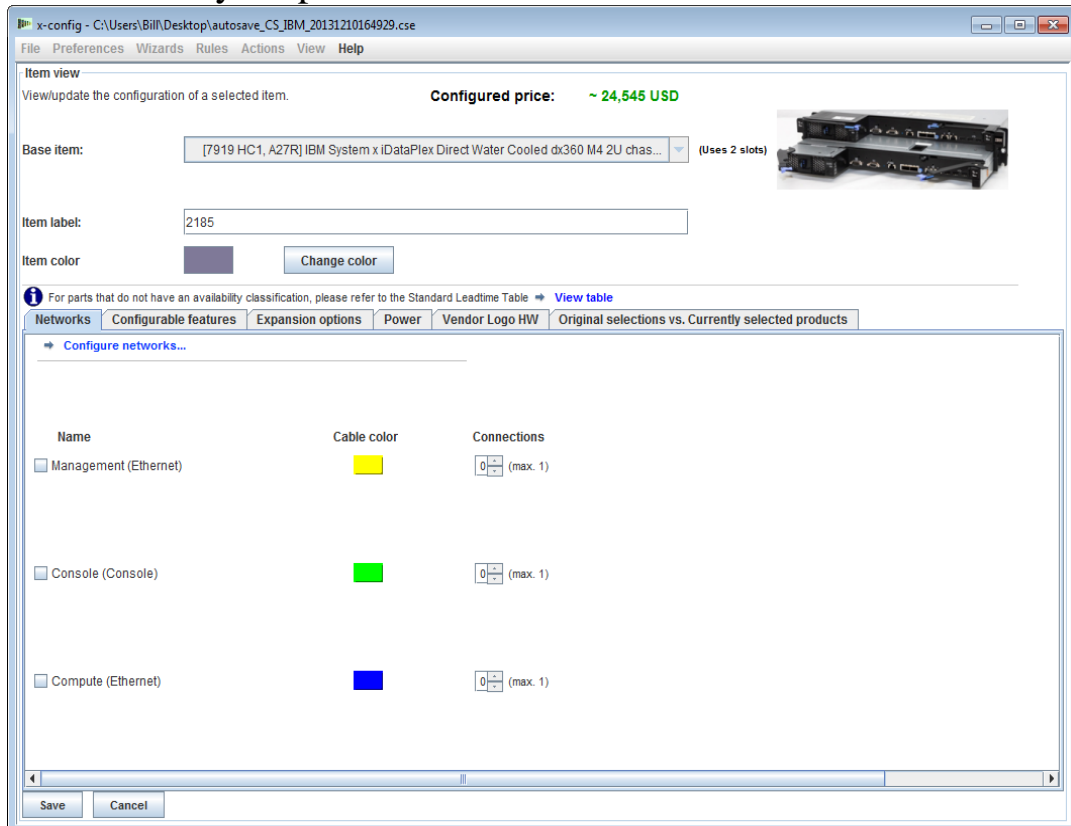
- To create a new item, highlight over an open slot in a Rack and click the blue **Add** button. This will open a pick list where the user may choose an item and then fully customize the item. After clicking **Save** to create the new item, the user may either create a single instance of the item, fill the entire rack with the item, or enter a specific quantity of the item to place into the cluster.
- To modify an existing item, highlight the item and either press **Edit** (the Notepad with a pencil) that appears directly on the item, or right-click on the item and select **Edit Item** from the menu.
- To duplicate an existing item, highlight the item and either press **Duplicate** (an arrow pointing down to the right), or right-click on the item and select **Duplicate Item** from the menu.
- To remove an existing item, highlight the item and either click **Remove** (the Trashcan) that appears directly on the item, or right-click on the item and select **Remove Item** from the menu.
- To move an item, click and drag the item to the desired location. If bumped against another item which can be moved to an adjacent slot, the item in the way will automatically move to that adjacent slot. Some items will also show blue or red boxes to the right side of some slots to indicate preferred or restricted slots, respectively.

