Recommendations catalogue for usability design in network monitoring tools

R1 - Perception of updating	
Description: Perceptible transition movements "from one state to another" improve cognition capacity, guiding the user's attention to inform about the change that occurred. Thus, it is recommended to present the change of any level of criticality or situation with a transition movement.	**Illustration:** 
Dataset: Flags, Levels (numerical scale), True-False.	
Interactivity: Fade in, Fade out, movements, transformations.	
Observations: An additional entry with the date and hour when the last change occurred might be useful in case the user has not noticed the change.	
When to avoid: Must be avoided when the element used to represent the movement or transformation is too small.	

R2 - Perception of colors

Description: Colors such as green, yellow and red, are useful to direct the user's attention, allowing him to assign the meanings "success", "alert" and "problem" to the colors, respectively. This allows the administrator to identify the state of the network elements and correct problems more quickly. However, it is important to consider color blind people, who would not be able to recognize colors, so in addition to colors, there must be some other way to allow the user to identify the state of the network elements.

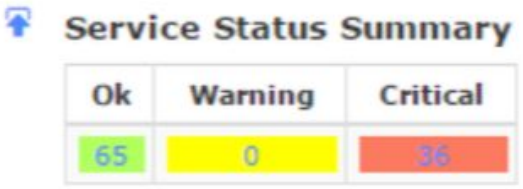
Dataset: Flags, Levels (numerical scale), True-False.

Interactivity: Does not apply.

Observations: It is necessary to be careful with very close colors, for example, when using a scale from light to dark, as they can be confused.

When to avoid: Must be avoided when the monitor is monochrome or only capable of displaying shades of gray and when the number of items that will be represented with colors is very large (greater than 16).

Illustration:



R3 - Finding specific information in a large set of data

Description: A tool can be used to reduce the difficulty of finding something in the midst of excessive information and help the user to find items. This tool can be, for example, a search box to search for keywords.

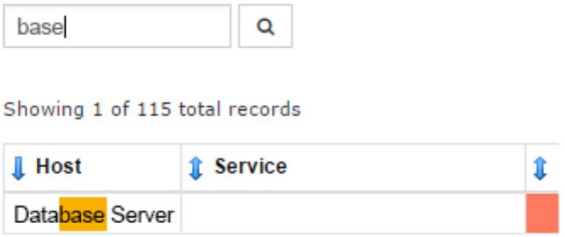
Dataset: Tables.

Interactivity: Color what was found with the tool and move the scroll bar to what was found.

Observations: It is necessary to take into account the computational capacity of the search process, since if the search takes longer than a few seconds the user might be overwhelmed when making several attempts until all possibilities are exhausted.

When to avoid: Must be avoided when there is not a keyword to be identified in the dataset and when there is not enough computational resource to perform the search in less than 3 seconds.

Illustration:



R4 - Obtaining more detailed information

Description: Storing the measurement history and the granularity of the collected information can result in highly detailed graphs. So the use of the mouse pointer is useful to point out exactly the value of the point of interest, without the user having to filter a time range from the history.

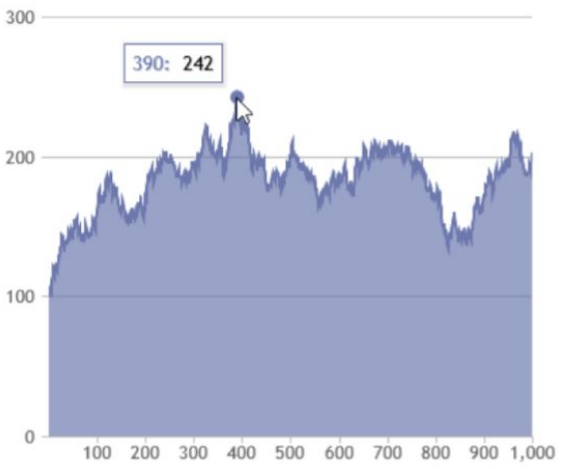
Dataset: Tables.

