Phoenix System

UserGuide v8.0.0

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Overview

Phoenix system consists of several components: *Phoenix*, *Camera Server* and their dependencies. This manual describes installation process of *Phoenix system* and its settings.

Installation

Prepare Ubuntu 16.04

If you use CoreOS Linux you don't need to follow steps in this section.

- Install docker (version higher than 17.04). Use official manual to get instructions: https://docs.docker.com/engine/installation/linux/docker-ce/ubuntu/#install-using-the-repository
- Remove IPv6 records from /etc/hosts associated with hostname.
- Install nvidia driver.

```
sudo apt update
sudo apt-get install nvidia-384
```

- Reboot the system.
- Install SAM util from deb-package

```
wget http://dl.smilart.com/download.php?file=f2b73c1aa3eabc039c6097fe1caec148 -O
sam-1.27.deb
sudo  apt install ./sam-1.27.deb
```

- Add Smilart repository to the SAM util

```
sudo -i
sam addrepo --default --name packages --server packages.smilart.com --username
admin --password admin
```

- Install base Smilart image

```
sam install smilartos-install:1855.4.0_150
```

Now you can continue to install Phoenix system.

Because Phoenix system was not adapt to install on Ubuntu, you must to do following steps AFTER installation Phoenix system:

- Check file /etc/hosts or check dns settings. Hostname mustn't be resolved into 127.x.y.z.
- The file /etc/hosts must contain the string: 172.17.0.1 <Hostname>

Online installation

- Add Smilart repository to the SAM util (under root). Skip this step if you did it before.

```
sam addrepo --default --name packages --server packages.smilart.com --username
admin --password admin
```

Run **installproduct** command without parameters to run installation prouduct utility in interactive mode.

```
installproduct
```

To use this method your server must have internet connection. You should be ready to download about 5GB of data.

- First window show the list of products. Choose *Phoenix system*;
- Second window show the list of product versions. Choose 8.0.0 or another version which you want to install;
- Confirm changes;
- Wait finishing installation;
- Reboot the system.

Products, installed before, will be removed.

Offline installation

Local registry method

Requirements: smilartos-install:1855.4.0_150

- Install necessary version of *registry-phoenix_system*. The version of *registry-phoenix_system* must match with the version of *Phoenix system* which you want to install. To install _registry-phoenix_system from the Internet use command:

```
sam in ./registry-phoenix_system-8.0.0_XX.tar.gz
```

You should write email to support@smilart.com to get file with _registry-phoenix_system.

Detail information about SAM util you can find in SAM util documentation.

- Run *installproduct localhost* to start installation. Next steps are the same as in *Online installation*.

Remote registry method

This method provides to deploy registry on any computer and use it to install *Phoenix system*

docker must be installed on the computer where you want to deploy the registry.

- Load file with registry into docker. Write request to support@smilart.com to get link to the file.

```
docker load < <file>
```

- Run registry

```
docker run -d --name=smilart-registry -p 5000:5000 -p 5001:5001 smilart/registry-phoenix_system:8.0.0_XX
```

- On the computer where you want to install *Phoenix system* you must turn on insecure mode for docker. To do that add *{ "insecure-registries":["<server address>:5000"] }* setting to */etc/docker/daemon.json*
- Run *installproduct* with registry ip address.

```
installproduct 192.168.10.56
```

- Next steps are the same as in *Online installation*

Applications Launch Control

Once installed, the application will automatically start up and automatically restart in the event of an emergency shutdown. It will also start automatically when the server restarts.

To stop the application, you must execute the command:

```
$ systemctl stop phoenix
```

To start the application, you must execute the command:

```
$ systemctl start phoenix
```

To restart the application, you must execute the command:

```
$ systemctl restart phoenix
```

To view the status of the application (started, stopped, terminated with an error), you must execute the command:

```
$ systemctl status phoenix
```

To turn off the application autorun, execute the command:

```
$ systemctl disable phoenix
```

To turn on the application autorun, execute the command:

```
$ systemctl enable phoenix
```

Helper Scripts

After `Phoenix System` is installed, these scripts will be available on the server.

The `Phoenix` should be running.

Adaptive Verification

Delete all sampled photos:

```
$ phoenix_remove_all_sampled_photos
```

Delete all sampled photos by camera pid:

```
$ phoenix_remove_sampled_photos_by_camera <CameraPid>
```

Delete all sampled photos by person id:

```
$ phoenix_remove_sampled_photos_by_person <PersonId>
```

Configuration

Two components of *Phoenix system* need configuration: *Phoenix* and *Camera Server*

Phoenix configuration

Phoenix provides configuration capability via set of configuration files.

Sysconfig

Rationale: low level configuration file only for Tech Support staff.
File modification policy: overwritten by the system every time the system is **installed**.
Typical reasons to change this file: switch from GPU to CPU daemons or change the number of the daemon instances.
Location: `/etc/phoenix/current/sys.config.orig`.
File post-modification action: `systemctl restart phoenix`.