4.3. Item Creation/Modification

When a new item is created, or an item is being modified, x-config displays the following options:

- Network connections can be configured
- Main, Expansion, Required, and/or Blade options may be selected
- Basic VLH items can be added Item label and color may be changed
- Base item type may be changed (only when creating a new item)

Adding or removing network connections will dynamically alter the available options on an item, and will automatically install or remove the appropriate hardware required for the selected networks. If the item has no way to connect to the network, it will automatically drop the network selection.



Creating a new item will present the following levels of insertion:

- Single – Create a single copy of the new item
- Pick – Pick selected spaces for this item
- Rack – Fill the entire rack with as many copies of the new item as possible
- Quantity – Create an exact number of copies of the new item into the cluster

Saving an edited item will allow the following levels of modifications:

- Global – Modify all copies of this item
- Rack – Modify all copies of this item for the current rack only
- Multi – Modify multiple copies of this item based on user selection
- Single – Modify a single copy of this item
- Cancel – Cancel all modifications

Removing an item will present the following levels of removal:

- Single – Remove a single copy of the item
- Multi – Remove multiple copies of the item based on user selection
- Rack – Remove all copies of the item from the current rack
- Global – Remove all copies of the item from the entire cluster

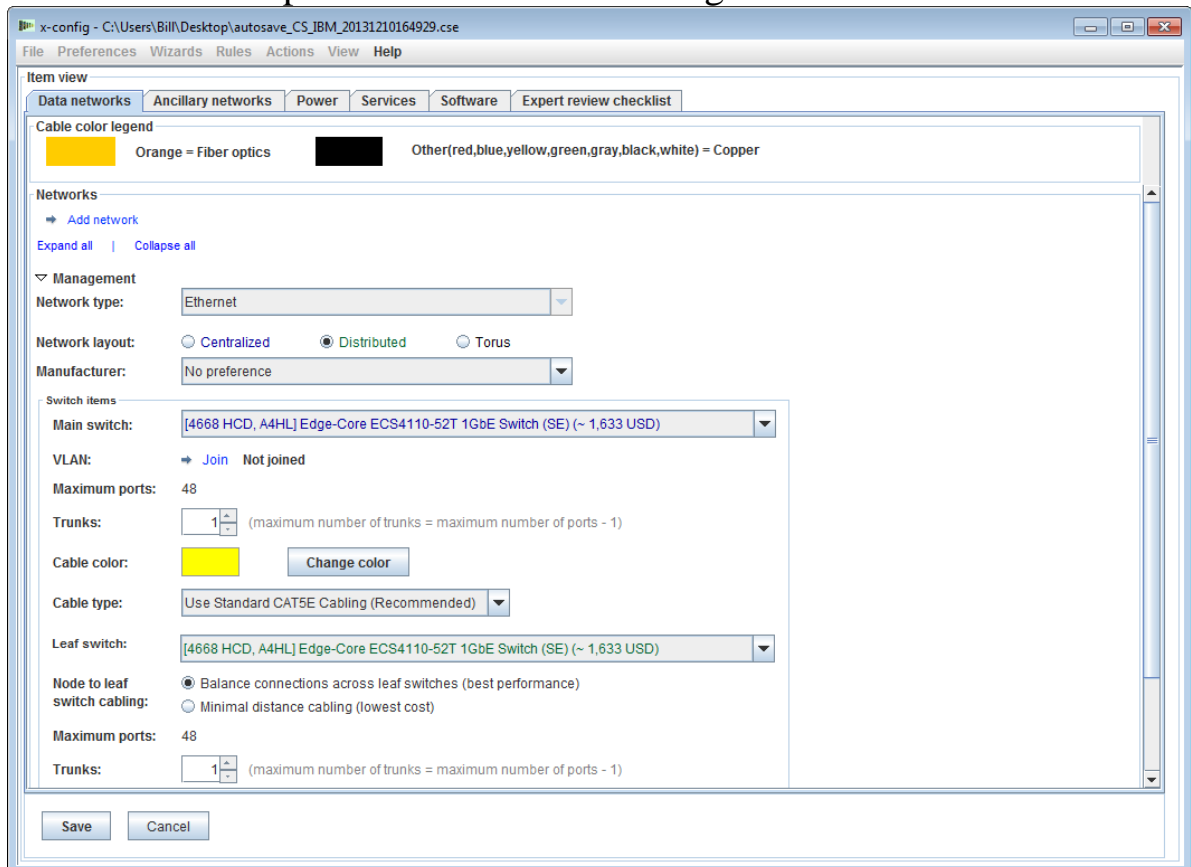
Note: When saving an item in any way other than globally, a new “template” or “version” of the item will be created, and any modified settings will only apply to the selected template or version. Any previous versions of the item outside the scope of the modification will remain unchanged. This will be reflected by a different label name and label color given to the new item.