Interactivity: Display a box with numerical data when the user points with the mouse to a specific point on the graph.

Observations: Useful to almost to every type of graph, such as line, bar, pie, radar, etc.

When to avoid: Must be avoided when the information to be displayed inside the box is too long, covering a large part of the graph when shown.

Illustration:



R5 - Sorting information

Description: In a visualization like tables, the ability to sort the data, by clicking on the column header, helps the user to immediately find a lower or greater value, being advantageous when the data is numerical.

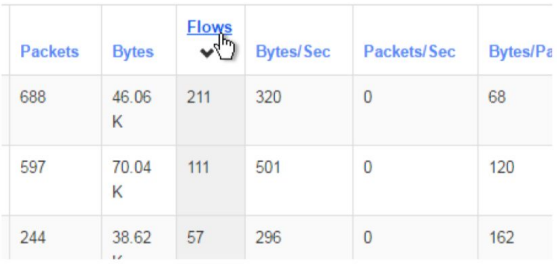
Dataset: Tables, Lists.

Interactivity: Inform how the data are sorted with a symbol (from smallest to largest or vice versa).

Observations: It is necessary to take into account the computational capacity of the ordering process, since if the ordering takes more than a few seconds, the user can give up using this feature.

When to avoid: Must be avoided when there is not enough computational resources to perform the search in less than 6 seconds, when the data type is not sortable, such as images, and when the data lose their meaning if shown in a different order than the predefined one.

Illustration:



Packets	Bytes	Flows	Bytes/Sec	Packets/Sec	Bytes/Pa
688	46.06 K	211	320	0	68
597	70.04 K	111	501	0	120
244	38.62	57	296	0	162

R6 - Spying before going deeper

Description: Using a summary view that shows the latest samples (or summarized samples) is important to direct the user to the correct path, avoiding unnecessary steps and, therefore, reducing the number of steps needed to perform a task.

Dataset: Tables, Lists, Flags, Levels (numerical scale).

Interactivity: Does not apply.

Observations: The summarized information to be shown needs to be validated with a key user or with an expert, so that the information shown to the tasks that need to be accomplished.

When to avoid: Must be avoided when it is not possible to show updated enough information (how much updated depends on each case) so as not to cause any false impression and prevent the user from making a wrong decision.

Illustration:

R7 - Starting point

Description: Graphs and information organized as soon as the user enters the monitoring tool provide an overview of everything that is happening on the network. Therefore, dashboards are a good starting point to begin analyzing a situation. Elements such as incident counters or problem counters alert the user to take an initiative.

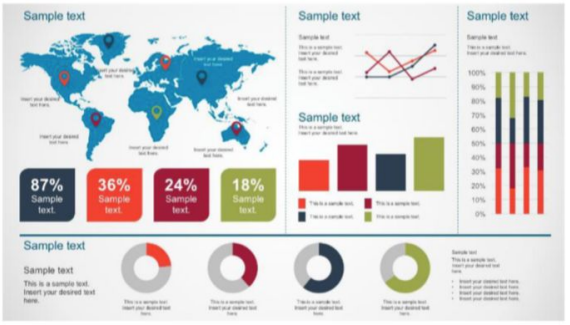
Dataset: Tables, Lists, Flags, Levels (numerical scale).

Interactivity: Does not apply.

Observations: Dashboards must be assembled by the user in order to show what is relevant to him. Dashboard suggestions can be provided by the tool itself, so that the user can make only minor adjustments.

When to avoid: Does not apply.

Illustration:



R8 - Use of metaphors to inform about status and incidents

Description: Symbols that represent the severity level of a problem are well understood, being recognized as “normal”, “alert” and “problem” and helping the user to identify problems more quickly, when compared to using only text.

Dataset: Flags, Levels (numerical scale)

Interactivity: Does not apply.