Text after **%%** is a comment

```
[
  {sml_phoenix, [

    {limiter, [
%%        {max_fps, 10} %% FPS limmit
    ]},

    {daemons, [
    %% Demons description format
    % {DaemonModule,
    %   {varied_daemons, #{
    %     daemons=>
    %     % List of configs for daemons (daemons numbers = configs number)
    %     [
    %       #{name=> "daemon_name", % Required!
    %         GenDaemonSettings
    %       },...
    %     ]
    %   }
    %   % OR
    %   {similar_daemons, #{
    %     % Numbers of Daemons
    %     count=> 3,
    %     % Config for all these daemons
```

```
%     GenDaemonSettings
%   }}
%   % when GenDaemonSettings has next format
%   logging=> {default, debug | info | warning | error} | without_spec_file |
%     {manual, #{file=>"daemons/fd/fd_gpu_0.log"}}, % See 'log_tracing' config
%   exec=> {docker, #{
%     docker_image => "smilart/daemon.fd_lite_cnn.cuda.x86_64:2.0.4",
%     docker_opts => #{privileged => true},
%     daemon_args => [{"gpu", 0}]
%   }}
% }

  {fd_lite_cnn, {varied_daemons, #{
    daemons => [
      #{
        name => "fd_gpu_0",
        logging => {default, info},
        exec => {docker, #{
          docker_image => "smilart/daemon.fd_lite_cnn.cuda.x86_64:2.0.4",
          docker_opts => #{
            privileged => true,
            volume_from => ["nvidia-driver:ro"],
            env => ["LD_LIBRARY_PATH=/usr/local/lib/nvidia/opengl/"]
          },
          daemon_args => [
            {"gpu", 0}
          ]
        }}
      }
    ]
  }}},
  {fr_kenya, {varied_daemons, #{
    daemons => [
      #{name => "fr_gpu_0",
        logging => {default, info},
        exec => {docker, #{
          docker_image => "smilart/daemon.fr_kenya.cuda.x86_64:2.0.3",
          docker_opts => #{
            privileged => true,
            volume_from => ["nvidia-driver:ro"],
            env => ["LD_LIBRARY_PATH=/usr/local/lib/nvidia/opengl/"]
          },
          daemon_args => [
            {"gpu", 0}
          ]
        }}
      }
    ],
    max_base_size=>300000
  }}},
  {fpf, {similar_daemons, #{
```

```
        count => 3,
        logging => {default, info},
        exec => {docker, #{
          docker_image => "smilart/daemon.fpf.cpu.x86_64:2.0.1",
          docker_opts => #{},
          daemon_args => [
            {"openmp-max-threads", 1}
          ]
        }}
      }}},
      {shm_writer, {similar_daemons, #{
        count => 3,
        logging=> {default, info},
        exec=> {docker, #{
          docker_image => "smilart/daemon.shm_writer.cpu.x86_64:5.0.1",
          daemon_args => []
        }}
      }}},
      %% The following daemons ignore "count" settings
      {exif_reader, {similar_daemons, #{
        logging=> {default, info},
        exec=> {docker, #{docker_image =>
"smilart/daemon.exif_reader.cpu.x86_64:3.0.1"}}
      }}},
      {exif_writer, {similar_daemons, #{
        logging=> {default, info},
        exec=> {docker, #{docker_image =>
"smilart/daemon.exif_writer.cpu.x86_64:3.0.1"}}
      }}},
      {shm_reader, {similar_daemons, #{
        logging=> {default, info},
        exec=> {docker, #{docker_image =>
"smilart/daemon.shm_reader.cpu.x86_64:3.1.0"}}
      }}}
    ]},

    {log_tracing, [
      %% {trace_name, #{
      %   file=> "PathToLogFile.log",
      %% Next opts applied by default
      %   config=> [{formatter, lager_default_formatter},
      %     {formatter_config, [date, " ", time, " ", message, "\r\n"]},
      %     {size, 104857600}, {date, ""}, {count, 4}
      %   ],
      %   level=> debug
      % }},

      {api_router_amqp, #{file => "amqp_api/router.log"}},
      {api_camera_amqp, #{file => "amqp_api/camera.log"}},
      {api_person_amqp, #{file => "amqp_api/person.log"}},
      {api_photobooth_amqp, #{file => "amqp_api/photobooth.log"}},
```

```
      {api_verification_amqp, #{file => "amqp_api/verification.log"}},
      {api_vca_amqp, #{file => "amqp_api/vca.log"}},
      {api_ipa_amqp, #{file => "amqp_api/ipa.log"}},
      {api_adaptive_verification_amqp, #{file =>
"amqp_api/adaptive_verification.log"}},

      {api_cameras, #{file => "erl_api/camera.log"}},
      {api_cameras_sup, #{file => "erl_api/cameras_sup.log"}},
      {api_person, #{file => "erl_api/person.log"}},
      {api_photobooth, #{file => "erl_api/photobooth.log"}},
      {api_ipa, #{file => "erl_api/ipa.log"}},
      {api_vca, #{file => "erl_api/vca.log"}},
      {api_vca_event_sender, #{file => "erl_api/vca_event_sender.log"}},
      {api_verification, #{file => "erl_api/verification.log"}},
      {api_verification_core, #{file => "erl_api/verification_core.log"}},
      {api_verification_event, #{file => "erl_api/verification_event.log"}},
      {api_verification_event_sender, #{file =>
"erl_api/verification_event_sender.log"}},
      {api_persons_event_sender, #{file => "erl_api/persons_event_sender.log"}},
      {api_adaptive_verification, #{file => "erl_api/adaptive_verification.log"}},

      {camera_mjpeg_stream, #{file => "http_api/camera_mjpeg_stream.log"}},
      {adaptive_verification_info, #{file => "adaptive_verification_info.log"}},
      {license, #{file => "license.log"}},
      {config, #{file => "config.log"}},
      {vitality, #{file => "vitality.log"}},
      {db_sync_service, #{file => "person_base_init.log"}}
    ]}
  ]},

  {sml_docker, [
    % {daemon_socket, "/var/run/docker.sock"} %% Path to docker.sock
  ]},

  {sml_multicast, [
    {reciver_opts, [
      {ip, {239, 10, 11, 12}},
      {port, 50000}
    ]},
    {sender_opts, [
      {ip, {239, 10, 11, 13}},
      {port, 50001}
    ]}
  ]},

  {sml_event_tracer, [ %% System events publishing
%    {tracing, {zipkin, [
%      {host, "${zipkin_host}"},
%      {tick_time, 1000},
%      {service_name, "phoenix"}
%    ]}},
```

```
    {event_sender, {influx_udp, [
      {host, "${influx_host}"},
      {port, 4444},
      {pool_size, 5},
      {max_overflow, 10}
    ]}}
  ]},

  {lager, [
    {log_root, "log"},
    {async_threshold, 100},
    {async_threshold_window, 25},
    {crash_log_size, 104857600},
    {crash_log_date, ""},
    {crash_log_count, 4},
    {handlers, [
%%      {lager_console_backend, error},
%%      {lager_file_backend, [{file, "debug.log"}, {level, debug}, {size, 104857600},
{date, ""}, {count, 4}]},
      {lager_file_backend, [{file, "info.log"}, {level, info}, {size, 104857600},
{date, ""}, {count, 4}]},
      {lager_file_backend, [{file, "warning.log"}, {level, warning}, {size,
104857600}, {date, ""}, {count, 4}]},
      {lager_file_backend, [{file, "error.log"}, {level, error}, {size, 104857600},
{date, ""}, {count, 4}]}
    ]},
    {extra_sinks, [
      {sml_lager_lager_event, [
        {async_threshold, 100},
        {async_threshold_window, 25}
      ]}
    ]}
  ]},
  {sasl, [
%    {sasl_error_logger, {file, "fdcam_sasl.log"}}
    {sasl_error_logger, false}
  ]}
].
```

Daemons

In this section gathered settings related to daemons. Each daemon has its own parameters set. Configuring a daemon may require professional assistance.

Name	Type	Description
fr_kenya.varied_daemons.daemons	object	fr_kenya daemon startup parameters. Number of daemons equals list size.
fd_lite_cnn.varied_daemons.daemons	object	fd_lite_cnn daemon startup parameters. Number of daemons equals list size.

fpf.similar_daemons.count	integer	Number of fpf daemons that will be started.

Example Config

Rationale: exploration of the default options and configuration scheme.
File modification policy: overwritten by the system every time the system is **started**.
Typical reasons to change this file: none, the content of this file does not affect the operation of the system.
Location: `/etc/phoenix/config/example.config`.
File post-modification action: none.

Text after **%%** is a comment

```
%% Workflow options.
{workflow, [
  {verification_and_identification, [
    {write_to_shm, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {write_exif, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {fpf, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {detect, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {create_template, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]}
  ]},

  {verification, [
    {correlation, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000},

      %% The value should have 'integer' type. Min value: 1.
      {limit,3}
    ]}
```

```
  ]},

  {photobooth, [
    {write_to_shm, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {fpf, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]},

    {detect, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000}
    ]}
  ]},

  {identification, [
    %% The value should have 'float' type. Min value: 0. Max value: 1.
    {threshold,0.6},

    {correlation, [
      %% The value should have 'integer' type. Min value: 500.
      {request_timeout_ms,1000},

      %% The value should have 'integer' type. Min value: 1.
      {limit,10}
    ]}
  ]}
]}.

%% Http services options(blobstore and mjpeg).
{web_server, [
  %% The value should have 'integer' type. Min value: 1. Max value: 1000000.
  {port,"${BLOBSTORE_PORT}"},

  %% The value should have 'string' type. Min length: 1.
  {hostname,"${cowboy_host}"}
]}.

%% Photobooth Service options.
{photobooth, [
  %% The value should have 'integer' type. Min value: 1.
  {sampling_time_limit_seconds,20},

  %% The value should have 'mixed' type.
  {partitioning_scheme,{grid3x3,[
    %% The value should have 'enumeration' type. Possible values:
[cross,horizontal,forward_turn,all_inner_poses].
```

```
    {stratums_of_interest,cross},

    %% The value should have 'mixed' type.
    {stratum_sampling,{rook,[
      %% The value should have 'float' type. Min value: 0. Max value: 1.
      {min_stratum_coverage_ratio,0.4}
    ]}},

    %% The value should have 'integer' type. Min value: 0. Max value: 90.
    {outer_square_side_size,60},

    %% The value should have 'integer' type. Min value: 0. Max value: 90.
    {inner_square_side_size,20}
  ]}},

  {fpf_extended_check, [
    %% The value should have 'integer' type. Min value: 0. Max value: 60.
    {max_angle_deviation_degrees,4},

    %% The value should have 'float' type. Min value: -1. Max value: 1.
    {face_quad_scaling_ratio,-0.05}
  ]}
]}.

%% Person Management Service options.
{person_management, [
  %% FR request settings.
  {fr_request_settings, [
    %% Maximum response time.
    %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
    {request_timeout_ms,1000}
  ]},

  %% FPF request settings.
  {fpf_request_settings, [
    %% Maximum response time.
    %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
    {request_timeout_ms,1000}
  ]},

  %% FD request settings.
  {fd_request_settings, [
    %% Maximum response time.
    %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
    {request_timeout_ms,1000},

    %% Minimum face quad side size.
    %% The value should have 'integer' type. Min value: 100. Max value: 1000000.
    {min_face_side_px,100},

    %% Maximum number of faces in FD response.
```

```
    %% The value should have 'integer' type. Min value: 1. Max value: 1000000.
    {max_searched_faces_on_frame,1000000},

    %% Maximum face quad side size.
    %% The value should have 'integer' type. Min value: 100. Max value: 1000000.
    {max_face_side_px,1000000}
  ]},

  %% Exif Writer request settings.
  {exif_writer_request_settings, [
    %% Maximum response time.
    %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
    {request_timeout_ms,1000}
  ]},

  %% Exif Reader request settings.
  {exif_reader_request_settings, [
    %% Maximum response time.
    %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
    {request_timeout_ms,1000}
  ]}
]}.

%% Full path to license.
%% The value should have 'string' type. Min length: 1.
{path_to_license,"/var/lib/smilart_srv/license/license"}.

%% Instant Photo Analytics Service options.
{ipa, [
  %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
  {request_timeout_ms,5000},

  %% The value should have 'integer' type. Min value: 1. Max value: 200.
  {queue_size,20},

  {identification, [
    %% The value should have 'float' type. Min value: 0. Max value: 1.
    {threshold,0.6}
  ]},

  {detect, [
    {fpf_request_settings, [
      %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
      {request_timeout_ms,1000}
    ]},

    {fd_request_settings, [
      %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
      {request_timeout_ms,1000},

      %% The value should have 'integer' type. Min value: 100. Max value: 1000000.
```

```
      {min_face_side_px,100},

      %% The value should have 'integer' type. Min value: 1. Max value: 1000000.
      {max_searched_faces_on_frame,1000000},

      %% The value should have 'integer' type. Min value: 100. Max value: 1000000.
      {max_face_side_px,1000000}
    ]},

    {exif_writer_request_settings, [
      %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
      {request_timeout_ms,1000}
    ]},

    {exif_reader_request_settings, [
      %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
      {request_timeout_ms,1000}
    ]},

    %% The value should have 'integer' type. Min value: 1. Max value: 1000000.
    {default_faces_limit,1000000}
  ]},

  %% The value should have 'integer' type. Min value: 1. Max value: 200.
  {count_workers,10},

  {correlation, [
    {fr_request_settings, [
      %% The value should have 'integer' type. Min value: 500. Max value: 1000000.
      {request_timeout_ms,1000},

      %% The value should have 'integer' type. Min value: 1. Max value: 1000000.
      {correlations_limit,10}
    ]}
  ]}
]}.

%% Identification options.
{identification, [
  %% The value should have 'integer' type. Min value: 1.
  {max_base_size,300000}
]}.

%% Persons storage options.
{database, [
  %% The value should have 'mixed' type.
  {installation_type,{master,[]}},

  %% The value should have 'mixed' type.
  {implementation,{mongodb,[
    %% The value should have 'string' type. Regular expression to check value:
```

```
^mongodb://.*.
    {uri,"mongodb://${mongodb_host}/smilart?readPreference=nearest"}
  ]}}
]}.

%% Camera Server connection options.
{camera_server, [
  %% Erlang Node name.
  %% The value should have 'string' type. Min length: 1.
  {node,"sml_camserver@camera_server"},

  %% Minimum time between reconnections.
  %% The value should have 'integer' type. Min value: 1.
  {min_resubscribe_timeout_ms,100},

  %% Maximum time between reconnections.
  %% The value should have 'integer' type. Min value: 1.
  {max_resubscribe_timeout_ms,60000},

  %% Cookie.
  %% The value should have 'string' type. Min length: 1.
  {cookie,"sml_camserver"}
]}.

%% In-memory blob storage.
{blobstore, [
  %% The value should have 'integer' type. Min value: 1000.
  {timeout_ms,30000},

  %% The value should have 'integer' type. Min value: 1024.
  {size_byte,52428800}
]}.

%% Amqp Api options.
{amqp_api, [
  {verification_event, [
    %% The value should have 'integer' type. Min value: 1000.
    {session_timeout_ms,30000},

    %% The value should have 'string' type. Min length: 1.
    {exchange_type,"direct"},

    %% The value should have 'string' type. Min length: 1.
    {exchange_name,"platform-api.verification"}
  ]},

  {verification, [
    %% The value should have 'integer' type. Min value: 1.
    {max_verification_timeout_seconds,30}
  ]},
```

```
  {vca, [
    %% The value should have 'integer' type. Min value: 1000.
    {session_timeout_ms,30000},

    %% The value should have 'string' type. Min length: 1.
    {exchange_type,"direct"},

    %% The value should have 'string' type. Min length: 1.
    {exchange_name,"platform-api.vca"}
  ]},

  {router, [
    %% The value should have 'string' type. Min length: 1.
    {routing_key,"#"},

    %% The value should have 'string' type. Min length: 1.
    {exchange_type,"fanout"},

    %% The value should have 'string' type. Min length: 1.
    {exchange_name,"platform-api"}
  ]},

  {photobooth, [
  ]},

  %% The parameter is responsible for the activity of the service.
  %% The value should have 'boolean' type.
  {enable,true},

  {amqp_settings, [
    %% The value should have 'string' type. Min length: 1.
    {user,"guest"},

    %% The value should have 'string' type. Min length: 1.
    {password,"guest"},

    %% The value should have 'string' type. Min length: 1.
    {host,"${rabbitmq_host}"}
  ]}
]}.

%% Adaptive Verification Service options.
{adaptive_verification, [
  %% Options for setting verification thresholds.
  {thresholds, [
    %% Type of photo selection.
    %% The value should have 'enumeration' type. Possible values:
[person_photos_per_camera,all_person_photos].
    {selection_type,person_photos_per_camera},

    %% The influence of the selection size on the threshold name during verification.
```

```
    %% The value should have 'list' type. Min length: 1. List element type: (The value
should have 'string' type. Min length: 1.). Can consist duplicated elements.
    {selection_size_to_verification_threshold_names,["UltraLow","Low","Normal"]}
  ]},

  {scoring, [
    %% The value should have 'integer' type. Min value: 0.
    {init_photo_time_score_sec,864000},

    %% The value should have 'integer' type. Min value: 0.
    {correlation_deviation_weight,80}
  ]},

  %% Restricting of the sampling of photos to add to a person.
  {sampling_restrictions, [
    %% The minimum time between adding a photo to a person for a camera.
    %% The value should have 'integer' type. Min value: 1.
    {sampling_throttle_sec,7200}
  ]},

  {photo_validation, [
    {fpf_check, [
      %% The value should have 'integer' type. Min value: 0. Max value: 60.
      {yaw,35},

      %% The value should have 'integer' type. Min value: 0. Max value: 60.
      {roll,30},

      %% The value should have 'integer' type. Min value: 0. Max value: 60.
      {pitch,25},

      %% The value should have 'integer' type. Min value: 0. Max value: 60.
      {max_angle_deviation_degrees,4},

      %% The value should have 'float' type. Min value: -1. Max value: 1.
      {face_quad_scaling_ratio,-0.05}
    ]}
  ]},

  %% The maximum number of photos that can be added to a person from one camera.
  %% The value should have 'integer' type. Min value: 1. Max value: 100.
  {max_photos_per_camera,5},

  %% The parameter is responsible for the activity of the service.
  %% The value should have 'boolean' type.
  {enable,false}
]}.
```