5. Cluster Preferences

To open the Cluster Preferences, select Cluster Preferences from the Preferences menu selection.

5.1. Networks

Adding, changing, and removing networks and their settings are available under the Data Networks tab. The color button box next to the network type selection is the cable color for that network. Clicking on the button will provide a choice of more than one possible color selection for that particular network's cabling.



5.2. Power, Services, and Software

Select the desired option in these tabs to change the cluster Power type selection, cluster level services, and software.

5.3 Expert Review Checklist

Answer the checklist questions carefully so the Solution center and reviewers have all the pertinent information on the customers Solution requirement. This information is mandatory in most configurations. This information will also help to architect the solution and to troubleshoot the configuration as designed.

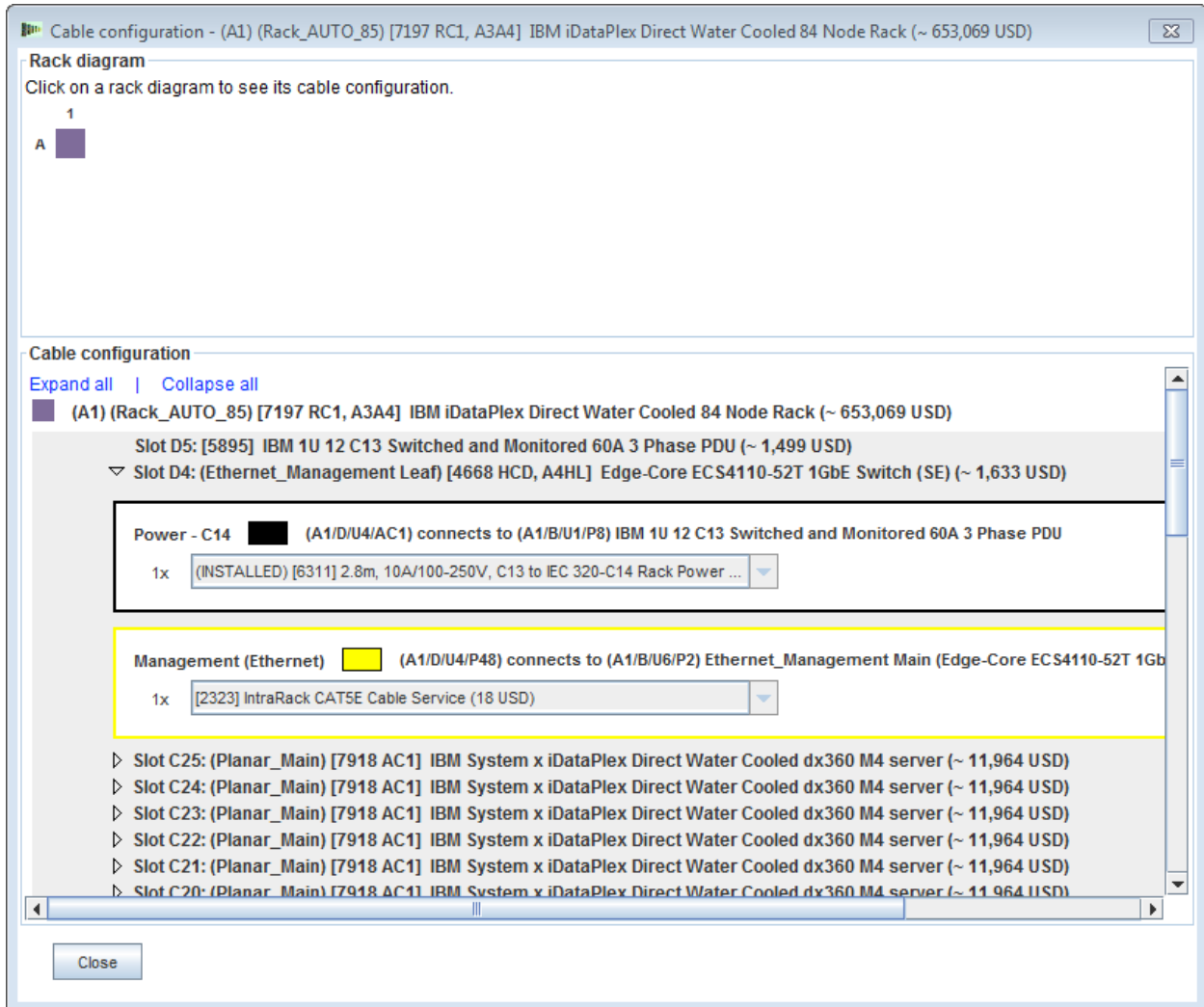
6. Solution Rules

Important note: Solution rules are important for successfully configuring solutions, and therefore should always be left on. If advanced users need to disable rules, as should only be done when the automation processes are not sufficient to meet the specific needs of the cluster, then the advanced user may choose to disable the automatic networking or racking rules. x-config displays the options to disable/enable the rules in the **Rules** menu.

- Disabling networking rules will prevent the solution from dynamically adjusting any switches, adapters, servers, and cabling.
- Disabling racking rules may prevent the solution from enforcing certain rules designed to keep all items in the cluster in accordance with Intelligent Cluster and racking standards.

7. Cabling

To view cabling, select **Cabling Preferences** from the **Preferences** menu. All cables are automatically selected based on network cable color and length required to make the connection from source to destination.



8. User View Options

There are a few options available to the user under the View menu to simplify the cluster building experience:

- **Rack View Size** – Extra Small, Small, Medium, and Large are available. These are automatically selected based on the user's system screen display size settings. In the order specified above, the recommended display requirements are 1024x768, 1280x1024, 1600x1200, respectively.
- **Rack List Orientation** – Ability to set Rack view either as upright or toppled over if you change the default from Show Rack Icons off to Show Rack Icons on.
- **Part Numbers** – Shows or hides TMF and/or HVEC part number information with item descriptions.
- **Show Color Labels** – Toggles the display of the item color labels to the left of each item in the middle Rack View area.
- **Show Network Lines** – Toggles the display of item network connections for the highlighted item. Lines to another item in the same rack indicate a connection to that item, whereas a line inside the circle on the highlighted item indicates a connection to an item outside the rack.
- **Show Images** – Toggles the display of actual image pictures on top of each item. Disabling this may increase the performance for some computers.
- **Show Allocation** – Toggles the display of the rack allocation gradient to the right of each item in the middle Rack View area. According to the weight distribution of the item, a lighter shade of green indicates a lighter weight allocation.

9. Tutorial

This section is a quick step-by-step to the creation of a simple cluster from scratch to get the user acquainted with the interface.

- a. Start by creating a new cluster from scratch by selecting **Custom** from the Starter screen, with “Intelligent Cluster” selected. Choose Intelligent Cluster. Choose the appropriate Country and Region. Choose ‘Full catalog – also include general racking components for special bids’. Choose the desired Rack power settings. Lastly choose **Finish**.
- b. In the first automatically created rack, highlight over any slot and press the blue **Add** button. Select Server, then New Server from the menu.
- c. In the **Item View** section, type in a different label name for this item in the field next to Item Label, choose appropriate Node role, then click **Change color** below the label field and choose any color for the new item.
- d. Select a server type from the box next to **Base Item**.
- e. Check the box next to Compute (Ethernet) under the **Networks** tab section, to give this item a Compute server connection.
- f. Make some changes to the option under the **Standard features and services** and **Expansion Options** sections.
- g. Click **Save**, and select the first option, which indicates that only a single item will be placed in the current rack.
- h. Highlight over another empty slot and press the blue **Add** button. Select Server, this time you should see the item which was previously created listed in the menu above the New Server button. Click the previously created item from the Server menu, and select the third option, which indicates that the current rack will be filled with as many of this item as it can hold without affecting other items in the rack or creating a new rack.
- i. Open the Cluster Preferences screen from the Preferences menu choice.
- j. Change the Management Network at the top to Distributed using the radio button.
- k. Click **Add Network** at the top of this panel and type in a name for the new network.
- l. Click **Save**, then click **OK**.
- m. Some items may have been moved to other racks to account for the new leaf switch that was created. If so, remove the extra rack by right-

- clicking on it from the Rack List on the left of the screen and clicking **Remove Rack**.
- n. Edit one of the servers created earlier by right-clicking the item and selecting **Edit Item** from the menu.
 - o. Select the newly created network for connection to this server in the **Networks** tab section.
 - p. Change a few of the options under **Standard features and services**.
 - q. Click **Save**, and select the first button to indicate making the changes to all instances of the item.
 - r. Create a new rack by clicking on **Add new rack** from the Rack List.
 - s. Add the previously created item by clicking the blue **Add** button again, this time selecting the fourth option on the dialog that appears, indicating a specific quantity of the item to be added. Enter any amount, and then click **OK**. Try 100, 1000, or even 10,000. *Note:* some systems may take a long time to draw and perform cabling for more than a few hundred racks.
 - t. Save the cluster by clicking **Save** from within the **File** menu.
 - u. Now you have completed a cluster configuration of at least 100 servers. Enjoy!

100 Node Intelligent Cluster

x-config - C:\Users\Bill\Desktop\CS_ibm guide.cse

File Preferences Wizards Rules Actions View Help

Solution: Intelligent Cluster, General Purpose Total List Price: **1,154,140 USD** Country: United States

Save Export Undo Redo Configuration Availability: **B** - Ships in 12 business days or less

About the configuration
 ⚠ This configuration is not FastPath compliant.
 Show details

Integrated products

Racks Items Non-racked items

Select a rack to view details in the diagram to the right. Right-click any rack or item to see available actions.
 Add new rack

- Rack_1 Quantity: 1 +/-
- Rack_2185 Quantity: 2 +/-
- Rack_2185_AUTO_85 Quantity: 3 +/-
- Rack_AUTO_85 Quantity: 1 +/-

Rack view/update
 Update the rack (Rack_1)
 Modify quantity Auto allocate
 Change options Remove with its contents

Right click on the diagram below to see the available actions for each item

Item view

Ethernet_Management Leaf (~ 2,828 USD)
 [4668 HCD, A4HL] Edge-Core ECS4110-52T 1GbE Switch (SE)
 Slot: 22
 Availability: B - Ships in 12 business days or less

Base list price (~ 1349 USD)

Installed options (~ 1404 USD)
 1x A [6311] 2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power C
 1x [A4HA] Edge-Core ECS Enterprise Rack Mount Hardware - Kit 1
 4x B [3268] -SB- IBM SFP RJ45 Transceiver (~ 299 USD)

Services (~ 75 USD)
 [2305] Rack Installation of 1U Component (~ 75 USD)

Network connections
 Ethernet: Total Ports=52
 Management (Ethernet): Trunks Out=1

Environmentals
 Power and cooling data provided by x-config is based on nameplate
 Current (@200V) = 0.33 A

Total in rack 1
 Total in cluster

Messages Summary History

Cluster Racks Items Networks

Note: Power and cooling data provided by x-config is based on nameplate c

- Total list price ~ 1,154,140 USD
- Current (@200V) ~ 492.21 A
- Max power load ~ 97841.00 W
- Total weight ~ 5646.64 kg
- Total BTU ~ 333882.33 btu/hr

Floor and cabling

1 2 3 4
 A
 B
 C
 D

Modify floor View cabling

10. Help and Support

The [x-config: Help and Support page](#) provides a variety of information on separate tabs:

- **Release notes:** Links to x-config enhancements, updated weekly and the current limitations/workarounds list
- **Education:** Detailed training for configurations using any of the three configuration types displayed on the Starter page: Intelligent Cluster, General Purpose, and PureFlex System
- **FAQ:** Frequently asked questions
- **Help contacts:** Configuration support information and specific instructions to report problems