Observations: The style of the symbols may vary according to the theme of the tool, however it is important to keep the colors green, yellow and red respectively with the symbols “✓”, “**!**” and “✗”.

When to avoid: Does not apply.

Illustration:

R9 - Notifications

Description: The use of pop-ups is not effective. Therefore, a non-intrusive notification method is recommended, which should appear at the corner of the screen, without disturbing the user. Thus, notifications at the corner of the screen are a succinct way to warn the user about an important event that may impact the functioning of the network.

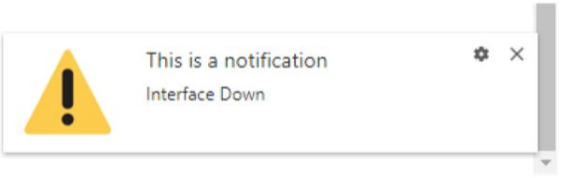
Dataset: Messages, Flags, True-False.

Interactivity: Display the notification with smooth movements when appearing and disappearing. Show detailed information when the user clicks on notification and allow the user to dismiss notification.

Observations: Do not use pop-ups that interrupt the user. Since they are widely used on the web for advertisements, they are often labeled as something that is unimportant and, therefore, users tend not to pay attention to any information presented by pop-ups.

When to avoid: Must be avoided when the monitoring tool is designed to be shown on a panel for a large audience to observe and when there is no user who will interact with the notification.

Illustration:



R10 - Help filling in fields

Description: With the help of only a simple label in the fields it is not possible to understand how they should be filled out. Thus, fields that need to be filled out with some specific rule or syntax should contain help to avoid misunderstandings.

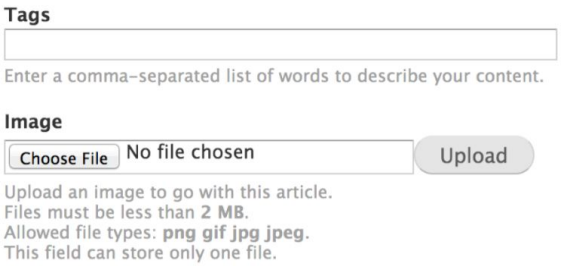
Dataset: Field and value.

Interactivity: Color the field borders red if it is not filled in correctly, for example, in a different format than specified, and specify what is incorrect.

Observations: In addition to the description of how to fill the field, an example of filling can be provided.

When to avoid: Does not apply.

Illustration:



R11 - Gradual display of information

Description: In complex cases, providing the network topology, a list or a dictionary can help the network administrator to understand the information seen on the screen. Content needed to support an analysis, when absent, impairs understanding and decision making. Given the large number of networks and hosts, it is difficult for the administrator to remember all the information, so such content must be visible when necessary.

Dataset: Tables, Lists, Images.

Interactivity: The supporting content must be moved around freely, so the administrator can place that content in the best place for him.

Observations: Supporting content can be anything the user finds useful: a topology, a list of routers or IPs. The user must be able to choose what type of information he wants to appear on the floating window.

When to avoid: Must be avoided when the monitor is too small and the support content covers the entire primary screen of the tool.

Illustration:

R12 - Suitably arranged data

Description: The different sizes of graphs can make some information unreadable if the space available for rendering the graph is not big enough. Therefore, the content needs to adapt to the format and size of the user's screen, so that the available space is used, keeping all information readable.

Dataset: Tables, Lists, Flags, Levels (numerical scale), Images.

Interactivity: Does not apply.

Observations: It is necessary to be careful with dynamic data, which makes it unclear how many items will be shown on the screen. The available space needs to be taken into account so that in a graph, for example, it does not end up being incomprehensible because it is too small.

When to avoid: Must be avoided when the content is designed to be shown on a fixed-size panel (TV or screen), very common in network operations centers, making automatic adaptation to the screen format unnecessary.

Illustration: