



Bintelan Module - Counting

User Manual
Version 5.0

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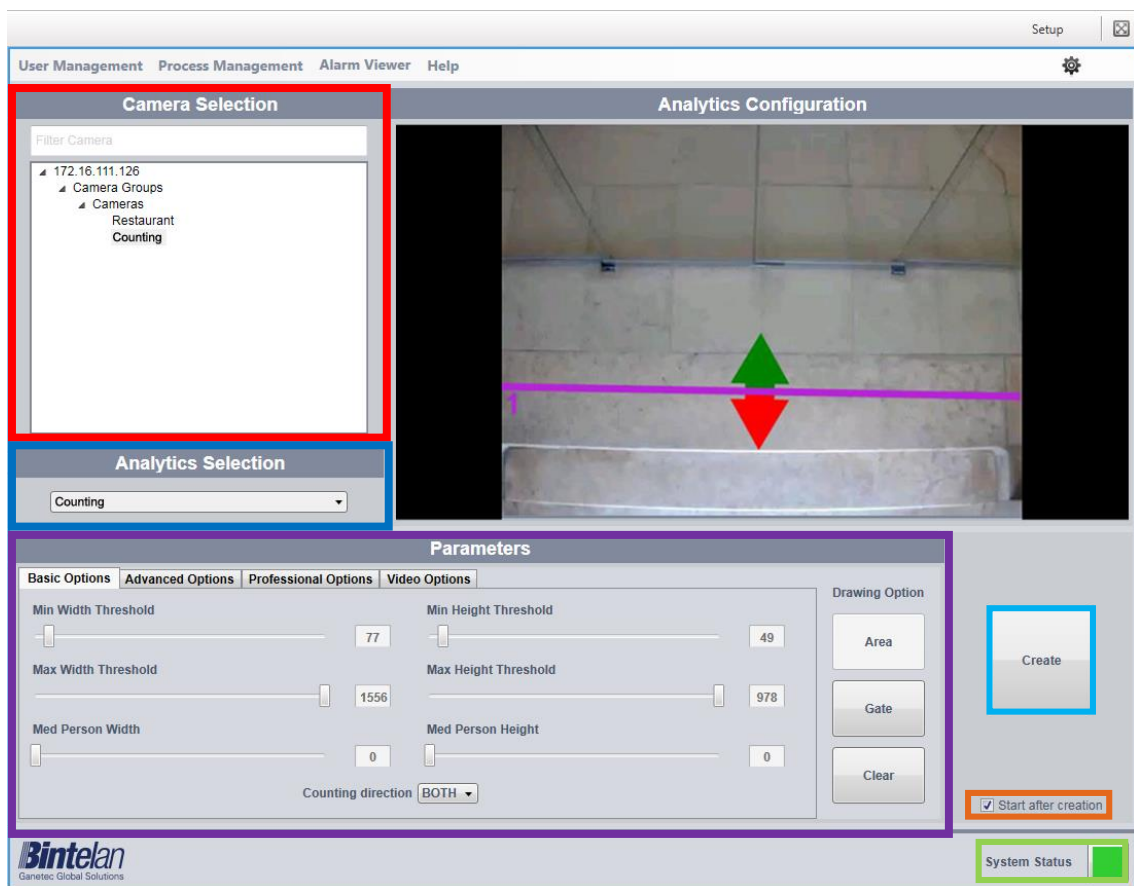


For technical support contact our Support Department:
support@ganetec.com

1 Configuring Counting Analytics

1.1 Creating the process

The Counting video analytic is used for counting objects that cross a barrier in one or more directions. In order to configure this type of video analytic, we must first **select the camera**, then **select the type** from a dropdown list. This selection will load its corresponding **configuration panel**. This panel contains three tabs: basic options, advanced options and professional options.



Once all the parameters are correctly configured, including the Basic, Advanced and Video options, we must create a new process. As depicted in the above image, below the **Create** button is a checkbox labeled as **Start after creation**. This checkbox ensures, if selected, that the process will be initiated after its creation. If you prefer to manually start the process simply uncheck this option.