Adaptive Verification (adaptive_verification)

The following formula is used to calculate the score of a sampled photo:

score = init_photo_time_score_sec + last_verification_time_sec - now_sec + (correlation_deviation_weight * (average_verification_coeff - get_threshold_by_name("high")) + number_of_successful_verifications) * 86400

if `score` is less than 0 then this photo can be replaced by `Adaptive Verification`.

Name	Type	Description
enable	boolean	The parameter is responsible for the activity of the service.
thresholds	object	Options for setting verification thresholds.
thresholds.selection_type	enumeration	Type of photo selection, available values: person_photos_per_camera,all_person_photos.
thresholds.selection_size_to_verification_threshold_names	array of strings	The influence of the selection size on the threshold name during verification.
scoring	object	Options for scoring of sampled photos.
scoring.init_photo_time_score_sec	integer	Parameter used in calculating the score.
scoring.correlation_deviation_weight	integer	Parameter used in calculating the score.
sampling_restrictions	object	Restrictions settings for adding sampled photos.
sampling_restrictions.sampling_throttle_sec	integer	The minimum time between adding sampled photos for one camera per person.
photo_validation	object	Options for photo validation.
photo_validation.fpf_check	object	Options for fpf photo validation.
photo_validation.fpf_check.yaw	integer	The maximum deviation of the yaw angle from the central angle.
photo_validation.fpf_check.roll	integer	The maximum deviation of the roll angle from the central angle.
photo_validation.fpf_check.pitch	integer	The maximum deviation of the pitch angle from the central angle.
photo_validation.fpf_check.max_angle_deviation_degrees	integer	The maximum angle deviation from second result of fpf.
photo_validation.fpf_check.face_quad_scaling_ratio	float	Face scaling ratio option to get second result of fpf.
max_photos_per_camera	integer	The maximum number of photos that can be added to a person from one camera.

Amqp Api (amqp_api)

Parameters:

Name	Type	Description
enable	boolean	The parameter is responsible for the activity of the service.
amqp_settings	object	Connection settings for RabbitMQ
amqp_settings.host	string	RabbitMQ Host
amqp_settings.user	string	RabbitMQ User
amqp_settings.password	string	RabbitMQ Password
router	object	RPC Amqp Api options
router.routing_key	string	Routing key for Api
router.exchange_name	string	Name of exchange for Api
router.exchange_type	string	Type of exchange for Api
vca	object	Amqp VCA options
vca.exchange_name	string	Name of exchange
vca.exchange_type	string	Type of exchange
vca.session_timeout_ms	integer	The lifetime of a session without renewing subscription
verification	object	Amqp VCA options
verification.max_verification_timeout_seconds	integer	Maximum waiting time for a positive verification result
verification_event	object	Amqp Verification Event publishing Options
verification_event.exchange_name	string	Name of exchange
verification_event.exchange_type	string	Type of exchange
verification_event.session_timeout_ms	integer	The lifetime of a session without renewing subscription

Blobstore (blobstore)

Name	Type	Description
timeout_ms	integer	Maximum time to store a single item
size_byte	integer	Storage capacity

CameraServer (camera_server)

Name	Type	Description
node	string	Camera server node name in {NAME}@{HOST} format
cookie	string	Camera server erlang cookie.

min_resubscribe_timeout_ms	integer	Minimum interval between attempts to connect to camera server.
max_resubscribe_timeout_ms	integer	Maximum interval between attempts to connect to camera server.

Database (database)

Name	Type	Description
implementation	object	Database implementation used
installation_type	object	Installation type used

Implementation (implementation)

implementation is a type of database used in Phoenix. It can be one of those types:

- mongodb — Default choice. It's highly advisable to use this database.
- memory — Stores data in memory, empties itself on restart. Can be used for a small dataset.

MongoDB settings

Name	Type	Description
uri	string	MongoDB connection string

URI string format:

mongodb://[username:password@]host1[:port1][,host2[:port2],...
[,hostN[:portN]]][/[database][?options]]

Full format description URI https://docs.mongodb.com/manual/reference/connection-string/

Available options:

Name	Type	w
custom	readPreference	enumeration
journal	bool	localThresholdMS
integer	connectTimeoutMS	integer
socketTimeoutMS	integer	serverSelectionTimeoutMS
integer	waitQueueTimeoutMS	integer
heartbeatFrequencyMS	integer	minPoolSize
integer	minHeartbeatFrequencyMS	integer
maxPoolSize	integer	wtimeoutMS

Installation Type (installation_type)

Type of Phoenix installation:

- master — In this mode Phoenix node has exclusive access to person database manipulation. Available for any database type. Propagation of changes from the database to the entire system takes a finite time. In most cases this is almost instantaneous;
- slave — In this mode Phoenix node synchronizes its state with database once in `sync_timeout_sec` seconds, and prohibited from manipulating person database. Propagation of changes from the database to the entire system is similar to eventual consistency. In most cases this takes about `sync_timeout_sec` seconds.

Slave options

Name	Type	Description
sync_timeout_sec	integer	Interval between synchronization attempts

Cluster mode settings:

To configure Phoenix in cluster mode one Phoenix must be chosen as a master node and will have the ability to manipulate persons. Machine with master Phoenix instance should also host master MongoDB instance.

To configure Phoenix instance as master`readPreference` parameter for this instance must be set to `primary`. Also this Phoenix instance must be connected to master node of MongoDB.

Hostname in MongoDB connection URI must be the same as a name of this MongoDB instance in cluster.

In cluster mode only one Phoenix master instance is allowed.

All other Phoenix instances must be configured in `slave` mode.

Identification (identification)

Name	Type	Description
max_base_size	integer	Maximum number of photos that can be loaded into face recognition daemon.

Instant Photo Analytics (ipa)

This section contains IPA settings.

Name	Type	Description
count_workers	integer	Number of workers to process requests parallel.
queue_size	integer	Request queue size.
request_timeout_ms	integer	Maximum response time in milliseconds.

detect	object	Detect settings.
detect.default_faces_limit	integer	Default number of faces to search for.
detect.fd_request_settings	object	FD request settings.
detect.fd_request_settings.max_searched_faces_on_frame	integer	Max number of faces in FD response.
detect.fd_request_settings.min_face_side_px	integer	Minimum face quad side size.
detect.fd_request_settings.max_face_side_px	integer	Maximum face quad side size.
detect.fd_request_settings.request_timeout_ms	integer	Maximum FD response time in milliseconds.
detect.fpf_request_settings	object	FPF request settings.
detect.fpf_request_settings.request_timeout_ms	integer	Maximum FPF response time in milliseconds.
detect.exif_writer_request_settings	object	ExifWriter request settings.
detect.exif_writer_request_settings.request_timeout_ms	integer	Maximum ExifWriter response time in milliseconds.
detect.exif_reader_request_settings	object	ExifReader request settings.
detect.exif_reader_request_settings.request_timeout_ms	integer	Maximum ExifReader response time in milliseconds.
correlation	object	Correlation settings.
correlation.fr_request_settings	object	FR request settings.
correlation.fr_request_settings.correlations_limit	integer	Maximum number of correlations included in the correlation result.
correlation.fr_request_settings.request_timeout_ms	integer	Maximum FR response time in milliseconds.
identification	object	Identification settings.
identification.threshold	float	Identification threshold.

Person Management (person_management)

This section contains Person Management Service settings.

Name	Type	Description
exif_reader_request_settings	Object	ExifReader request settings.

exif_reader_request_settings.request_timeout_ms	integer	Maximum ExifReader response time in milliseconds.
exif_writer_request_settings	Object	ExifWriter request settings.
exif_writer_request_settings.request_timeout_ms	integer	Maximum ExifWriter response time in milliseconds.
fpf_request_settings	Object	FPF request settings.
fpf_request_settings.request_timeout_ms	integer	Maximum FPF response time in milliseconds.
fr_request_settings	Object	FR request settings.
fr_request_settings.request_timeout_ms	integer	Maximum FR response time in milliseconds.
fd_request_settings	Object	FD request settings.
fd_request_settings.request_timeout_ms	integer	Maximum FD response time in milliseconds.
fd_request_settings.max_searched_faces_on_frame	integer	Maximum number of faces in FD response.
fd_request_settings.min_face_side_px	integer	Minimum face quad side size.
fd_request_settings.max_face_side_px	integer	Maximum face quad side size.

Photobooth (photobooth)

This section contains photobooth settings.

Name	Type	Description
partitioning_scheme	object	See below.
sampling_time_limit_seconds	integer	Maximum time photobooth will gather detects before it yelds result.
fpf_extended_check	object	Options for extended check.
fpf_extended_check.max_angle_deviation_degrees	integer	The maximum angle deviation from second result of fpf.
fpf_extended_check.face_quad_scaling_ratio	float	Face scaling ratio option to get second result of fpf.

partitioning_scheme grid3x3:

Name	Type	Description
stratums_of_interest	enumeration	Areas of interest, available values: cross, horizontal, forward_turn, all_inner_poses
stratum_sampling	object	Type of stratum sampling.
outer_square_side_size	integer	The size of the outer square of the partitioning scheme.

inner_square_side_size	integer	the size of the inner square of the partitioning scheme.

stratum_sampling rook

Name	Type	Description
min_stratum_coverage_ratio	float	Minimum stratum coverage ratio

WebServer (web_server)

Name	Type	Description
hostname	string	Name of a host that will be used in urls generated by Phoenix
port	integer	Port to access blobstore

If you change port in Phoenix setting you also need to change this port forwarding in systemd service file.

Workflow (workflow)

This section contains settings for Workflow.

Name	Type	Description
verification_and_identification	Object	Verification and Identification settings.
verification_and_identification.write_to_shm	Object	Write to shm request settings.
verification_and_identification.write_to_shm.request_timeout_ms	integer	Maximum response time in milliseconds.
verification_and_identification.detect	Object	Detect request settings.
verification_and_identification.detect.request_timeout_ms	integer	Maximum response time in milliseconds.
verification_and_identification.fpf	Object	FPF request settings.
verification_and_identification.fpf.request_timeout_ms	integer	Maximum response time in milliseconds.
verification_and_identification.write_exif	Object	Write exif request settings.
verification_and_identification.write_exif.request_timeout_ms	integer	Maximum response time in milliseconds.

verification_and_identification.create_template	Object	Create template request settings.
verification_and_identification.create_template.request_timeout_ms	integer	Maximum response time in milliseconds.
identification	Object	Identification settings.
identification.threshold	float	Identification threshold.
identification.correlation	Object	Correlation request settings.
identification.correlation.request_timeout_ms	integer	Maximum response time in milliseconds.
identification.correlation.limit	integer	Maximum number of correlations included in the correlation result.
verification	Object	Verification settings.
verification.correlation	Object	Correlation request settings.
verification.correlation.request_timeout_ms	integer	Maximum response time in milliseconds.
verification.correlation.limit	integer	Maximum number of correlations included in the correlation result.
photobooth	Object	Photobooth settings.
photobooth.write_to_shm	Object	Write to shm request settings.
photobooth.write_to_shm.request_timeout_ms	integer	Maximum response time in milliseconds.
photobooth.detect	Object	Detect request settings.
photobooth.detect.request_timeout_ms	integer	Maximum response time in milliseconds.
photobooth.fpf	Object	FPF request settings.
photobooth.fpf.request_timeout_ms	integer	Maximum response time in milliseconds.

Current Config

Rationale: preserve configuration changes between system updates. In the case of an empty file all system options will be set by default, which were displayed by the system in the Example Config.
File modification policy: each time the system starts up, it tries to preserve meaningfull specified options (except the unknown options) in this file, but can change its structure, which shouldn't affect the desired behavior of the system.

Some changes to the service states that should be saved upon restart are also saved to this file.

Typical reasons to change this file: change system wide options for a regular system administrator.
Location: `/etc/phoenix/config/current.config`.

File post-modification action: `systemctl restart phoenix`.

Face Recognition Customization file

Rationale: preserve the recognition options associated with a particular version of the recognition (defined in the file name: `fr-<version>.json`) between system updates.
File modification policy: creates and fullfills with default values by the system if not exists.
Typical reasons to change this file: change recongition thresholds, define new threshold names in the system.

Please contact to Tech Support to change the options in this file and in the case of modification of the file associated with another version of recognition.

Location: `/etc/phoenix/customizations/fr-3.json`.
File post-modification action: `systemctl restart phoenix`.

File scheme:

```
{
  "defaultVerificationThreshold":float
  "verificationThresholds": {
     <thresholdName>:float
  }
}
```

Properties

Property Name	Value Type	Description
defaultVerificationThreshold	float	Default thresholds for verification. Will be used if no verification threshold name was specified in request.
verificationThresholds	nested object	Custom thresholds map for verification.
verificationThresholds.<thresholdName>	float	Defines verification threshold with name `thresholdName`.

It highly recommended to create new items in `verificationThresholds` instead of overriding `defaultVerificationThreshold`.

Frame Processing Customization file

Rationale: preserve the frame processing options between system updates.
File modification policy: creates and fullfills with default values by the system if not exists.
Typical reasons to change this file: change the number of searched faces, limit face detection on different distances to the camera in context of a single camera group.

Please contact to Tech Support to change the options in this file.

Location: `/etc/phoenix/customizations/cs-group-settings.json`.
File post-modification action: `systemctl restart phoenix`.

File scheme:

```
{
  "csGroups": [ string ],
  "cameraRules": [
    {
      "oneOf": [ string ],
      "thenApply": {
        "fd": {
          "minFaceSizePx": integer,
          "maxFaceSizePx": integer,
          "maxSearchedFacesOnFrame": integer
        }
      }
    }
  ]
}
```

Properties

Property Name	Value Type	Description
csGroups	array of strings	Groups of cameras with which phoenix works.
cameraRules	array	Ordered list of rules for frames processing for VCA and Verification services. First matching rule will be applied.
cameraRules[].oneOf	array of strings	If camera belongs to one of these specified groups.
cameraRules[].thenApply	nested object	Then following options for frames processing will be applied.
cameraRules[].thenApply.fd	nested object	FD options.
cameraRules[].thenApply.fd.minFaceSizePx	integer	Minimum face quad side size. default: 100, min: 100, max: 1000000.
cameraRules[].thenApply.fd.maxFaceSizePx	integer	Maximum face quad side size. default: 1000000, min: 100, max: 1000000.
cameraRules[].thenApply.fd.maxSearchedFacesOnFrame	integer	Max number of faces in FD response. default: 1000000, min: 1, max: 1000000.

Basically face detection works in three steps. First, it searches for faces with face quad in [`minFaceSizePx`, `maxFaceSizePx`] and sorts faces found by size. Second, it applies maxSearchedFacesOnFrame and chooses only the biggest faces. And last, it confirms faces chosen in step two and because of this some faces can be discarded.

If there are three faces on frame and `maxSearchedFacesOnFrame` is equal to 1 and the biggest face would not be confirmed then the answer with no faces on frame will be received.

- Decrease of `maxFaceSizePx` parameter will lead to less face detection.
- Increase of `minFaceSizePx` parameter will lead to less face detection time.
- Decrease of `maxSearchedFacesOnFrame` parameter will lead to less face detection.

OpenVPN

OpenVPN require some network tune. If you use NetworkManager you should disable tun*, (and probably docker и br-) interfaces.

Edit **/etc/NetworkManager/NetworkManager.conf**

```
[main]
plugins=keyfile

[keyfile]
unmanaged-devices=interface-name:tun*;interface-name:docker*;interface-name:br-*
```

Then reboot the server:

```
reboot
```

License

For license installation please follow

https://docs.smilart.com/_smilartos.installation/1855.4.0/html/index.html#_collecting_data_for_a_license

Camera Server configuration

You can manage **Camera Server** through Camera Server **Admin Panel**.

To access **Admin Panel** go to http://<your_server>:8082/ (you can change the port in **Camera Server** config)

By default there is no authorization for **Admin Panel**, but it is possible to add some.

1. By using **Nginx** basic authorization.
2. By using **Keycloak** (https://www.keycloak.org/).

Secure Admin Panel by Nginx basic access authentication

Install and setup **Nginx** (https://smilart.atlassian.net/wiki/spaces/PS/pages/173670407/Install+nginx+for+basic+access+authentication).

For instance we want to have access to **Admin Panel** by http://nginx-address/cs/. And assume that Nginx can get **Admin Panel** by http://192.168.1.39:8082

To get that you have to change file (/etc/nginx/nginx.conf) by adding `location` rules to your `http server` which on port 80.

```
#...
http {
#...
server {
    listen       80;
#...

# Next rule is to get Admin Panel resources files
location /cs/ {
    proxy_pass http://192.168.1.39:8082/; # note the trailing slash!
}

# Next used for interanl Camera Server API
location /cs/api/csi {
    proxy_pass http://192.168.1.39:8082/api/csi;
    proxy_http_version 1.1;
    proxy_set_header Upgrade $http_upgrade;
    proxy_set_header Connection "upgrade";
    proxy_read_timeout 2073600; #maximum supported is 24 days
}

#...
}
}
#...
```

Applying changes in the config needs restart **Nginx** by `systemctl restart nginx`.

After that follow next steps to close **Camera Server Admin Panel** port:

1) Create file `/var/lib/iptables/rules-save` and edit like in example below.

```
*filter
-A INPUT -p tcp -m tcp --dport 8082 -j DROP
COMMIT
```

2) Enable iptables-restore `systemctl enable iptables-restore`.

3) Reboot.

Secure Admin Panel by Keycloak

Install and setup **Keycloak** (https://smilart.atlassian.net/wiki/spaces/PS/pages/164102281/Install+keycloak).

Change **Camera Server** config parameter `admin_panel` (/etc/camera_server/current/sys.config.orig).

```
% - makes comment until end of line
% ...
    {admin_panel, [
      %% {authentication, none | {keycloak, [ ...]} }
      {authentication,
        {keycloak, [
          {host, "${keycloak_host}"},
          {port, 8080},
          {role, "cs_admin"},
          {client_id, "cs_admin_panel"},
          {realm, "smilart"}
        ]}
      },
      {port, "${ADMIN_PANEL_PORT}"}
    ]},
% ...
```

Properties

Name	Type	Description
admin_panel	object	Settings for **Admin Panel**.
admin_panel.port	integer	**Admin Panel** port. By default will get from env. `${ADMIN_PANEL_PORT}`, which is 8082 by default.
admin_panel.authentication	object	Can be `none` or `keycloak`.
admin_panel.authentication.keycloak.host	string	Host name of **Keycloak**. By default will get from env. `${keycloak_host}`, which is hostname of station with the **Camera Server**.
admin_panel.authentication.keycloak.port	integer	Port of **Keycloak**. By default `8080`.
admin_panel.authentication.keycloak.role	string	Required role of **Keycloak** user to access **Admin Panel**. By default `cs_admin`.
admin_panel.authentication.keycloak.client_id	string	Name of **Keycloak** 'Client' for **Admin Panel**. By default `cs_admin_panel`.
admin_panel.authentication.keycloak.realm	string	**Keycloak** realm to use. By default `smilart`.

If you change **Admin Panel** port you also need to change this port forwarding in systemd unit file (/etc/systemd/system/camera_server.service).

Host name and port of **Keycloak** must be reachable from `camera_server` docker container and from client side of **Admin Panel**.

Applying changes in the config needs restart **Camera Server** by `systemctl restart camera_server`.

Camera Server Admin Panel

User interface for administration of Camera Server.

Provides capabilities:

- Add/Configure/Delete MJPEG, RTSP, Basler cameras.
- View live stream from camera.
- View license information.
- View actual information about cameras.

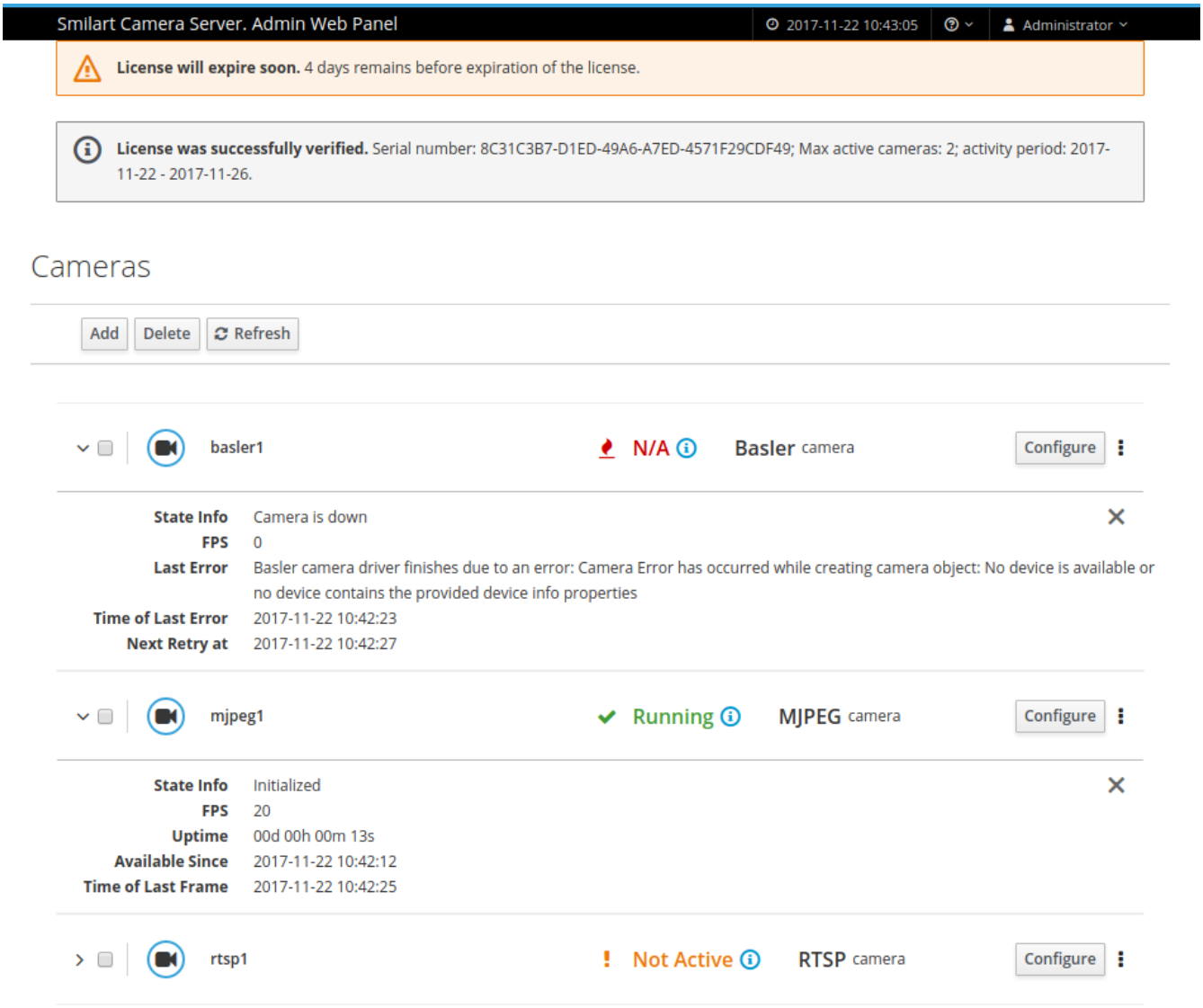

Figure 1. Main page

