

StorageGuard™

Golden Standard Comparison

User Guide

October 2025



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Introduction

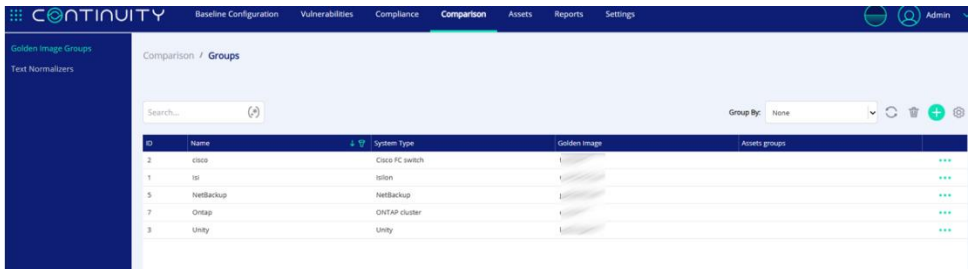
Starting with StorageGuard 9.2.7, you can benchmark each asset’s configuration against a designated “Golden Standard” asset. The tool compares outputs of the same commands on both assets and highlights the meaningful differences. This helps you quickly spot and fix baseline drifts, keeping configurations consistent and security posture aligned across the fleet.

How to use it

Group of assets to compare

Creating new group

1. Open the tool by clicking the “Comparison” tab in the top side of StorageGuard WebUI



2. Click (+) “Add new” to create a new Comparison group

Add Group ✕

Name

Description

Default Text Normalizer ▼

System Type ▼

Golden Image Select

Assets to compare Select

Assets groups ▼

3. Type “Name” and “Group Description”

4. Choose a Default Text Normalizer (explained in a separate section). Leave empty to allow automatic selection

5. Choose preferable “System Type” from the list

6. Choose “Golden Image” asset from the list by clicking “Select”. Click “Apply”

Golden Image ✕

(?)

Name	Site	IP address	Scan status	Verify

11 rows

50 1 < > 1

7. Choose assets to compare from the list by clicking “Select”. Click “Apply”

Selected Assets

Search...

	Name	Site	IP address	Scan status	Verify
☒	ontap1	ONTAP	10.10.10.10	Success	
☒	ontap2	ONTAP	10.10.10.11	Success	
☒	ontap3	ONTAP	10.10.10.12	Success	
☐	ontap4	ONTAP	10.10.10.13	Success	
☐	ontap5	ONTAP	10.10.10.14	Success	
☐	ontap6	ONTAP	10.10.10.15	Success	
☐	ontap7	ONTAP	10.10.10.16	Success	
☐	ontap8	ONTAP	10.10.10.17	Success	
☐	ontap9	ONTAP	10.10.10.18	Success	
☐	ontap10	ONTAP	10.10.10.19	Success	

3 out of 11

Show 50 1 < 1 > 1

Apply

Alternatively, select a predefined Assets Group (if exists) from the list

Assets groups

Isilon Gr1 X

- ☒ All (1) Selected
- ☒ Isilon Gr1

8. Click “Apply” to apply changes or ‘X’ to cancel

Edit group

1. Double-click the relevant entry in the Groups table to edit it

Edit Group

Name: Ontap

Description:

Default Text Normalizer: Default normalizer for Ontap (1)

System Type: ONTAP cluster

Golden Image: cluster1

Assets to compare: [Assets list]