We can also check if the **global system state** is correct. Click on the colored square at the right of the message system status for additional details. There are three possible states of the system, represented by colors:

- **Ok:** all Bintelan Analytics Platform modules and services are working properly.
- **Warning:** one or more modules or services in the Bintelan Analytics Platform is showing a warning. Warnings do not affect the correct performance of the system, but should be verified and resolved to avoid future errors.
- **Error:** one or more of the modules or services in the Bintelan Analytics Platform is having problems. By clicking the icon you can check the source of the problem.



1.2 Manage Analytics

Additionally, you can view and manage the processes created. Select the "**Manage Analytics**" from the "**Process Management**". You will obtain a detailed view of all the processes created and their current status. A process can have up to seven different states:

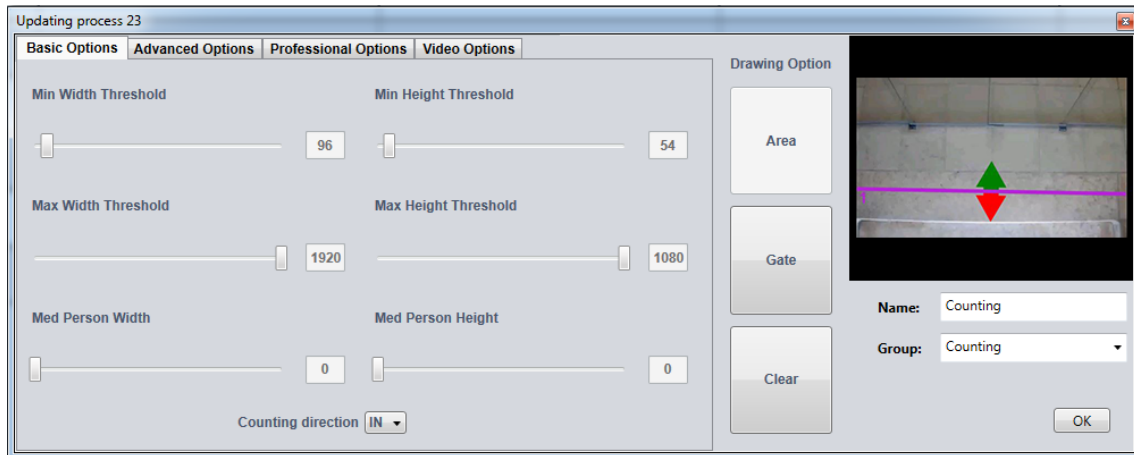
- **Launching**: the process has just been created.
- **Scheduling**: the process is queued and will start soon.
- **Initializing**: the process is starting and configuring.
- **Processing**: the process is running correctly. The process output should now appear.
- **Stopping**: the process is stopping.
- **Hold**: there something missing and the process cannot be started. Usually this happens when you need a hardware license to be placed in the Licenses folder under Bintelan installation path.
- **Failed**: the process could not execute properly. Check the logs or contact support.
- **Empty state**: if this field is empty the process is ready to be started. Currently the process is stopped.



User Management		Process Management		Alarm Viewer	Help	
Start Analytics		Group	Analytic	Source	Status	Options
<input type="checkbox"/> Select all	<input checked="" type="checkbox"/> Manage Analytics					
<input type="checkbox"/>	Face Detection - Restaurant	Testing	Face Detection	Restaurant	Launching	
<input type="checkbox"/>	License Plate - LPR	Testing	License Plate	LPR	Scheduling	
<input type="checkbox"/>	Face Detection - Restaurant	Testing	Face Detection	Restaurant	Initializing	
<input type="checkbox"/>	Face Recognition - Enroll	Testing	Face Recognition	Enroll	Processing	
<input type="checkbox"/>	Intrusion - LPR	Testing	Intrusion	LPR	Stopping	
<input type="checkbox"/>	Area Counting - LPR	Testing	Area Counting	LPR	Hold	
<input type="checkbox"/>	Gate Flow - LPR	Testing	Gate Flow	LPR	Failed	
<input type="checkbox"/>	Face Recognition - Enroll	Testing	Face Recognition	Enroll		

Furthermore, you can **Start**, **Stop** and **Delete** any process from this pane. You will only have to press the desired button in each case. You should take into account that you will only be able to delete a process if it has been previously stopped.

