Tango Controls Documentation Documentation

Release 0.1

Tango Community, 3Controls, Piotr Goryl

August 18, 2016

CONTENTS

Contents:

CHAPTER

ONE

TANGO ON WINDOWS

This guide provides step by step guide on installation of Tango Controls under Windows operating systems.

1.1 What is Tango Controls

Tango Controls is an object oriented, distributed control system. It is a framework for building custom SCADA systems. It defines communication protocol and API. It provides libraries, set of GUI tools and drivers (so called *Device Servers*) for variety of standard and specific control equipment. For more information see: http://www.tango-controls.org/what-is-tango-controls/

Your computer may have different (one or more) roles in the Tango CS system. The roles are:

- Client computer, where you run GUI applications like **Synoptic**,
- Tango Host, where configuration of all other components is stored,
- Device Servers running.

Your Windows computer may perform all above roles simultaneously.

1.2 Tango package installation

Prerequisite

Some **Tango Controls** tools require **Java Runtime Environment (JRE) >=1.7**. Please install it first. You may find JRE on http://java.com .

The simplest way to have Tango Controls running is to install it from a binary package. Binaries are available at http://www.tango-controls.org/downloads/binary/

- Download the binary package with your favorite browser.

Tango Host, DataBaseds

Each Tango Controls system/deployment has to have at least one running DataBaseds *Device Server*. The machine on which the *Device Server* is running has a role of so called *Tango Host*. DataBaseds is a device server providing configuration information to all other components of the system as well as a runtime catalog of the components/devices. It allows (among others) client applications to find devices in distributed environment.
The `TANGO_HOST` variable is providing information about the address or IP number and the port on which the DataBaseds is listening for connections. The `TANGO_HOST` environment variable is built as follows: *host_name_or_IP:port*, example: `localhost:10000`

- Run the downloaded executable file (double-click on it when downloaded).
- Follow instructions provided by the installation wizard.
- **Configure `TANGO_HOST` environment variable:**
  - **On Windows 8 and 10:**
    - From the Desktop, right-click the very bottom left corner of the screen to get the *Power User Task Menu*.
    - From the *Power User Task Menu*, click *System*.
  - **On Windows XP and 7**
    - From the Desktop, right-click the *Computer* icon and select *Properties*. If you don't have a *Computer* icon on your desktop, click *Start* button, right-click the *Computer* option in the *Start* menu, and select *Properties*.
  - Click the *Advanced System Settings* link in the left column.
  - In the System Properties window, click on the *Advanced* tab, then click the *Environment Variables* button near the bottom of that tab.
  - In the *Environment Variables* window click the *New* button.
  - In the field *Name* write `TANGO_HOST`.
  - In the field *Value* write proper value. If it is the only computer in the Tango System provide `localhost:10000`.

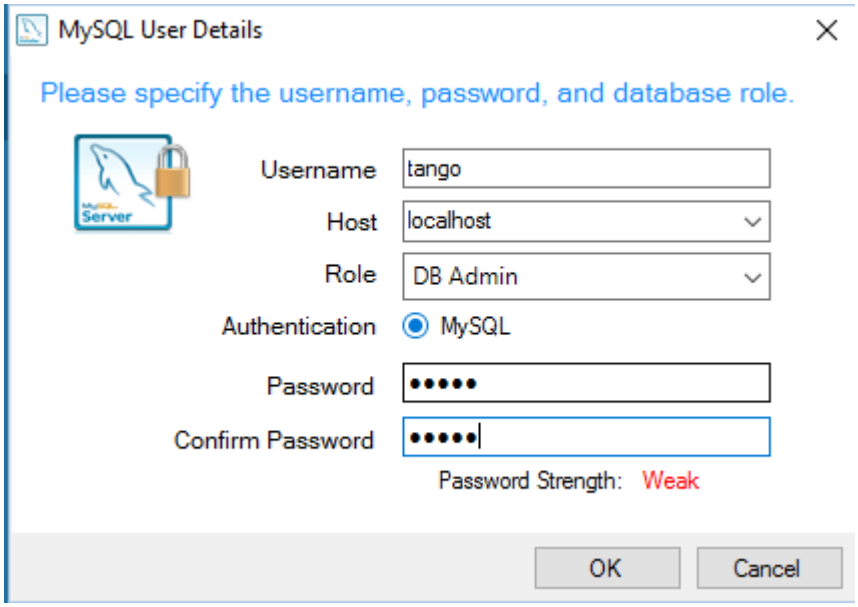
If there is a *Tango Host* already running on some other computer in your deployment and you have provided proper address and port in the `TANGO_HOST` you may start using client and management applications like **Jive**, **Jdraw/Synoptic**. In other case you have to configure the system to perform a role of *Tango Host*.

1.3 Tango Host role

Tango Host role is created by running the **DataBaseds** device server. This device server requires MySQL database in its most common application. To make a computer become a Tango Host you need to:

- **Install MySQL server.** You may use community version available from http://dev.mysql.com/downloads/mysql/ . It is suggested to use **MySQL Installer** with all tools included. You may read more on MySQL installation topic here: http://dev.mysql.com/doc/refman/5.7/en/windows-installation.html

  It is suggested to create dedicated `tango` user with *DB Admin* priviledges during installation. In the installation wizard on a tab *Accounts and Roles* select button *Add User* and create a dedicated user. See



- **Setup environment variables providing credentials to access MySQL:**
  - Open *Command Line*.
  - Invoke command: **%TANGO_ROOT%bindbconfig.exe**.