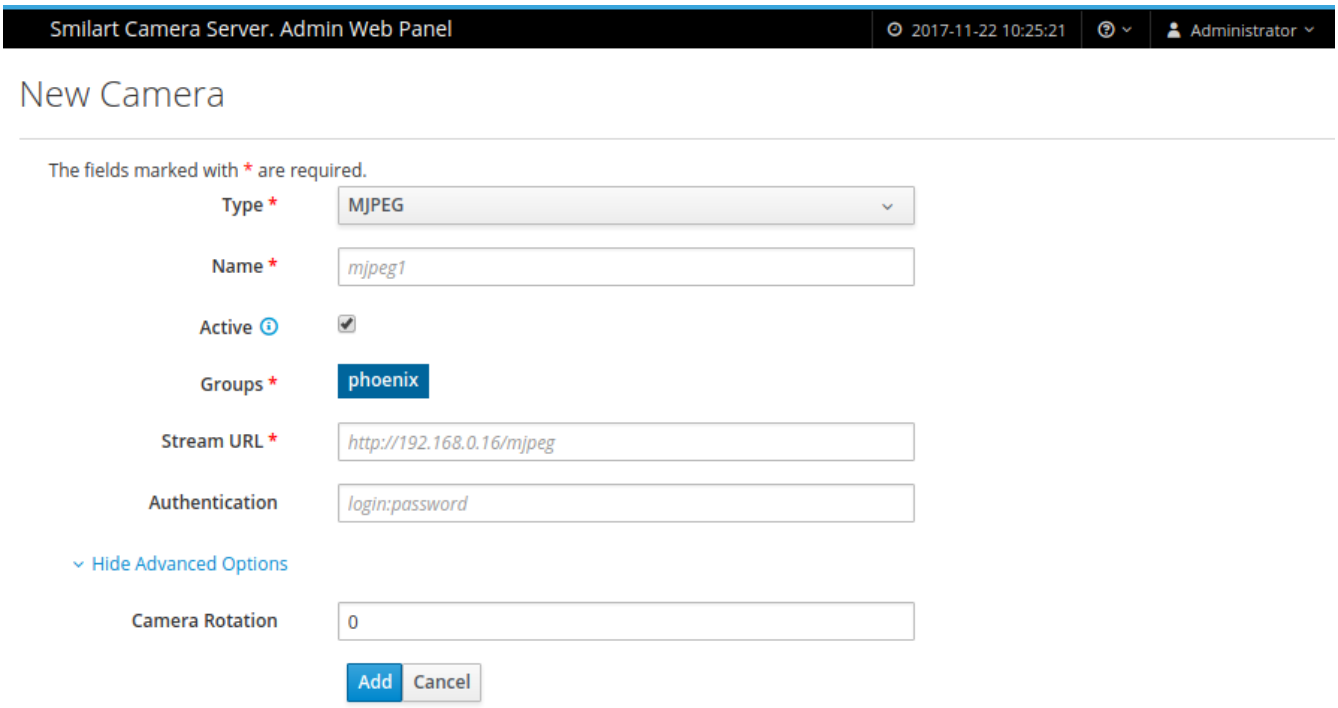

Figure 2. Panel of MJPEG camera

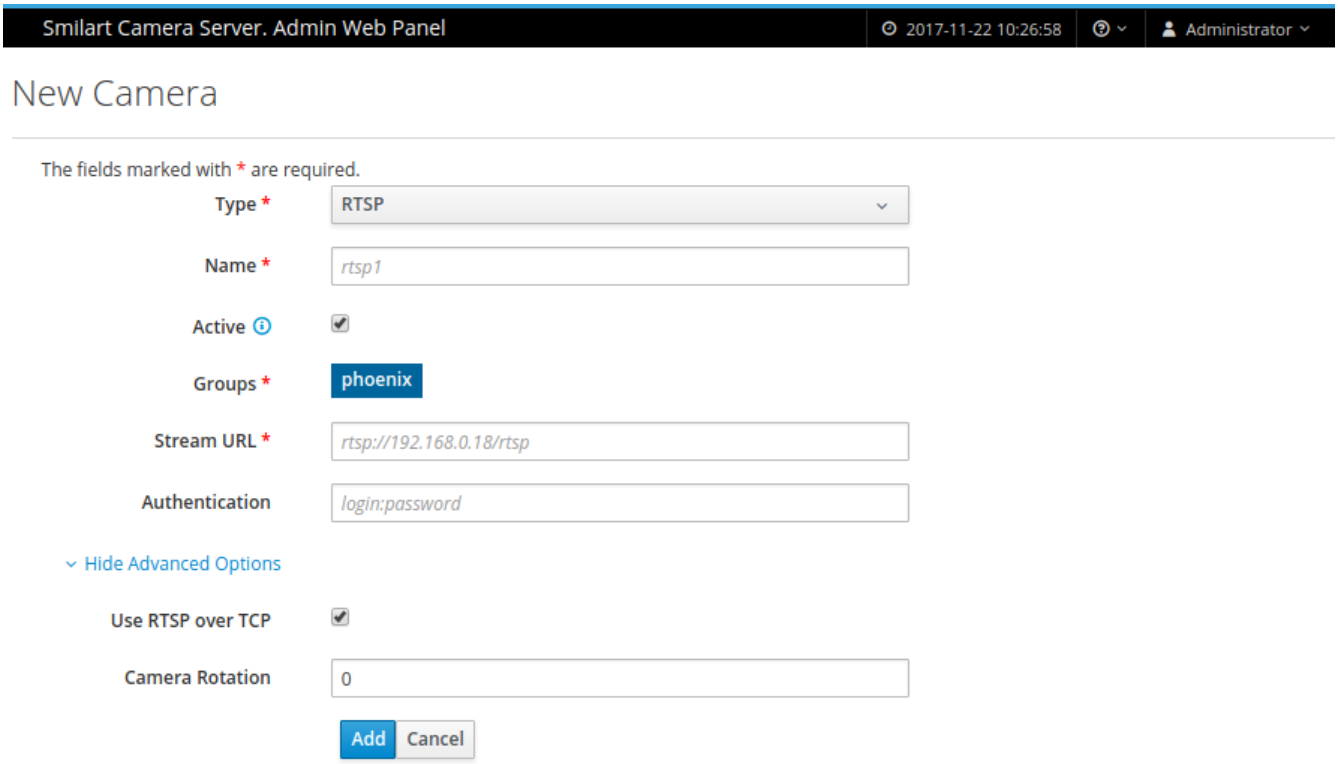

Figure 3. Panel of RTSP camera

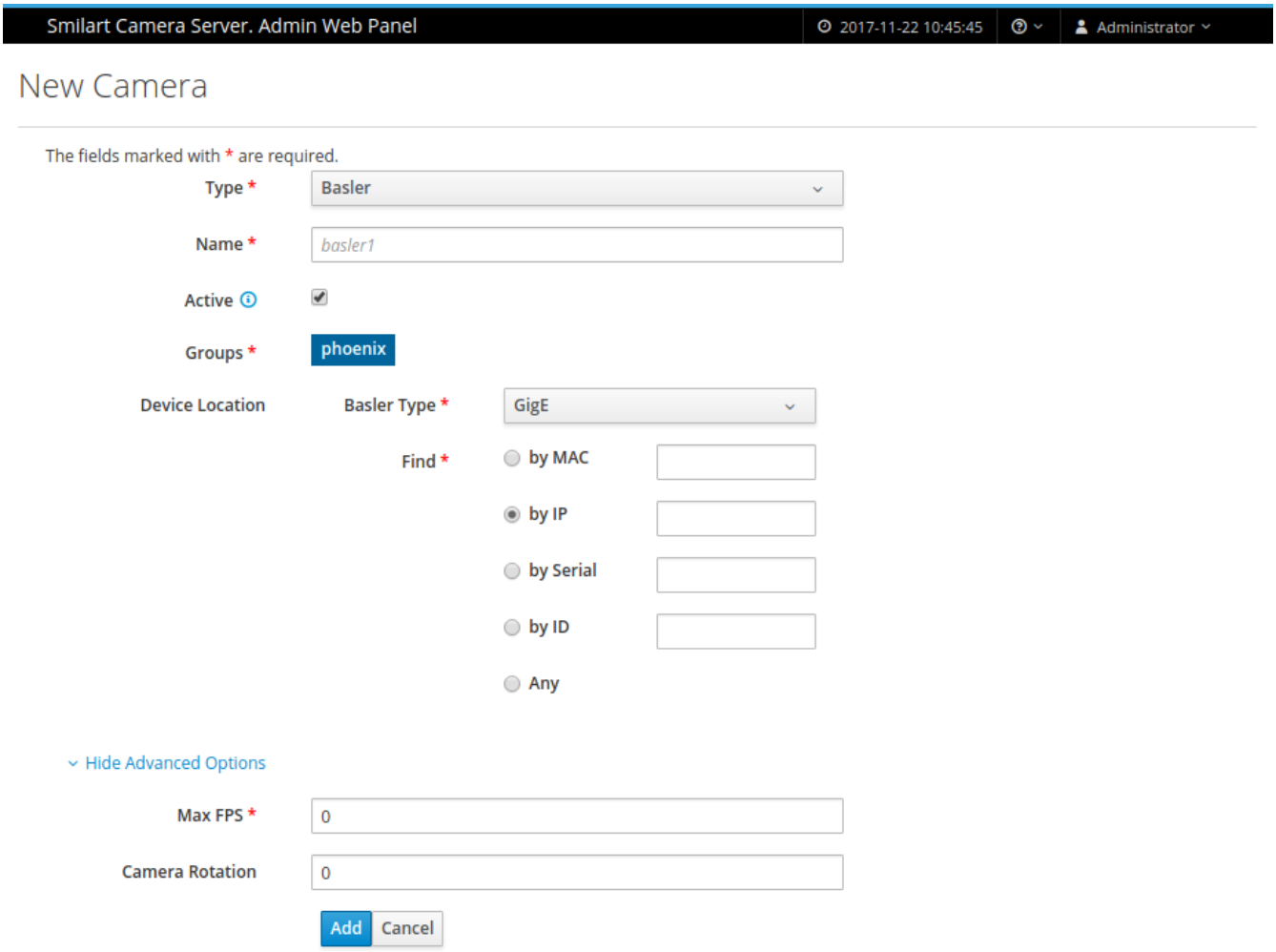

Figure 4. Panel of Basler camera