Moreover, you can also configure any process once it has been created. In this way you will be able to perform fine adjustments to the module in order to achieve better results or due to changes in the camera or the scene. To do so, click the **Settings** button, between the stop and delete buttons. A window containing all the module information will appear, as depicted in the next image. From it, you will be able to adjust all the parameters that correspond to the module selected.



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1.2.1 Basic Options

On the Basic tab, the following parameters can be configured:

Parameter	Value
Min Width Threshold	77
Min Height Threshold	49
Max Width Threshold	1556
Max Height Threshold	978
Med Person Width	0
Med Person Height	0

Counting direction: **BOTH**

- **Parameters:**
 - **Min Width Threshold:** used to define the minimum width of the detected object in the image (in pixels).
 - **Min Height Threshold:** is used to define the minimum height of the object detected in the image (in pixels).
 - **Max Width Threshold:** used to define the maximum width of the detected object in the image (in pixels).
 - **Max Height Threshold:** used to define the maximum height of the object detected in the image (in pixels).
 - **Med Person Width:** used to define the average width of the object detected in the image that you want to count (in pixels).
 - **Med Person Height:** used to define the average height of the object detected in the image that you want to count (in pixels).
 - **Counting direction (only used for configuring the gate):** this parameter can have 3 values:
 - **IN:** Triggers an alarm if the object enters the gate through the direction of the **green** arrow.
 - **OUT:** Triggers an alarm if the object enters the gate through the direction of the **red** arrow.
 - **BOTH:** Triggers an alarm if the object crosses the gate through either direction.
 - **Visual Options:** The size of the object are depicted with a green and a red rectangle. **Green** depicts the smallest size of the object while **red** the biggest.

1.2.2 Drawing Options

This panel is used to draw and manage the gates where the analytic wants to be in the scene.



- **Área:** this option is disabled for the Counting module.

- **Gate:** to set up a gate or barrier where the intrusion detection will be performed, follow these steps:
 1. Select the button **Gate**.
 2. Draw in the image the first point of the gate.
 3. Draw the endpoint in the image of the gate.
 4. You can now select the following options:
 - a. **Clear:** Deletes the gate that is being drawn and returns to the initial state (before step 1).
 - b. **Finish:** continue with the setup process (step 5).
 5. Select the direction of the gate: in, out or both.
 6. Insert the gate name, it is used to identify the gate in the Intrusion alarm list.

An object will be counted when an object crosses a gate in the selected direction.

- **Clear:** Deletes the last door or area configured.

1.2.3 Advanced Options

In the advanced settings tab you can configure more specific parameters of the module type selected.

Basic Options	Advanced Options	Professional Options	Video Options	
	Update Window (sec)	10	Sens Threshold	500
	Background Reset Percentage	0.5	Use Shadow Removal	None
	Horizon Height	0	Blob proportion	1
	Min Persistence (sec)	0.2	Max missing (sec)	0.1

- **Background parameters:**

This section describes the low-level parameters related to updating the background image. These parameters must be set according to the "noise" of the scene, and to the areas within the image, such as vegetation on a windy day or an undulating water flow surface, which the algorithm should not identify as moving objects. If the scene is very noisy (usually outdoors), a faster update of the background is recommended ("Refresh Window" with a lower value) and higher sensitivity ("Threshold Sensitivity" high). On the other hand, if the scene is not noisy (as an indoor scenario), a slower update of the background may be required ("Refresh Window" with a higher value).

- **Update Window [sec]:** time to update the temporal background window (default 10 seconds).
 - The background starts to assimilate the scene changes, when a greater value than one third of this parameter is achieved. For example, if this value is set to 10 seconds, then after three seconds of background changes, the new background begins to merge these changes with the stored background. Additionally, if an object stands still for a minimum time equal to the value of this parameter, it ends up being completely assimilated by the reference image of the system. Therefore, it will belong to the background image.
- **Sens Threshold:** minimum sensitivity for foreground segmentation (default 500).
 - The system compares each image acquired by the video stream, with a reference image (background) in order to detect objects within the scene. The reference image is generated by a statistical pixel, in order

to work in a very "noisy" scene (such as vegetation in a windy day, the undulating surface of a water flow, etc ...) and continually updating the reference image.

- The minimum sensitivity value is the minimum difference with which a pixel of the image is classified as part of the foreground. However, if the background is non-stationary, the threshold is affected by the "noise level" of this pixel. Thus, in the case of "too complex" scenarios, the minimum threshold set with this parameter, can be automatically increased by the processing algorithm. For example, in areas within the image where there is a greater variation per unit / time.
- **Background Reset Percentage:** fraction of the reset threshold background (default 0.5).
 - If the difference between the number of pixels from the image acquired by the video stream and the reference image (background), is greater than the resulting quotient (for example, more than half the default value), the background image is updated. This threshold parameter describes the difference between these two images. It also helps to detect some sudden light changes, like a light turn on (indoors), or if a cloud passes in front of the Sun (outdoors).
- **Use shadow Removal:** NONE by default.
 - With the "Shadow Removal" option, you can enable a video processing module to minimize the introduced noise by the shadows in the scene. Its use is recommended for outdoor scenes where there may appear long pointed shadows that can affect the correct object detection. There are three modes to enable this option: **color**, **geometric** or **both**. Depending on whether you want to remove shadows using color or geometric features, you should choose one option or another. Using both options simultaneously increasing the CPU usage of the system.
- **Parameters proportions:**
 - **Horizon Height:** used to set the boundary for the calculation of the object proportion (see next item).
 - **Blob proportion:** this ratio is related with the depth of field of the scene. For example, if the value is 5, then the object in the horizon is 5 times smaller than an object at the bottom of the image (default 1).

- **Tracking parameters:**
 - **Minimum persistence [sec]:** time interval that must elapse before a detected object is associated with a new tracking algorithm. Note that only the objects followed by the system can send alarms (default 0.8).
 - **Maximum missing [sec]:** time period that the algorithm requires to eliminate the tracking associated with a particular object (default 0.1).



1.2.4 Professional Options

In the professional options tab you can change some specific settings of this module.

Basic Options	Advanced Options	Professional Options	Video Options
Morphological Filtering			
Enable <input type="checkbox"/>			
Minimum Width: <input type="text" value="10"/>			
Minimum Height: <input type="text" value="10"/>			
Threshold: <input type="text" value="75"/>			
Foreground Filtering			
Enable <input type="checkbox"/>			
Horizontal Search: <input type="text" value="10"/>			
Vertical Search: <input type="text" value="10"/>			
Threshold: <input type="text" value="3"/>			
Brightness Filtering			
Enable <input type="checkbox"/>			
Max. Target Brightness: <input type="text" value="127"/>			
Max. Background Brightness: <input type="text" value="200"/>			
Brightness (%): <input type="text" value="50"/>			