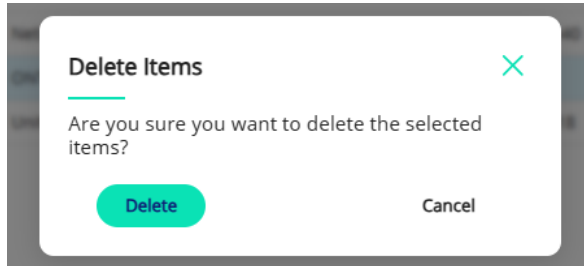
Assets groups: Select Assets groups

Apply

2. Make changes and click “Apply” to save or ‘X’ to cancel and exit

Delete group

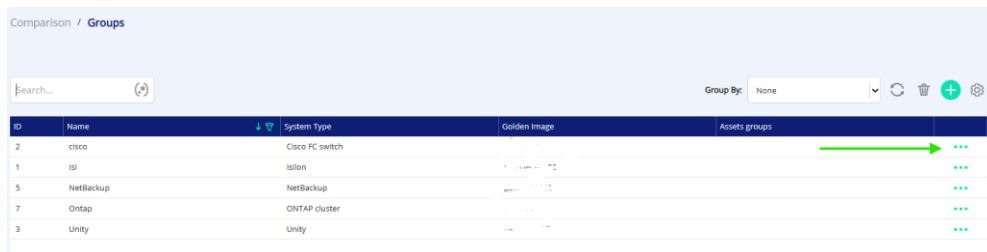
1. Select a Golden Image group to delete and click “Delete” icon



2. Click “Delete” to remove the group, or “Cancel” to undo your selection

Review results

To review results in **Summary View** or **Detailed View**, click the “...” next to the relevant Golden Image group entry.

A screenshot of a web application interface showing a table of Golden Image groups. The table has columns for ID, Name, System Type, Golden Image, and Assets groups. A green arrow points to the three-dot menu icon in the Assets groups column for the first row (ID 2, Name cisco).

ID	Name	System Type	Golden Image	Assets groups
2	cisco	Cisco PC switch		...
1	ISI	Isilon		...
5	NetBackup	NetBackup		...
7	Ontap	ONTAP cluster		...
3	Unity	Unity		...

Summary view

The **Summary View** provides an overview of configuration comparison results (asset vs “Golden Copy”) across all assets in the selected Golden Image group.

Comparison / Groups / cisco

Group: cisco System Type: Cisco FC switch Golden Image: SN: IP: ☐ Show Ignored Commands Detailed View

Show all

Assets in Group	Asset 1	Asset 2	Asset 3	Asset 4	Asset 5	Asset 6
CiscoExpansionPackage/show aaa authentication	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show hardware	✓	N/A	✗	✗	✗	✗
CiscoExpansionPackage/show hardware inc 'Device name:'	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show http	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show ip interface mgmt0 inc internet	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show logging server	✓	N/A	✗	✓	✗	✓
CiscoExpansionPackage/show ntp peer-status	✓	N/A	✗	✗	✗	✗
CiscoExpansionPackage/show role brief	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show role name default-role	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show role network admin	✓	N/A	✓	✓	✓	✓
CiscoExpansionPackage/show snmp user	✓	N/A	✗	✗	✗	✓

- Each **row** represents a specific command or configuration item.
- Each **column** represents an asset included in the group.
- **Check marks (✓)** indicate that the configuration matches the Golden Copy.
- **Red X marks (✗)** indicate a mismatch or deviation.
- **N/A** means the data for that command is not available for the asset.
- The top-right area lists all assets in the group. You can remove or re-add assets to focus on specific ones.
- Use the navigation arrows to scroll horizontally between assets.
- Filters at the top allow you to limit the view by result type or search for a specific command.

This view helps quickly identify which assets deviate from the Golden Image baseline

Detailed View

The **Detailed View** displays side-by-side configuration differences between the selected asset and its Golden Image reference.

By Commands:

Search...

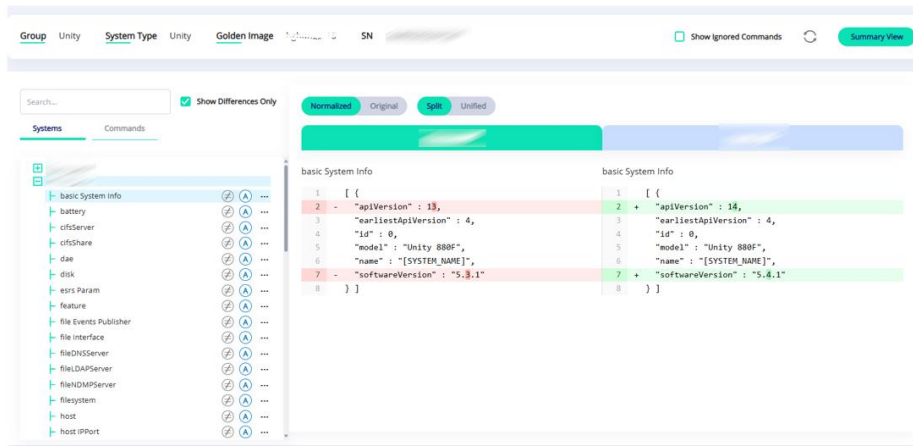
Systems Commands

basic System Info

Golden Image asset

Golden Image asset	Selected System
1 [{	1 [{
2 - "apiVersion" : 18,	2 + "apiVersion" : 18,
3 "earliestApiVersion" : 4,	3 "earliestApiVersion" : 4,
4 "id" : 0,	4 "id" : 0,
5 "model" : "Unity 880F",	5 "model" : "Unity 880F",
6 "name" : "[SYSTEM_NAME]",	6 "name" : "[SYSTEM_NAME]",
7 - "softwareVersion" : "5.3.1"	7 + "softwareVersion" : "5.4.1"
8] }	8] }

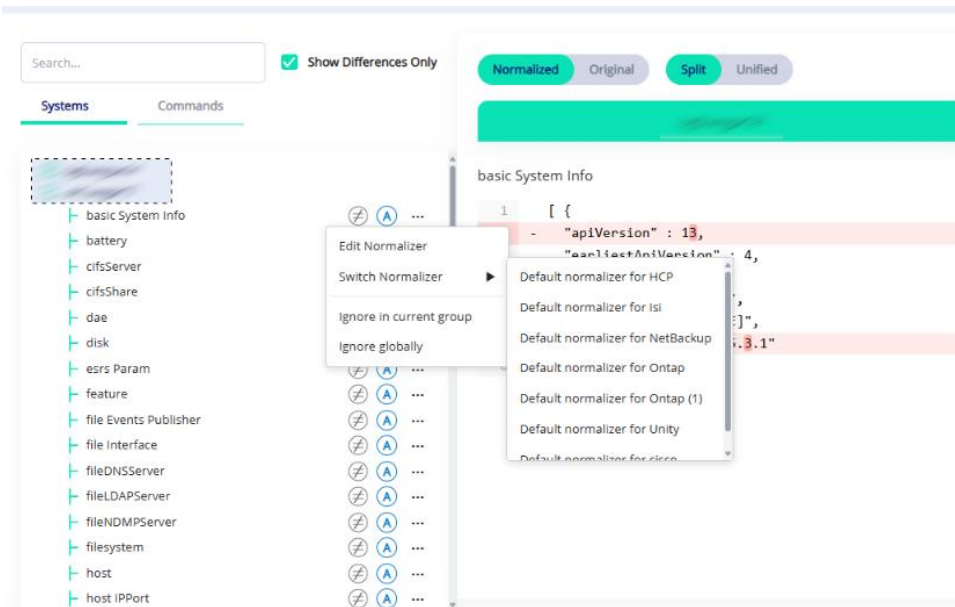
By Systems:



- The **left panel** lists all systems and commands included in the comparison.
- Selecting a command shows the **detailed comparison output** in the main area.
- The **left pane** of the comparison shows the Golden Image configuration, and the **right pane** shows the compared asset.
- Differences are **highlighted in color**:
- **Red** marks removed or mismatched values.
- **Green** marks added or differing values.
- Use the toggle buttons to switch between **Normalized**, **Original**, **Split**, and **Unified** views.
- Enable **Show Differences Only** to hide identical lines and focus on deviations.
- Use the **Show Ignored Commands** checkbox to include or exclude commands filtered out by Text Normalizers.
- **Unequal (≠) icon**: Indicates that the command output for this asset differs from the Golden Image.
- **A, T, Y, X icons**: Show which **Text Normalizer** (default Automatic, Text, YAML/JSON, XML) has been applied to this command to clean and standardize the output before comparison (for example, to ignore timestamps or unique identifiers).

Command Options menu

Click the “...” icon next to a command to manage how its output is compared and normalized.

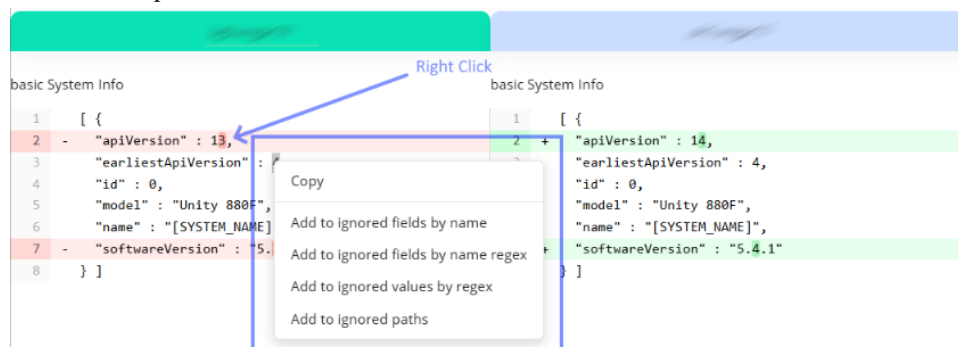


- **Edit Normalizer** – Opens the Text Normalizer editor for this command, allowing you to adjust rules that clean or ignore specific patterns.
- **Switch Normalizer** – Lets you apply a different built-in or custom normalizer (for example, for Unity, NetBackup, or Ontap systems).
- **Ignore in current group** – Excludes this command from comparison results only in the selected Golden Image group.
- **Ignore globally** – Excludes this command from all comparisons across all groups.

Use this menu to control how command outputs are processed and ensure only meaningful differences are displayed.

Ignoring differences by creating Normalization Rules

Right-click menu in Detailed View comparison results area: Use this menu on a highlighted difference to clean noise in future compares.



- **Copy:** Copies the selected text.
- **Add to ignored fields by name:** Hides diffs for this exact JSON field name.
- **Add to ignored fields by name regex:** Hides fields whose names match a regex pattern.
- **Add to ignored values by regex:** Hides values that match a regex pattern, regardless of field name.
- **Add to ignored paths:** Hides diffs for this full JSON path.

Notes:

The image shows a configuration interface with three tabs: **Array Comparison**, **Numerical Comparison**, and **String Comparison**. The **Array Comparison** tab is selected and contains the following settings:

- ☐ Ignore Array Order
- Sort Array Elements by Key:
- ☐ Ignore Extra Array Items
- ☒ Require All Array Items Present
- Match Array Items By:
 - ☒ Strict Equality
 - ☐ Fuzzy Match
- Unique Key:

The **Numerical Comparison** tab shows: Floating Point Tolerance:

The **String Comparison** tab shows:

- ☐ Ignore Case
- ☐ Normalize Unicode
- ☐ Trim Whitespace

An **Apply** button is located at the bottom center of the interface.

General Settings

- **Ignore Whitespace and Formatting:** Ignores differences in spacing or line breaks.
- **Sort Object Keys Alphabetically:** Ensures object keys are ordered consistently.
- **Remove Empty Strings:** Removes fields with empty string values.
- **Remove Null Values:** Removes fields with null values.

Coerce Data Types

- **Numbers to Strings:** Converts numbers to strings for consistent comparison.
- **Strings to Numbers:** Converts string numbers to numeric values.
- **Booleans to Strings:** Converts true/false values to strings for consistency.

Field Exclusions

- **Ignore Paths:** Enter full JSON paths to exclude from comparison.
- **Ignore Fields By Name:** Exclude fields by exact name.
- **Ignore Fields By Name Regexp:** Use regex patterns to exclude fields (e.g., `(?i)(date|time)`).
- **Ignore Values Regexp:** Use regex to exclude dynamic or timestamp values (e.g., `\d{4}-\d{2}-\d{2}[T]\d{2}:\d{2}:\d{2}(?:\.\d+)?(?:Z|[-+]\d{2}:\d{2})?`).

Array Comparison

- **Ignore Array Order:** Treats arrays with the same elements but different order as identical.
- **Sort Array Elements by Key:** Defines which key to use for sorting array elements before comparison.
- **Ignore Extra Array Items:** Skips extra items in arrays that do not exist in the Golden Image.
- **Require All Array Items Present:** Ensures every item from the Golden Image is present in the compared output.
- **Strict Equality:** Compares array items exactly, including data type and value.
- **Fuzzy Match:** Allows minor variations when comparing array items.
- **Unique Key:** Defines a key that uniquely identifies array elements for more accurate matching.

Numerical Comparison

- **Floating Point Tolerance:** Defines the acceptable difference range between two floating-point numbers (e.g., 0.01 ignores minimal rounding differences).

String Comparison

- **Ignore Case:** Treats uppercase and lowercase letters as equal.
- **Normalize Unicode:** Ensures consistent handling of special or accented characters.
- **Trim Whitespace:** Removes leading and trailing spaces before comparison.

TEXT tab

The screenshot displays the diff2html configuration interface, organized into six main sections:

- System Identity Settings:** Includes checkboxes for replacing system name, IP address, and serial, each with a corresponding placeholder field (e.g., {SYSTEM_NAME}).
- General:** Features a 'Normalize Line Endings To' dropdown (set to LF), and checkboxes for ignoring empty lines, trailing/leading whitespace, unicode, text case, and sorting lines.
- Exclusions:** Contains an 'Exclude Lines Matching Regex' field, a 'Redaction Patterns Regex' list with several patterns, and a 'Redaction Placeholder' set to [REDACTED].
- Line Content:** Includes checkboxes for trimming line whitespace, normalizing internal whitespace, and converting tabs to spaces, along with a 'Tab Width' input field.
- Comments:** Features checkboxes for ignoring full line and inline comments, and fields for defining 'Full Line Comment Prefixes' and 'Inline Comment Delimiters'.
- Key Value Pair:** Includes an 'Enable Key Value Pair Parsing' checkbox, a 'Key Value Separator' field, and checkboxes for trimming keys/values and ignoring case for keys/values.

General

- **Normalize Line Endings To:** Converts all line endings to a consistent format (e.g., LF for Unix).
- **Ignore Empty Lines:** Skips blank lines in the comparison.
- **Ignore Trailing Whitespace:** Ignores spaces or tabs at the end of lines.
- **Ignore Leading Whitespace:** Ignores spaces or tabs at the start of lines.
- **Normalize Unicode:** Ensures consistent encoding for special or accented characters.
- **Ignore Text Case:** Treats uppercase and lowercase text as equal.
- **Sort Lines:** Compares lines alphabetically rather than by their original order.

Exclusions

- **Exclude Lines Matching Regex:** Removes lines matching a regex pattern (e.g., `^\s*$` ignores empty lines).
- **Redaction Patterns Regex:** Defines regex patterns for sensitive or dynamic values such as timestamps, IDs, or serials.
- **Redaction Placeholder:** Replaces any redacted content with a fixed token (e.g., `[REDACTED]`).

Line Content

- **Trim Line Whitespace:** Removes leading and trailing whitespace on each line.
- **Normalize Internal Whitespace:** Replaces multiple spaces or tabs within a line with a single space.
- **Convert Tabs to Spaces:** Converts tabs to spaces using the defined width.
- **Tab Width:** Defines the number of spaces to replace each tab (default is 4).

Comments

- **Ignore Full Line Comments:** Skips lines that contain only comments.
- **Full Line Comment Prefixes:** Define symbols that mark full-line comments (e.g., `#`, `;`, `//`).
- **Ignore Inline Comments:** Removes comments appearing at the end of a line.
- **Inline Comment Delimiters:** Define symbols used for inline comments (e.g., `#`, `//`).

Key Value Pair

- **Enable Key Value Pair Parsing:** Activates parsing for files with key-value structures (e.g., `key=value`).
- **Key Value Separators:** Defines the characters used to separate keys and values (e.g., `=`, `:`).

- **Trim Keys:** Removes extra spaces around keys.
- **Trim Values:** Removes extra spaces around values.
- **Ignore Case for Keys:** Treats keys as equal regardless of letter case.
- **Ignore Case for Values:** Treats values as equal regardless of letter case.

