



# Bintelan Module - Face Recognition

User Manual  
Version 5.0

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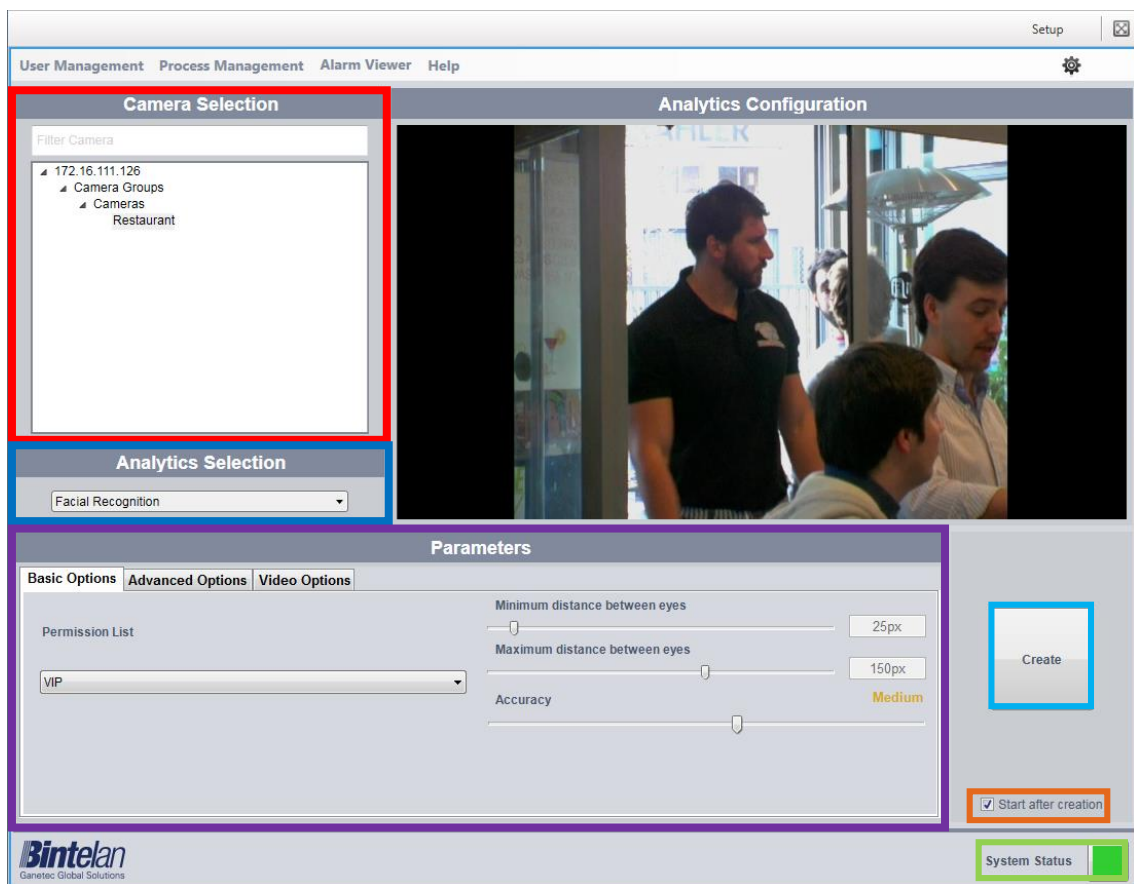
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# 1 Configuring the Face Recognition Module

## 1.1 Creating the process

The **face recognition** video analytic is used when the presence of any face previously registered in a list appears in an image. In order to configure this type of video analytic, we must first **select the camera** and 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 **video** 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:

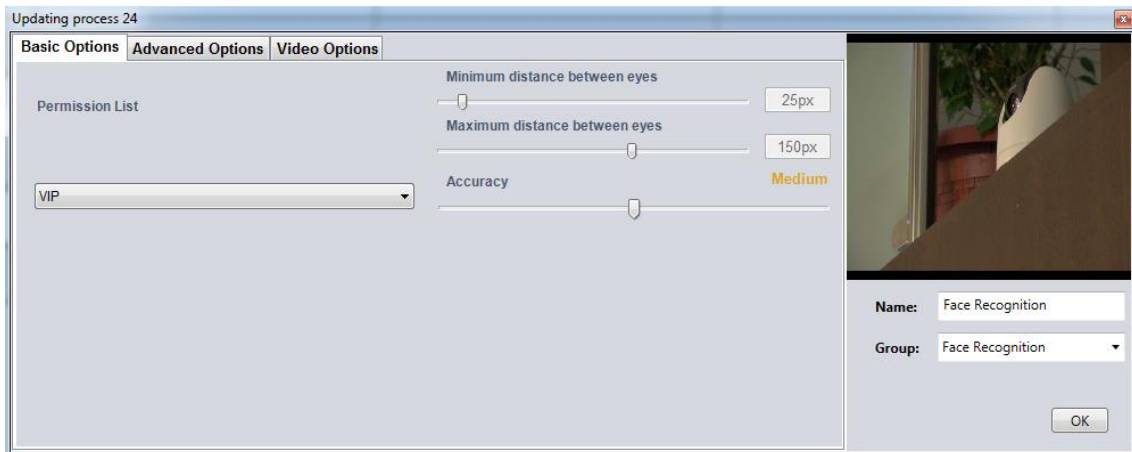
- **Launching**: the process has just been created.
- **Scheduling**: the process is queued and will start soon.
- **Initializing**: the process is starting and configuring.
- **Processing**: the process is running correctly. The process output should now appear.
- **Stopping**: the process is stopping.
- **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 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.

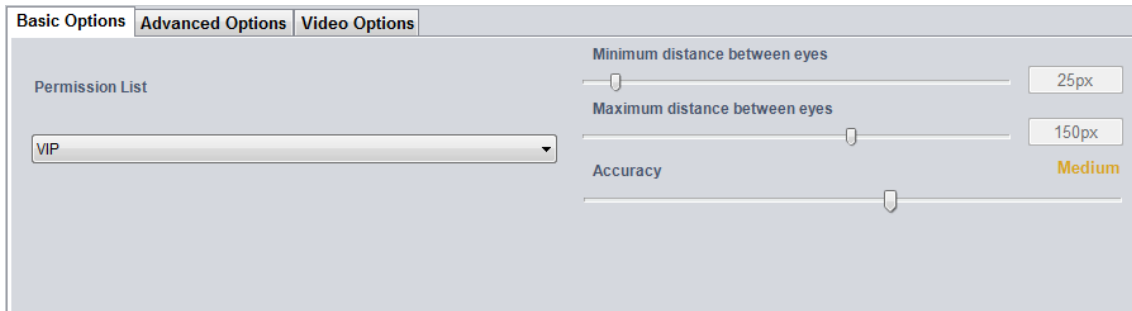
Moreover, you can also configure any process once it has been created. In this way you will be able to perform fine adjustments to the module in order to achieve better results or due to changes in the camera or the scene. To do so, click the **Settings** button, between the stop and delete buttons. 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:



- **Parameters:**
  - **Permission List:** alerts of only stored subjects in any of the selected permission lists will be launched. You can select one or more lists when launching a process.
  - **Minimum distance between eyes:** this value represents the minimum distance between eyes of the face. Faces with a smaller distance will not be taken into account by the algorithm. By moving track bar, a visual silhouette of the face will be displayed on the image.
  - **Maximum distance between eyes:** this value represents the maximum distance between eyes of the face. Faces with a smaller distance will not be taken into account by the algorithm. By moving track bar, a visual silhouette of the face will be displayed
  - **Accuracy:** the algorithm provides faces that obtain a higher value than the accuracy threshold established. This value refers to the precision with which it is determined whether the detected object is or not a face, or if it is a face from a list. Please note that a higher accuracy level implies that it is less likely to obtain a false alarm and, consequently, a lower level increases the probability of "false positives".

## 1.2.2 Advanced Options

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

Basic Options	Advanced Options	Video Options	
Number of threads <input type="text" value="2"/>	Number of recognitors <input type="text" value="1"/>	Alerts before send <input type="text" value="0"/>	<input type="checkbox"/> Use ROI <input type="button" value="Draw ROI"/>
Best face only <input type="checkbox"/>	Max. Number of candidates <input type="text" value="10"/>	Time between alerts (secs) <input type="text" value="1"/>	Reconnection attempts <input type="text" value="Infinite"/>

- **Number of Threads:** number of threads that the algorithm used internally to detect. Increasing this value will increase CPU usage.
- **Number of recognitors:** number of instances of recognizers that will be processing each image. Increasing this value will increase CPU usage.
- **Best face only (\*):** if enabled, the algorithm only launches an alert with the best face on the image.
- **Maximum Number of Candidates (\*):** if a detected face matches more than one stored subject, only an alert for the "n" first candidates will be sent.
- **Alerts before send:** number of alerts that must be generated of the same detected or recognized object before sending one alarm of it.
- **Time between alerts (sec):** time required to expire between two consecutives alerts, in order to consider them as two different ones.
- **Reconnection attempts:** number of times the algorithm will try to reconnect to the camera in case the connection is lost. Reconnection will be retried for the number of times specified, waiting 10 seconds between each retry. It can also be defined as **infinite**, so that the process will always try to reconnect.
- **Use ROI (Region of Interest):** we can define a region of interest in the image. The algorithm will only process that part of the image, reducing the amount of CPU required.

(\*) Features available only for some algorithms.



## 1.2.3 Video Options

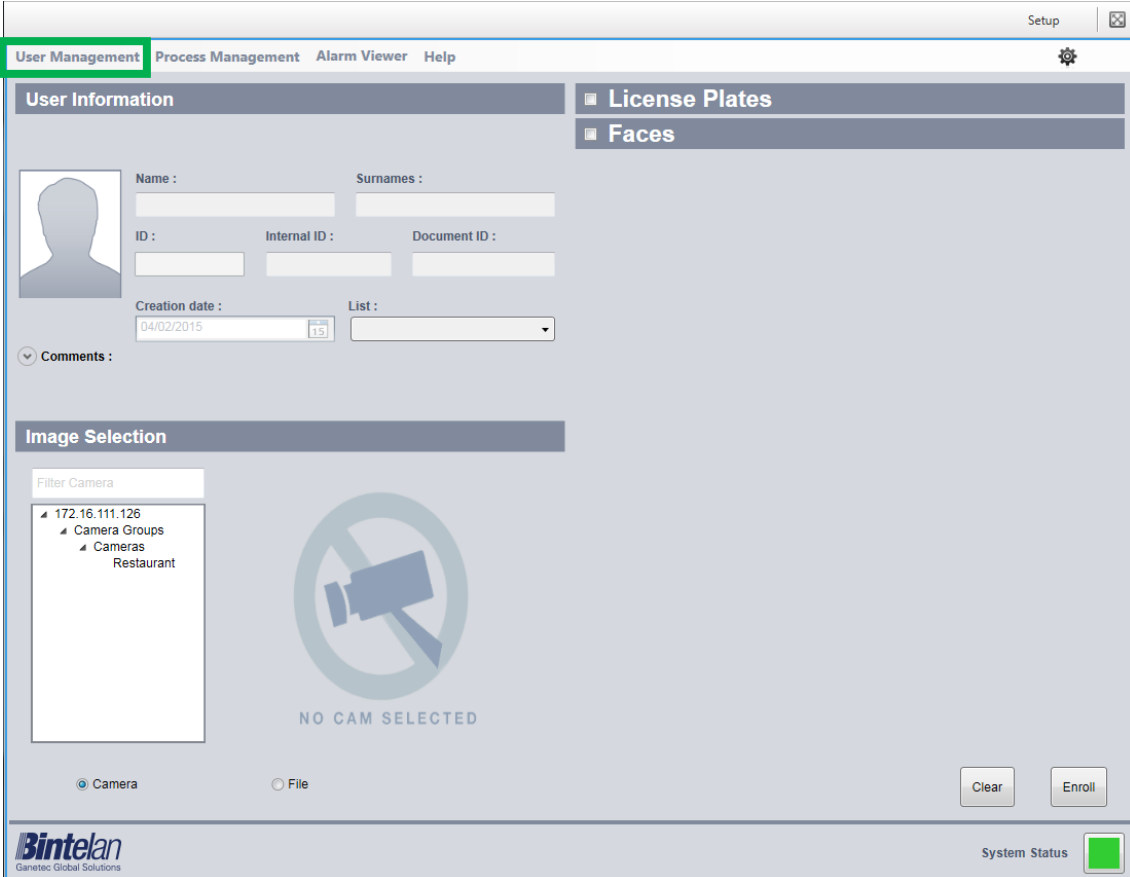
In the video options tab you can change some settings specific from the VMS and/or the output types of the module.

The screenshot shows the 'Video Options' configuration window. It features three tabs: 'Basic Options', 'Advanced Options', and 'Video Options'. The 'Video Options' tab is selected. The interface is split into two main panels. The left panel, outlined in green, includes radio buttons for 'Live' (selected) and 'Stored video', and two time range dropdowns for 'Start time' and 'End time', both set to '10:36:30 - 27/02/2015'. The right panel, outlined in orange, includes a 'Motion detection' checkbox (unchecked), 'Frame Rate' and 'Resolution' dropdown menus (both set to 'full'/'Full'), and radio buttons for 'Alarm' (selected) and 'Event'.

- **Video Streaming:** we can choose to analyze the live video (Live) or stored video (Stored) by selecting the starting and ending time. This option is enabled only if the client is connected to a VMS system that supports it.
- **Motion Detection:** we can start a process with the motion detection mode enabled. This will make the algorithm to process only when motion is detected in the video stream, reducing the amount of computational cost required. The motion sensitivity can be configured one the checkbox is enabled, providing visual feedback to the user through an overlay image.
- **Frame rate:** we can modify the rate of frames per second used in case the scenario doesn't need to process all the images, thus can reduce CPU requirements.
- **Resolution:** we can scale the camera's native resolution to reduce the bandwidth consumption.
- **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.

## 2 User Enrollment

Before initiating a recognition process, a new user must be previously registered in the database. To do this, access the **User Management** tab located at the top left corner of the screen.



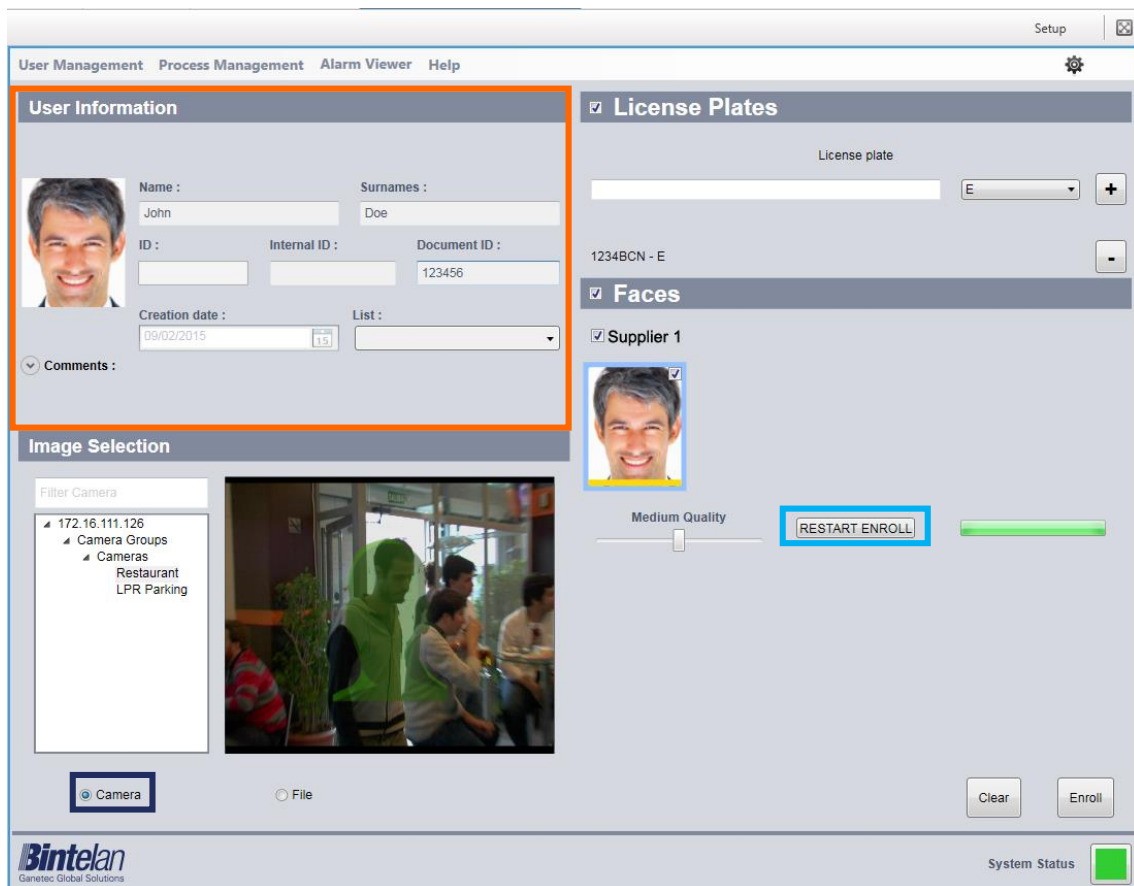
The screenshot displays the 'User Management' tab in a software interface. The top navigation bar includes 'User Management', 'Process Management', 'Alarm Viewer', and 'Help'. The 'User Management' tab is highlighted. The main content area is divided into two columns. The left column, titled 'User Information', contains a user profile picture placeholder, input fields for 'Name' and 'Surnames', 'ID', 'Internal ID', and 'Document ID', a 'Creation date' field with a calendar icon, and a 'List' dropdown menu. Below these fields is a 'Comments' section with a dropdown arrow. The right column contains two expandable sections: 'License Plates' and 'Faces'. Below the 'User Information' section is an 'Image Selection' section. It features a 'Filter Camera' tree view with a selected path: '172.16.111.126' > 'Camera Groups' > 'Cameras' > 'Restaurant'. A large camera icon with a red 'X' over it and the text 'NO CAM SELECTED' is displayed in the center. At the bottom of the 'Image Selection' section are two radio buttons: 'Camera' (selected) and 'File'. To the right are 'Clear' and 'Enroll' buttons. The footer of the interface shows the 'Bintelan' logo (Garnetec Global Solutions) on the left and a 'System Status' indicator (a green square) on the right.

Furthermore, from the Registration screen, if you right click with the mouse the **Lists** pane, you would be able to **Add**, **Delete** or **Rename** them. In this way, you can easily and quickly manage all your lists.

Once in the User Management tab, there are two methods to perform the enrollment process, from **Camera** or from **File**. You must select the most appropriate one for your application.

## 2.1 Enrollment from Camera

**Select the camera** from which you want to enroll the user that you want to recognize by clicking on the name of the desired camera. Now that you have correctly selected the camera to perform the registration process, **Face Enroll** button is enabled and you can select the suppliers with which you want to extract biometric references. The last step is to choose the quality level that best fits your application. Finally click the button **Face Enroll** to begin the extraction process of the biometric references.



From this point, the software will start to obtain the subject's face from the images until all biometric references are extracted. During the extraction process, you will see how the progress bar advances on the right of the button **Face Enroll**. When the biometric references from the selected images are extracted, the progress bar will finish and the **Face Enroll** button will change its name to "**Restart Enroll**".

If you cannot extract any biometric reference it can be because the provided images do not have enough quality, in this case, the following message will be displayed: ". **No faces with enough quality could be found, please try again with better conditions**". You must ensure that the quality of images from the camera fulfill the minimum quality requirements of

**the enrollment process.** Therefore, if the latter message appears, repeat the enrollment process by clicking the "**Restart Enroll**" button (previously "Face Enroll ") until biometric references have been successfully extracted.

After obtaining all user images, you can select and deselect which ones will be used for the enrollment process. This is useful if some of the images obtained are very blurry or do not meet the minimum quality requirements for registration. In this case, simply uncheck the images you do not want to include. Similarly, you can select which image will appear on the **User Information**.

Once all the images of the subject have been obtained and **the extraction the biometric references from the face has been completed**, you must fill in the **user fields**. These fields are the following ones:

- **Name:** name of the subject. This field is **mandatory**.
- **Surnames:** surnames of the subject. This field is **mandatory**.
- **ID:** private identifier of the system, it is automatically assigned and you cannot modify it. It will correspond to the one that appears with the alerts.
- **Internal ID:** number representing the ID in the internal database system. This can be useful for example if we want to cross data from an internal database of employees with the database of the system. This field is optional and can only be a number with a maximum of 11 digits.
- **Document ID:** normally used to store the passport or identity number of the user's country. This is an optional field and can be any alphanumeric value with a maximum of 45 characters.
- **List:** the subject can belong to one or more lists. At least **one** list must be selected.
- **Creation date:** this field is automatically filled with the current user creation date.
- **Comments:** optional field. Any text can be introduced, including multiple lines.

Once you have completed all mandatory fields, click the "**Enroll**" button. Then the new user will be stored in the database. A green message confirming that the "**Enrollment was successful**" will appear. If the registration has not been successful due to wrong introduced fields or the lack of quality of the faces in the images, the following message will appear in red: "**Errors registration, please try to register again.**" This process can be repeated several times to enroll all users you want to recognize and add to the lists.

The screenshot displays the Bintelan user management interface. The top navigation bar includes 'User Management', 'Process Management', 'Alarm Viewer', and 'Help'. The main content area is divided into several sections:

- User Information:** Contains fields for Name (John), Surnames (Doe), ID, Internal ID, Document ID (123456), and Creation date (09/02/2015). A red box highlights this section.
- License Plates:** Features a 'License plate' dropdown menu with 'E' selected and a '1234BCN - E' entry below it.
- Faces:** Shows a 'Supplier 1' section with a face image and a 'Medium Quality' slider. An orange box highlights this section.
- Image Selection:** Includes a 'Filter Camera' tree view with '172.16.111.126' and 'Camera Groups' expanded to show 'Restaurant' and 'LPR Parking'. A camera feed shows a person in a green vest. Radio buttons for 'Camera' and 'File' are at the bottom.

At the bottom right, there are 'Clear' and 'Enroll' buttons, with the 'Enroll' button highlighted in yellow. The footer includes the Bintelan logo and a 'System Status' indicator showing a green square.

**NOTE:** Please note that the better the enrollment, the more accurate the results of the system. Try to avoid poor quality images and repeat the process if necessary. We recommend that the face occupies around 50% and 80% of the image for a good supervised enrollment.

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## 2.2 Enrollment from File

Select the **File** option and then the images you want to use. A dialog box will appear from which you can select images with the face of the new user to enroll. Note that enrolling from file requires at least one image with good quality, although you can also use multiple images by selecting all of them and ensuring that they belong to the same user. Once the images are selected, choose the algorithm or algorithms you want to use and determine the quality level that best fits your application. Finally, click the **Face Enroll** button to begin the process of extracting biometric templates. Wait for the system to process and validate the quality of the images. Once these have been processed, **complete all the mandatory fields described above** and select the list or lists to which you want to add the new user. Make sure all fields are correct and click **Enroll** to complete the registration process.

The screenshot displays the Bintelan user management software interface. The main window is titled "User Management" and includes a menu bar with "Process Management", "Alarm Viewer", and "Help". The interface is divided into several sections:

- User Information:** A red-bordered box highlights this section, which contains fields for Name (John), Surnames (Doe), ID, Internal ID, Document ID (123456), Creation date (09/02/2015), and List. A "Comments" field is also present.
- Image Selection:** Located below the user information, it shows two image thumbnails and a "Clear" button.
- License Plates:** A section with a "License plate" input field and a dropdown menu set to "E".
- Faces:** A section with a "Supplier 1" checkbox and three image thumbnails, each with a checkmark.
- Quality Control:** A "Medium Quality" slider and a "RESTART ENROLL" button.
- Enrollment Options:** At the bottom, there are radio buttons for "Camera" and "File" (the "File" option is selected and highlighted with a purple box), and a "Select Files" button.
- Enroll Button:** A blue-bordered "Enroll" button is located at the bottom right.

The Bintelan logo and "Garretts Global Solutions" are visible in the bottom left corner, and a "System Status" indicator is in the bottom right corner.

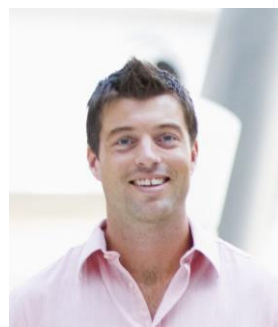
Recommendations for the enrollment from file are the following ones:

- The image registration has to be frontal
- The face must not have excessive shadows or partial illumination
- Never enroll a user with excessive background light
- It is recommended that the size of the face must be 500 pixels high or have a distance of 100 pixels between eyes
- The image of the face must be free from distortion or be blurred

Here are some examples of what we consider good or bad enrollment faces:



**Blurry Face**



**Good Face**



**Excessive lateral light**

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### 3 User Search

This section lists allow us to manage the user information and the lists to which they belong. To access the screen **Search Users**, click **User Management**, but this time select **Search** from the drop-down list.

The screenshot displays the 'User Management' application interface. The top navigation bar contains 'User Management', 'Process Management', 'Alarm Viewer', and 'Help'. The main content area is split into two panels. The left panel, titled 'User Information', features a profile picture placeholder, a 'Comments' dropdown, and several input fields: 'Name', 'Surnames', 'ID', 'Internal ID', 'Document ID', and 'Creation date'. A 'List' dropdown menu is highlighted with a blue box. Below these fields is an 'Insert License Plate' button. The right panel shows two expandable sections: 'Faces' and 'License Plates'. At the bottom of the 'User Information' panel are buttons for 'Search Profile', 'Search', 'Clear', 'Edit', 'Update', and 'Delete'. Below this is a 'Results' section with a red border, showing '0 entries' and a pagination control set to '10' items per page. The footer includes the 'Bintelan' logo and a 'System Status' indicator.

User search options: on the Search screen there are two options to find the user: a **user information** and **Lists**.

- **User Information:** introduce the user data you want to search in their correspondent fields (the more fields you fill, the higher the accuracy of the results) and then press the Search button
- **Lists:** select one or several lists from which you want to know the user information and click the Search button.

In the **lower panel** all search results appear. By default they will appear 10 to 10. You can change this value in the right panel dropdown. Select the user that you want to manage. Its information will fill in the **user information fields** and their associated biometric templates.



The data of the selected user is displayed in the **user information** panel and its corresponding **lists** where the user is registered or not. Thus, we can easily manage both user data and lists to which it is linked. By clicking the **Update** button the changes are saved. Pressing the **Delete** button deletes the record from this user database forever, and the biometric models and license plates bound to it.



Finally, if you want to make changes to the user information or add more biometric templates, you must select the **Edit** option. Then you will be redirected to the Registration screen. On this screen you can update all the data from the selected user.

## 4 Alarm Viewing

The visualization of the alarms can be performed in two ways:

1. Through Bintelan **Alarm Viewer**, located within the Bintelan Client platform.
2. Through the **VMS Client** you are using after a correct configuration.

### 4.1 Alarm Viewer

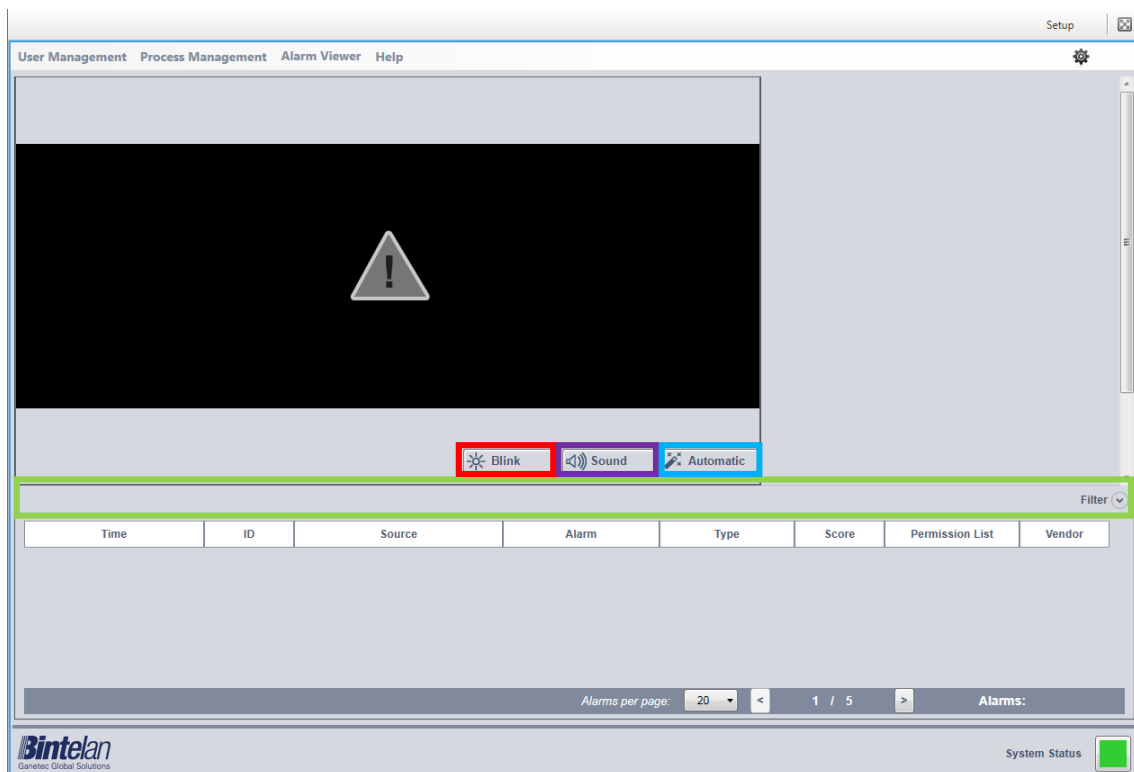
Inside the Bintelan Client, both the StandAlone-and the specific ones from each VMS, you can view the generated alarms in the "**Alarm Viewer**" tab. On this screen, the information of the alarms is detail presented. The layout consists of three different areas. In the top left we have the image of the alarm, where a square highlights the source of it. In the case of using a video analytics involving recognition (facial or lpr), the square color will match its accuracy level (**Very Low** - **Low** - **Medium** - **High** - **Very high**).

Time	ID	Source	Alarm	Type	Score	Permission List	Vendor
12:58:34 27/01/2015	131	Face Surveillance	John Doe	FaceRecognition	Medium	White	Supplier
12:58:32 27/01/2015	129	Face Surveillance	Juan Perez	FaceRecognition	Low	Employee	Supplier
12:58:31 27/01/2015	128	Face Surveillance	Juan Perez	FaceRecognition	Very High	Employee	Supplier
12:58:28 27/01/2015	127	Face Surveillance	Juan Perez	FaceRecognition	Medium	Employee	Supplier
12:58:25 27/01/2015	126	Face Surveillance	Juan Perez	FaceRecognition	Medium	Employee	Supplier
12:58:24 27/01/2015	125	Face Surveillance	Juan Perez	FaceRecognition	Low	Employee	Supplier

At the top right the information of the registered user is displayed. If you are using analytics involving detection, **an image** from the alarm will appear over this information.

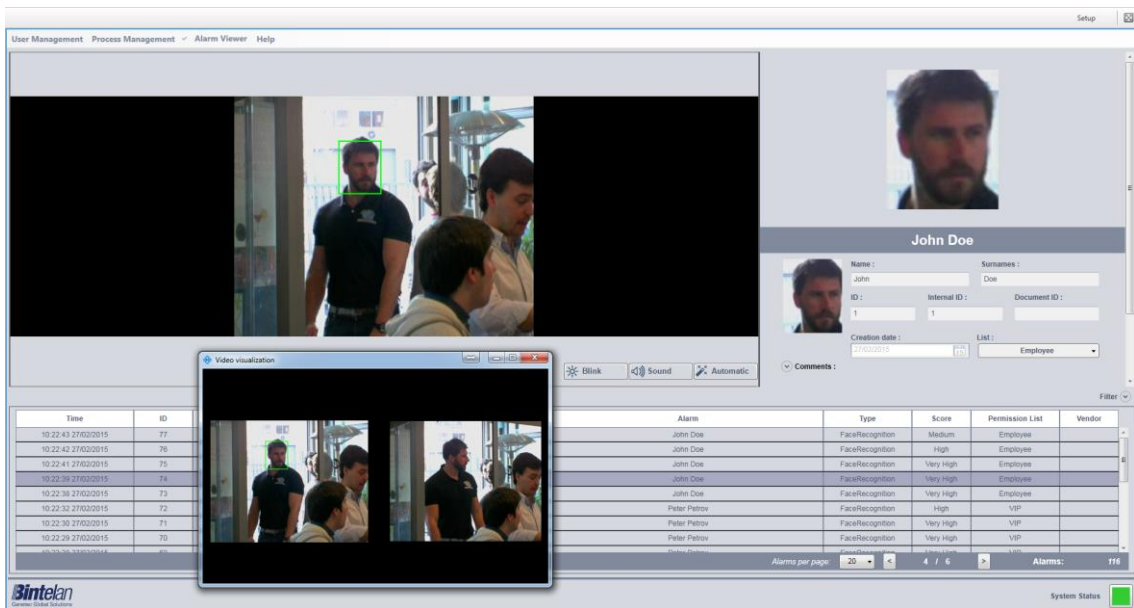
Finally, under both screens is **the alarm list**, where the parameters of each alarm are depicted: date and exact time of the alarm, its identifier, its source (camera name), the object's name,

the analytics type, accuracy, list (in case of recognition) and analytics provider. Additionally, it has an option to **filter the alarms**. Above the list, on the right, you can expand the options available to filter the alarms. You can filter by **source, alarm name** or **type**, using one or more of these options simultaneously.

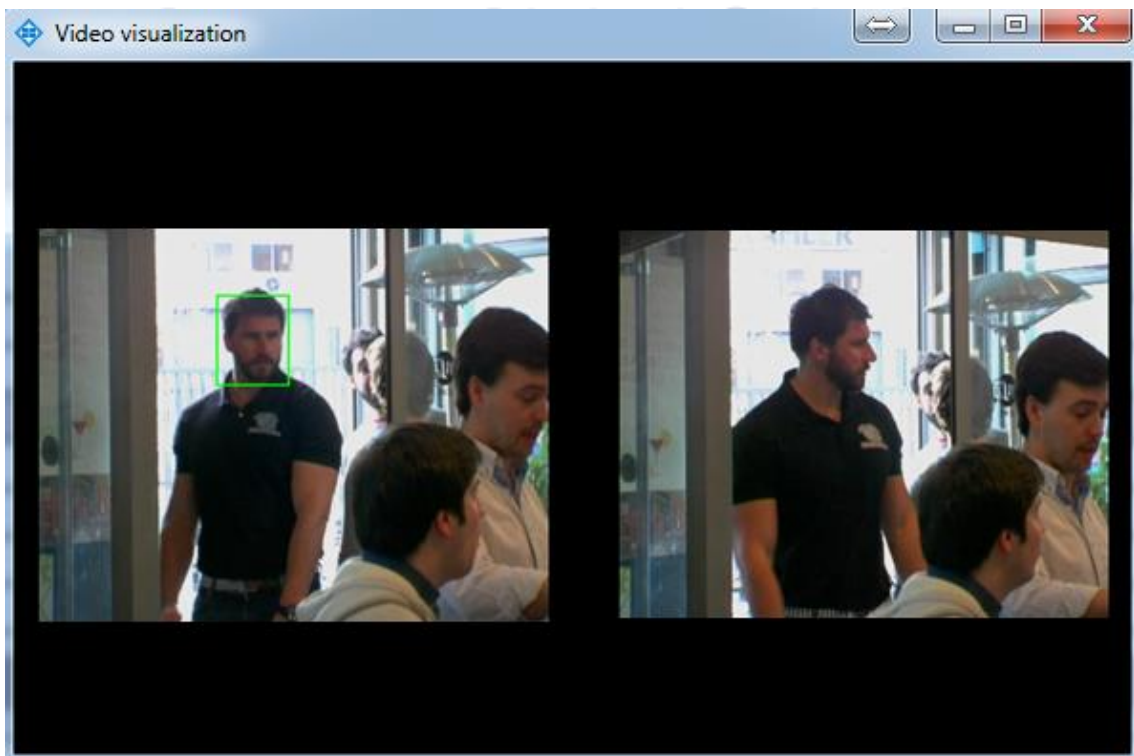


In addition, the "Alarm Viewer" has 3 operational modes, which can be activated by selecting or deselecting the buttons at the bottom right of the alarm image. The first mode is called **Blink**, it activates a red flashing border around the alarm image every time a new one is received. The second one, **Sound**, enables an acoustic signal after receiving a new alarm. The last mode, **Automatic** implies that the last alarm received is displayed on the image and in the information layout. These three modes can be selected independently or combined as the end user prefers.

Another option available in the "Alarm Viewer" is to see a small clip of 5 seconds before and 5 after of the alarm received, 10 seconds in total. To view this clip, double-click the alarm line that you want to see its detailed information.



Furthermore, a screen with two superimposed images will appear. The left image corresponds to **5 seconds before and 5 after of the alarm**. On the other hand, the right image shows the camera video that launched the alert in "Live" mode. Thus, this feature allows us to simply and intuitively review the received alarms.

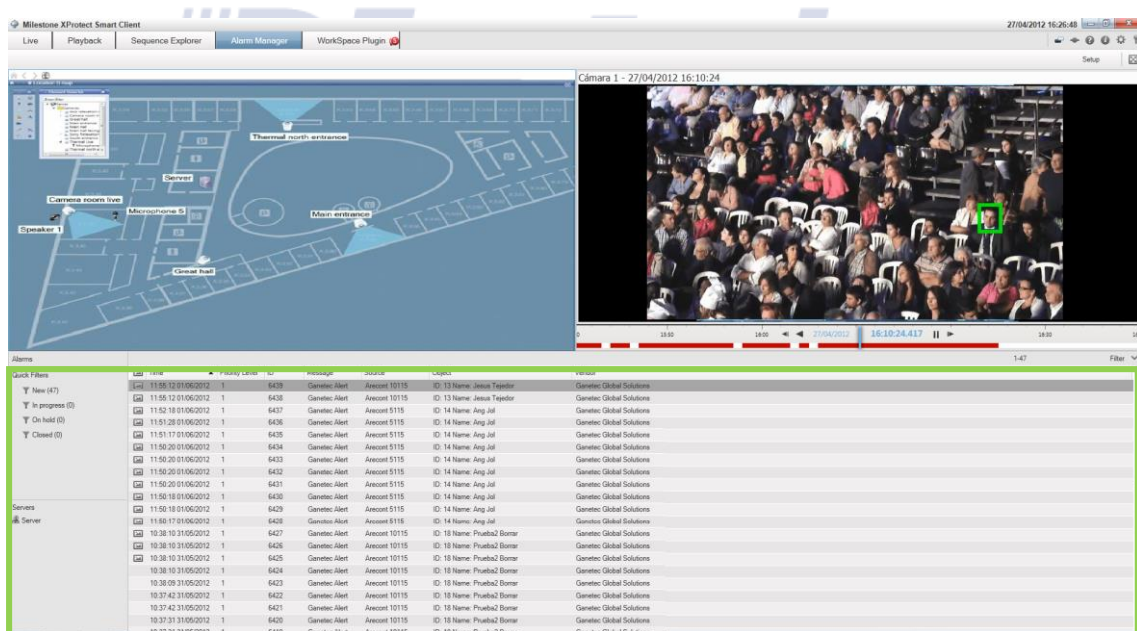


## 4.2 VMS's Alarm Viewer

Within each VMS there are different options for viewing alarms. In this section it will be explained how you visualize if you are using the VMS from Milestone Systems.

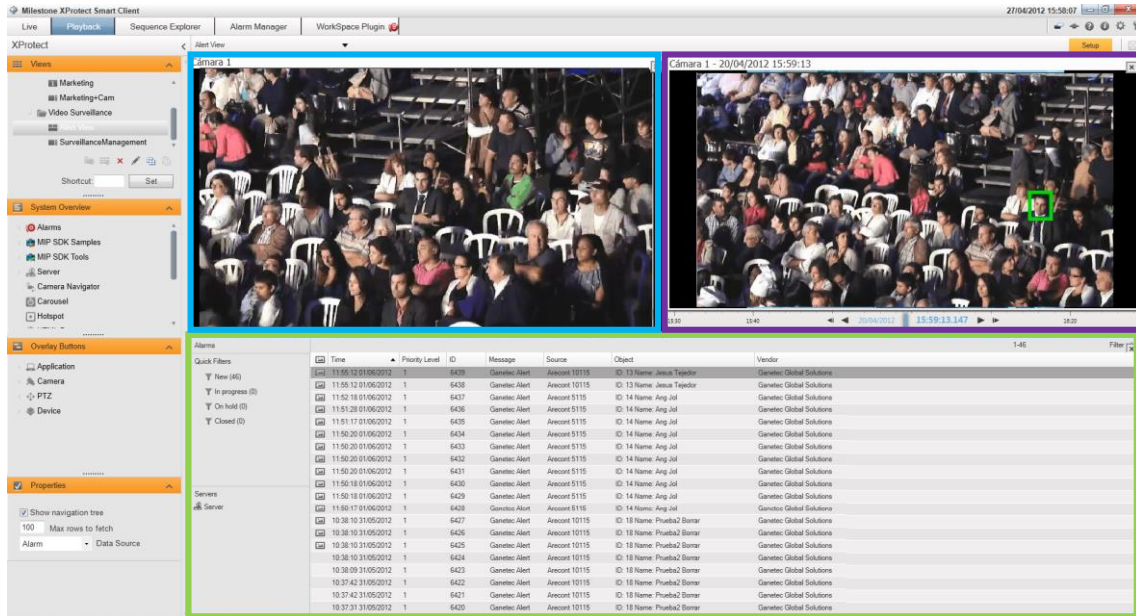
Once inside the Milestone XProtect Smart Client and if you are using a version of Milestone XProtect Smart Client 7.0 or higher, the easiest way to view the information alarm is through the **Alarm Manager** tab. This panel is extremely useful as you can visualize and link both the alarm and its source location.

In the "Alarm Manager" you will see, in the upper left display, a map of the location of all the cameras. The alarm images are displayed in the right pane, depicting the alarm with a colored square. The square color will match your range accuracy level (**Very Low** - **Low** - **Medium** - **High** - **Very high**). The alarms list is found under both screens, where the different parameters of the analytic event are presented: the object name, camera model which has performed the event, date and exact time at which the alarm was triggered.

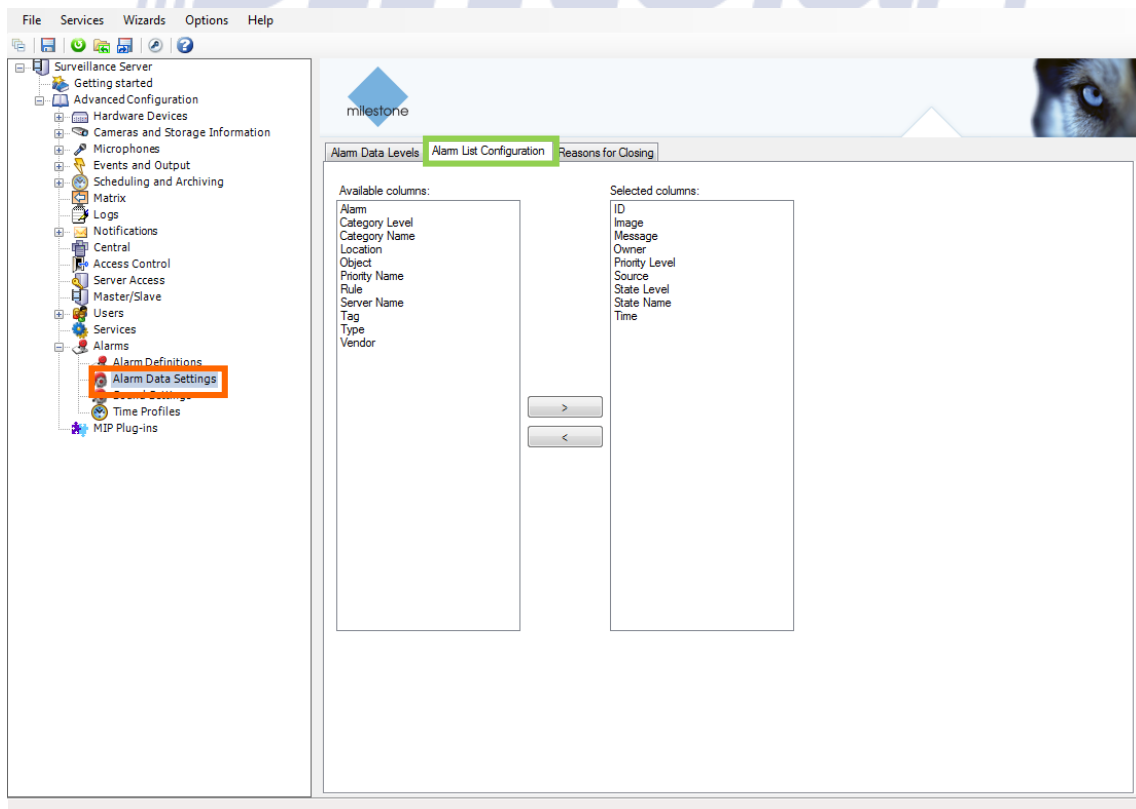


Additionally, to display the alarms, you can create your own alarm view within the "Live" panel. First of all, create a panel **1+2\*** and locate in the upper left panel **the live stream from the camera**. Then, place in the upper right panel the **alarm preview** to finally position the **alarm list** on the bottom. This provides you with a suitable layout to check alarms in real time, both in "Live" and "Playback" modes. Also take into account that when you click each record you can view the pictures from the instant in which the alarms were generated. To

navigate between the two options you can simply change the selected tab ("Live" or "Playback"). In the next picture an example of the configuration described before is presented.



Finally, note that in order to display the fields in the list of alarms as in the previous examples, both panels must be configured from the **Milestone XProtect Management** application. To do this, select the **Alarms Data Settings** within **Alarms**, and then the **Alarm List Configuration** tab. Arrange the fields as described in the next image:





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