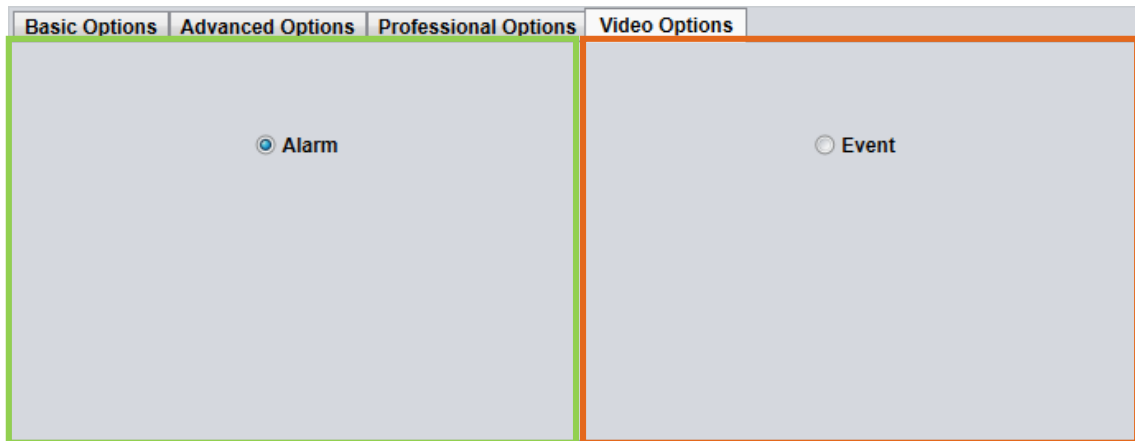
- **Morphological filtering:** A morphological filter that will be applied to the background can be enabled. This feature allows the removal of small noise artifacts, making the background model obtained more robust to fast changes of small objects. It uses two different functions: erosion and enlargement (dilation). Depending on the value of the segmentation threshold, one or the other is used. Take into account that using it increases the computational cost.
 - **Minimum width:** minimum width of the object expressed in pixel (default 10).
 - **Minimum height:** minimum height of the object expressed in pixel (default 10).
 - **Segmentation threshold:** segmentation threshold value ranged between 0 and 100 (default 75). Lower than 50 corresponds to a dilation, higher than 50 corresponds to a segmentation of the objects.
- **Foreground filtering:** A morphological filtering that will be applied to the foreground can be enabled. This feature allows you to remove small noise artifacts, increasing the robustness of the model from quick movements of small objects in the foreground. Therefore, limiting the problems due to moving objects in the background (trees, grass, trees' shadows, flags, flags' shadows...) and light camera's vibrations. The aim of this filter is to look for foreground pixels with correspondence between them and the ones on the background, tagging them. In this way, the problems described before are reduced. Keep in mind that their use increases the computational cost.
 - **Horizontal search:** searching zone horizontal size (in pixel) (default 10).
 - **Vertical search:** searching zone vertical size (in pixel) (default 10).
 - **Difference threshold:** minimum difference between the color of the foreground pixel and the background pixels, in order to be able to delete the foreground one (default 3).

- **Brightness filtering:** This type of filter limits the blob creation, due to strong lights detached from the target (for example light reflections on puddles). Its use is recommended mainly in bad light conditions (parameter set by the user "Max background brightness"). It is used to calculate the cumulative light that is higher than the "Max target brightness". If the blob value (%) compared to the number of white dots, is higher than light threshold, the blob stays invisible and the module does not follow it. Keep in mind that their use increases the computational cost.
 - **Max target brightness:** minimum value from which the cumulative is calculated (default 127).
 - **Max background brightness:** value below which the filter is activated (default 200).
 - **Brightness [%]:** minimum cumulative percentage compared to the blob area, above which the bounding box is filtered (default 50).



1.2.5 Video Options

In the video options tab you can change some settings specific from the VMS and/or the output types of the module.



- **Alarm or Event:** we can select the output type of the process, through an alarm or event. This distinction is useful when working with Milestone because if we select the alarm option we avoid creating a specific event for each door or area.