XML tab

The screenshot shows the XML configuration tab with the following settings:

- System Identity Settings:**
 - ☒ Replace System Name (placeholder: [SYSTEM_NAME])
 - ☒ Replace System IP Address (placeholder: [SYSTEM_IP_ADDRESS])
 - ☒ Replace System Serial (placeholder: [SYSTEM_SERIAL_NUM])
- General:**
 - ☒ Ignore Comments
 - ☒ Ignore Processing Instructions
 - ☒ Ignore Doctype Declaration
 - ☒ Normalize Empty Elements
 - ☒ Normalize CDATA Sections
 - ☐ Remove Default Attributes
- Exclusion Settings:**
 - ☐ Ignore Elements by XPath
 - ☐ Ignore Element Values Regex
 - ☐ Ignore Attributes by XPath
 - ☐ Ignore Attribute Values Regex
- Element Comparison:**
 - ☐ Ignore Child Element Order
 - ☐ Sort Child Elements by XPath
 - ☐ Ignore Extra Child Elements
 - ☒ Require All Child Elements Present
- Attribute Comparison:**
 - ☒ Sort Attributes by Name
 - ☐ Trim Attribute Values
 - ☐ Ignore Case for Attribute Values
 - ☐ Normalize Unicode for Attribute Values
- Namespace Settings:**
 - ☐ Ignore Namespace Prefixes
 - ☐ Ignore Namespace URIs
 - ☒ Canonicalize Namespace Declarations
- Text Content Settings:**
 - ☐ Trim Text Content
 - ☐ Normalize Whitespace in Text Content
 - ☐ Ignore Case for Text Content
 - ☐ Normalize Unicode for Text Content
 - ☒ Normalize Character Entities

A green 'Apply' button is located at the bottom center of the configuration area.

General

- **Ignore Comments:** Skips XML comment nodes during comparison.
- **Ignore Processing Instructions:** Excludes XML headers or processing tags (e.g., `<?xml ...?>`).
- **Ignore Doctype Declaration:** Ignores document type declarations like `<!DOCTYPE>`.
- **Normalize Empty Elements:** Treats `<tag>` and `<tag></tag>` as identical.
- **Normalize CDATA Sections:** Ensures CDATA content is handled consistently.
- **Remove Default Attributes:** Removes attributes automatically added by XML parsers.

Exclusion Settings

- **Ignore Elements by XPath:** Excludes specific XML elements matching defined XPath expressions.
- **Ignore Element Values Regex:** Excludes element text values that match regex patterns.
- **Ignore Attributes by XPath:** Excludes specific attributes identified by XPath.
- **Ignore Attribute Values Regex:** Excludes attribute values matching regex patterns (e.g., timestamps, dynamic IDs).

Element Comparison

- **Ignore Child Element Order:** Treats elements as equal even if their child order differs.
- **Sort Child Elements by XPath:** Defines how to reorder elements before comparison.
- **Ignore Extra Child Elements:** Ignores child elements present only in one file.
- **Require All Child Elements Present:** Ensures all expected child elements exist in the compared XML.

Attribute Comparison

- **Sort Attributes by Name:** Orders attributes alphabetically before comparison.
- **Trim Attribute Values:** Removes spaces from the start and end of attribute values.
- **Ignore Case for Attribute Values:** Treats uppercase and lowercase attribute values as equal.
- **Normalize Unicode for Attribute Values:** Normalizes special or accented characters in attribute values.

Text Content Settings

- **Trim Text Content:** Removes leading and trailing whitespace in text nodes.
- **Normalize Whitespace in Text Content:** Converts multiple spaces or tabs into a single space.
- **Ignore Case for Text Content:** Treats text content as equal regardless of letter case.
- **Normalize Unicode for Text Content:** Unifies special or accented characters.
- **Normalize Character Entities:** Ensures entities like & and < are compared consistently.

Namespace Settings

- **Ignore Namespace Prefixes:** Ignores namespace prefixes (e.g., ns1: vs. ns2:).
- **Ignore Namespace URIs:** Ignores differences in namespace URIs.
- **Canonicalize Namespace Declarations:** Standardizes how namespace declarations are represented.

Customizing existing Text Normalizers

1. Double-click the relevant entry in the Text Normalizers table to edit it

2. Make changes and click “Apply” to save or ‘X’ to cancel and exit

Delete Text Normalizers

1. Select a Text Normalizer to delete and click “Delete” icon

2. Click “Delete” to remove the Normalizer, or “Cancel” to undo your selection

