

# WEB CLIENT FOR PANIC ALARMS MANAGEMENT SYSTEM

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## Abstract

Alarms are one of the most important aspects of control systems. Each control system can face unexpected issues, which demand fast and precise resolution. As the control system starts to grow, it requires the involvement of more engineers to access the alarm's list and focus on the most important ones. Our objective was to allow users to access the alarms fast, remotely and without special software. According to current trends in the IT community, creating a web application turned out to be a perfect solution. Our application is the extension and web equivalent to the current Panic GUI application. It was developed to be integrated with EPICS and TANGO control systems. It allows constant remote access using just a web browser which is currently present on every machine including mobile phones and tablets. In that paper the status of application will be presented as well as key features.

## ALARM SYSTEM IN TANGO CONTROL SYSTEM

TANGO Control System is object-oriented control system based on CORBA. It is widely used in order to create Supervisory Control and Data Acquisition system architecture. One of the most important advantages is that it is available under Open Software free license. TANGO is widely used in scientific facilities e.g. Max IV (Lund, Sweden), ALBA (Barcelona, Spain) or SOLARIS (Cracow, Poland) as well as in industry [1]. In institutes like synchrotrons the scientists and engineers are dealing with thousands of signals per second coming from different types of devices. It is clear that there is a need to monitor non-typical situations. Here comes the idea of alarm. It is asynchronous notification that some event happened, or a given state was reached. In scientific facilities using TANGO Controls the idea of creating a set of tools to manage alarms led to the creation of an alarm system. One of the most popular systems are PANIC and Tango Alarm System.

## PANIC

PANIC (Package for Alarms and Notification of Incidences from Controls) was developed in ALBA Synchrotron. It is a set of tools including API, Tango device and user interface for evaluation of a set of conditions and user notification. [2]

## PyAlarm

One of key elements of PANIC toolkit is PyAlarm device server [3]. According to documentation, it connects to the list of alarms provided and verifies their values. Each alarm is independent in terms of formula, but all alarms within

the same PyAlarm device will share a common evaluation environment. PyAlarm device allows also to configure mail or SMS notification as well as logging. That features are needed to ensure convenient alarm management for user.

## Panic GUI

Panic GUI is a desktop application implemented using Taurus library. It allows checking existing alarms and manipulate them.

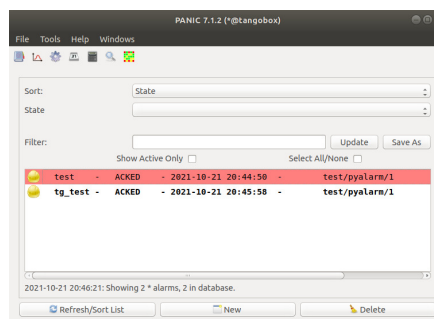


Figure 1: Alarm dashboard in PANIC GUI

Moreover, PANIC allows user to modify alarm formula, acknowledge or disable alarm.

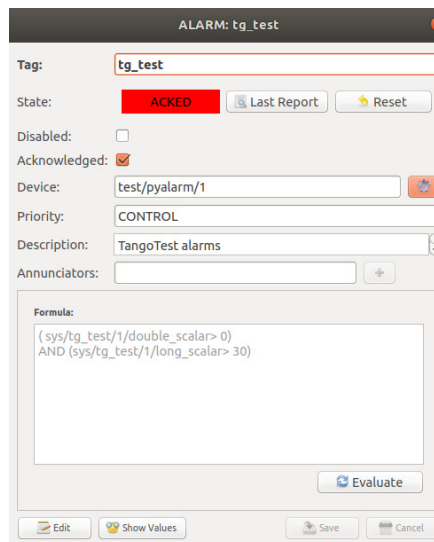


Figure 2: Alarm modification in PANIC GUI

## IC@MS

Although PANIC GUI is a useful application, it has some drawbacks. First, it is desktop application what means it requires installation, and it can be only run on a desktop. Nowadays, there is a trend to move desktop applications to web, which can easily be open on wider range of different devices including mobile phones, tablets and desktop

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Moreover, user experience is limited by Taurus library used to create interface. When creating web application, there are multiple modern frameworks which make websites look modern and easy on the eye. That are main reasons why we decided to create our web application. Our application is called IC@MS - Integrated Cloud Ready Alarm Management System. It provides the same functionalities as Panic GUI but also extends it with some new functionalities like adding devices supporting different protocols. What is important, IC@MS can be integrated not only with TANGO but also with alternative control system - EPICS [4].

### KEY FEATURES

In that section we want to describe most important parts of IC@MS and explain, why they make our application so useful.