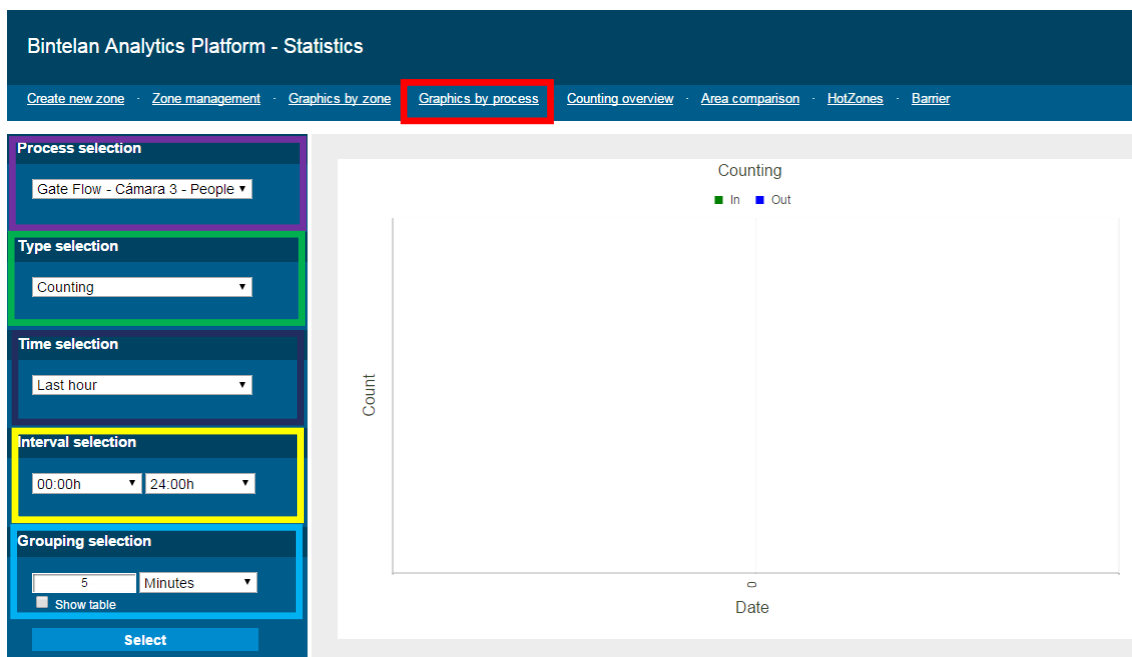
NOTE: Please note that the video options are only available if you are working with a VMS that supports them. When working with the Client StandAlone, this tab is not available.

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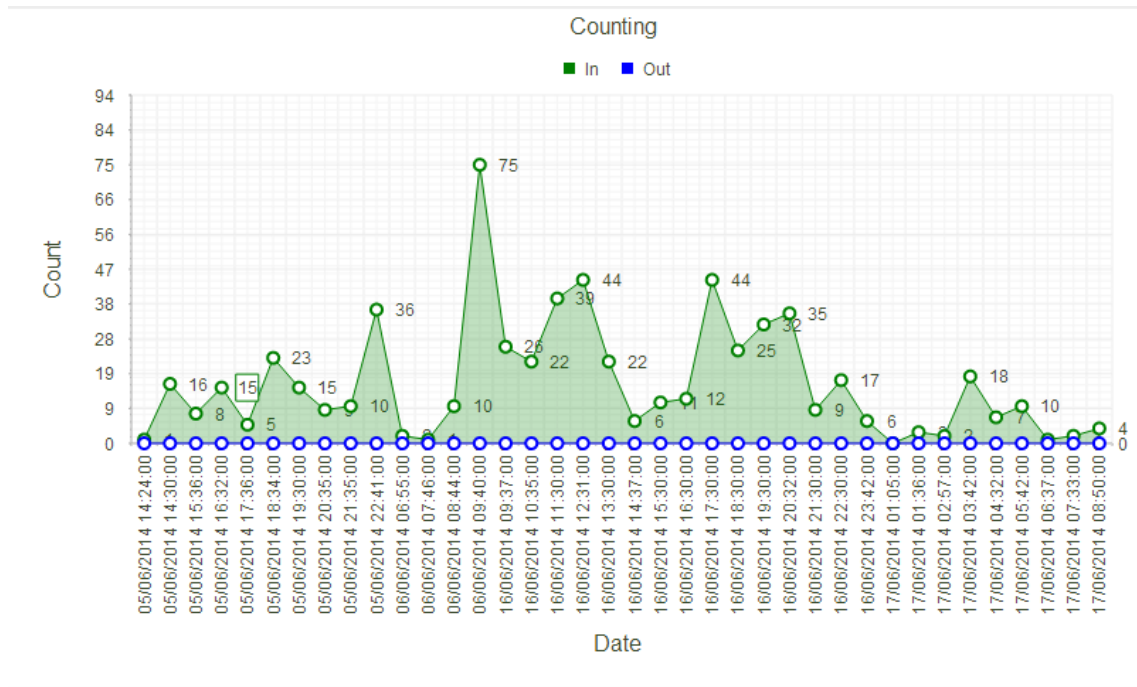
2 Viewing Statistics