#### Cloud Ready

Our application is cloud ready. It means that it can be simply deployed to the cloud like Azure. It speeds up product deployment process. The application is easily accessible and is ready for future development for next versions.

#### Signing Up

For IC@MS security is important. Only registered users can log in and see the dashbord. Moreover, we have introduced roles to manage access to different parts of our application. Thanks to that, in production mode, people with different access levels and permissions will see only parts related to their job.

#### Alarm Dashboard

As well as in PANIC GUI, the most important part of application is alarm dashboard which allows seeing active and not active. When the alarm is triggered, its colour is changed what depends on severity. The most important and recent alarms are shown first. There are buttons to perform operations like acknowledging alarms, reset or disable.

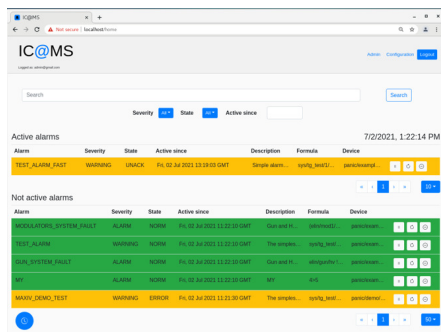


Figure 3: Alarm dashboard in IC@MS

User can easily create new alarms as well as modify existing ones using the form in the configuration page. User can include provide mail and phone number to get notifications about alarm. Moreover, IC@MS allows out of the box integration with any TANGO based device server.

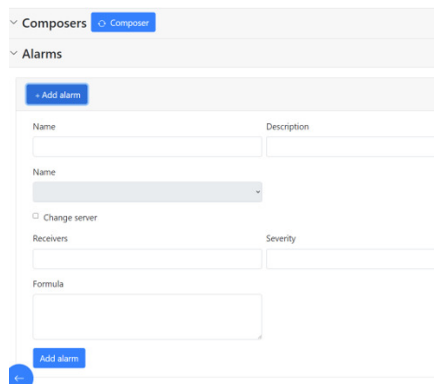


Figure 4: Creating alarm in IC@MS

#### Data Sources and Composers

One of IC@MS's features - the configuration page, allows to create data sources and composers devices. Data sources are TANGO devices which provide data acquired from HTTP, MQTT or Modbus protocol. For example, it can be integrated with thermometer which uses MQTT protocol, MQTT data source is created and broker IP, port, topic provided. Composer is a device which propagates signal from many low-level devices (like data sources), and can be used to define alarm formulas.

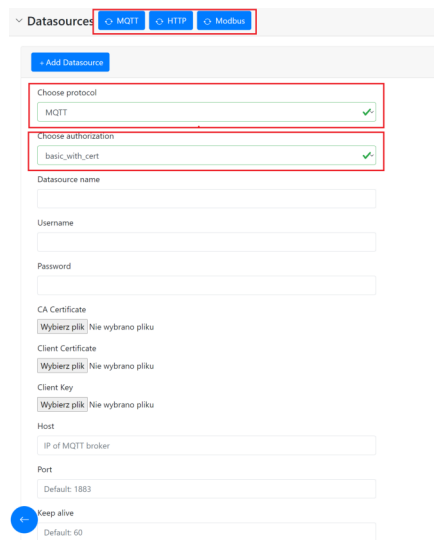


Figure 5: Creating MQTT data source in IC@MS

## ALARM HISTORY

The next feature is alarm history page, which allows user to check history of alarms including dates, state and values of formula connected to that given alarm. Moreover, user can sort entries by date or severity.

Date/Time	Event	Formula
Sat, 04 Sep 2021 05:52:54 GMT	TangoTest alarms	(cpuTg_test1000000000 < 0) AND (cpuTg_test1000000000 > 30)

Date	Comment	Value
Sat, 04 Sep 2021 05:52:12 GMT	ACKNOWLEDGED RESET	-124.11239534864608
Sat, 04 Sep 2021 05:47:55 GMT		-120.18402696868596
Fri, 03 Sep 2021 19:57:30 GMT		-242.05311044332897

Figure 6: Alarm history in IC@MS

## CONCLUSION AND FUTURE WORK

That paper shows key features of web application based on PANIC GUI and how it can be used in order to fulfil

requirements of modern alarm systems. According to trend to use web applications, we see a great development potential for that project. Our plans include e.g. fixing navigation issues and extending phonebook.

## REFERENCES

- [1] TANGO Controls System website, <https://www.tango-controls.org/>.
- [2] PANIC documentation, <https://tango-controls.readthedocs.io/projects/panic/en/latest/>.
- [3] PyAlarm documentation, <https://www.tango-controls.org/developers/dsc/ds/1401/>
- [4] EPICS website, <https://epics-controls.org/>.