The viewing of the counting results is done through the statistics interface. You can access this interface from any browser. The URL to access the statistics panel is: **<http://localhost:8128/graphicsByProcess.php>**

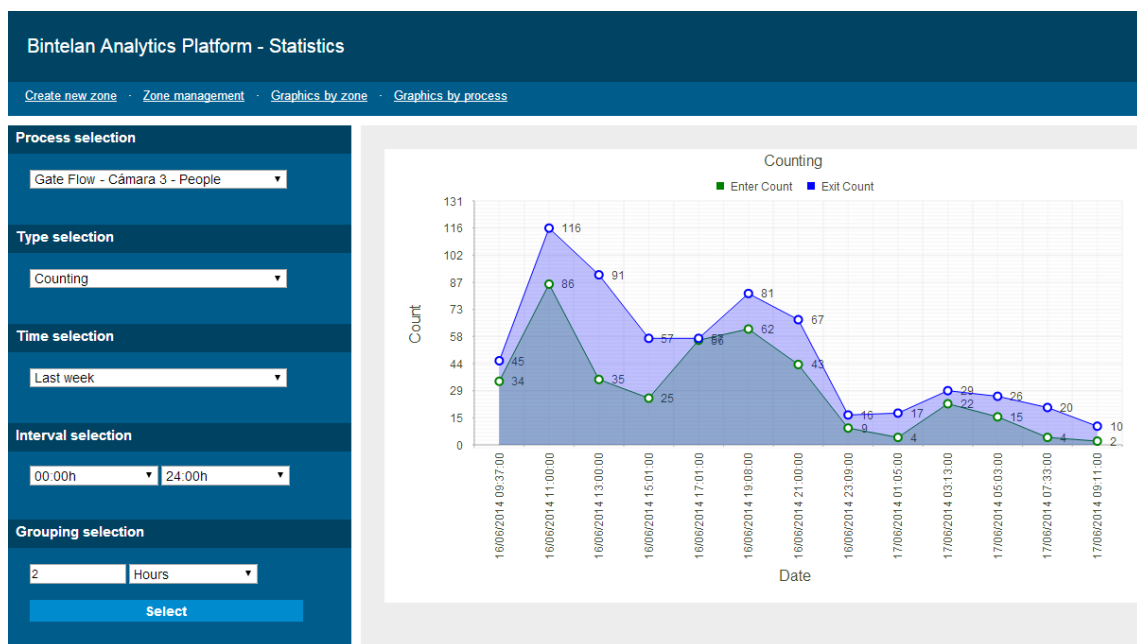
Once inside this panel, select from the top Menu the option **Graphics by process**. Then you must select the process that you want to display statistics. To do this, select it from the dropdown **Process selection**. Then you must select the process type, in this case, **Counting**. The next step is to choose the suitable time interval in which to display statistics, you can do it from the drop-down selection in the **Time selection**. Additionally, select the time interval with which to view the statistics from the two drop-downs in the **Interval selection** part. Finally, select the granularity or resolution of the statistics table. You can make this selection from the selection **Grouping section**.



Two examples of counting statistics are shown in the following images. The following picture shows a gate count with a unique direction and a resolution of 5 minutes. Different values can be appreciated depending on the number of entries in each range from 14:24 to 8:50. Note that in those intervals in which there are no entries, for example, the value is zero, they get grouped, as it can be seen in the last part of the image below:



Additionally, if the process has a gate both in the input and output, you will see two overlapping graphs with different colors and a granularity of 2 hours, as you can see in the picture below:





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