    Note: This lets you setup two environment variables `MYSQL_USER` and `MYSQL_PASSWORD` used to access the MySQL server. You may use `root` credentials provided upon MySQL installation if it is your development workstation. For production environment it is suggested to create an additional user with `DB Admin` privileges. On Windows you may use **MySQL Installer** from *Start* menu and select the option *Reconfigure* for MySQL Server. Please refer to: http://dev.mysql.com/doc/refman/5.7/en/adding-users.html

- **Populate database with an initial Tango configuration:**
  - Open a command line.
  - Add MySQL client to be available in the PATH. For MySQL version 5.7 the command should be: **set PATH=%PATH%;"C:Program FilesMySQLMySQL Server 5.7bin"**

    Note: Adjust the path according to your MySQL version and the path where it is installed.

  - Invoke **cd "%TANGO_ROOT%sharetangodb"**.
  - Call **create_db.bat**.
- **Start a DataBaseds *Device Server*:**
  - Open a new command line window.
  - In the command line call **"%TANGO_ROOT%binstart-db.bat"**.

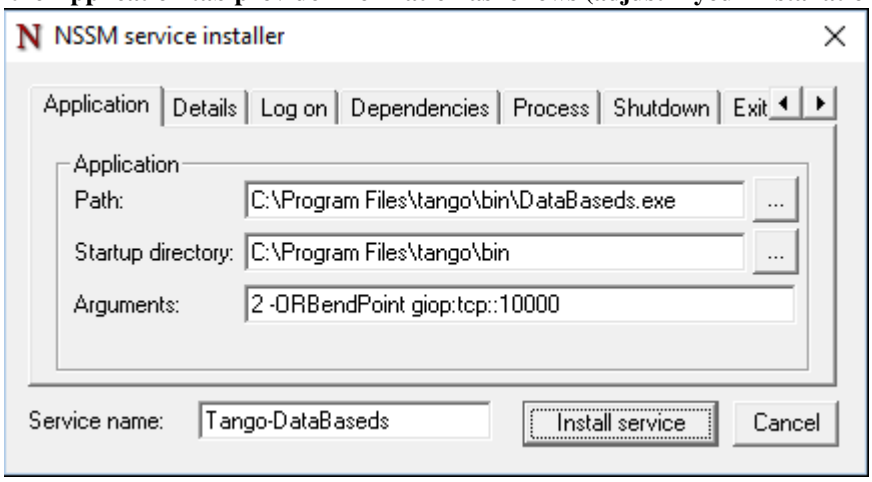
    Note: To make your Tango installation operational you have to have this **DataBaseds** running permanently. You may either add the command above to *Autostart* or run it as a service.

- **Make DataBaseds run as a service**

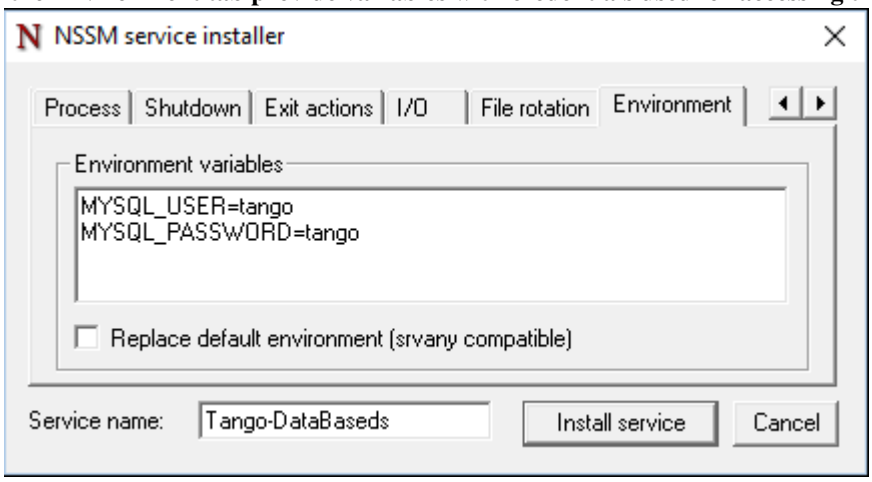
Note: The proposed solution uses NSSM tool which works on all versions of Windows but you may find

some other tools available including native srvany.exe.

- Download NSSM from http://nssm.cc/.
- Unpack the file to some convinient location. It is suggested to copy proper (32bit or 64bit) version to the Tango bin folder `%TANGO_ROOT%\bin\`.
- Open *Command Line* as Administrator.
- Change current path to where the **nssm** is unpacked or copied, eg. **cd "%TANGO_ROOT%bin"**.
- **Invoke nssm.exe install Tango-DataBaseds. This will open a window where you can define service parameters.**
  - **In the Application tab provide information as follows (adjust if your installation path is different).**



  - **In the Environment tab provide variables with credentials used for accessing the MySQL, like:**



  - Click *Install Service*.
- Invoke **nssm.exe start Tango-DataBaseds** to start the service.
- Test if everything is ok. Use *Start* menu to run Jive or in command line call **"%TANGO_ROOT%binstart-jive.bat"**.

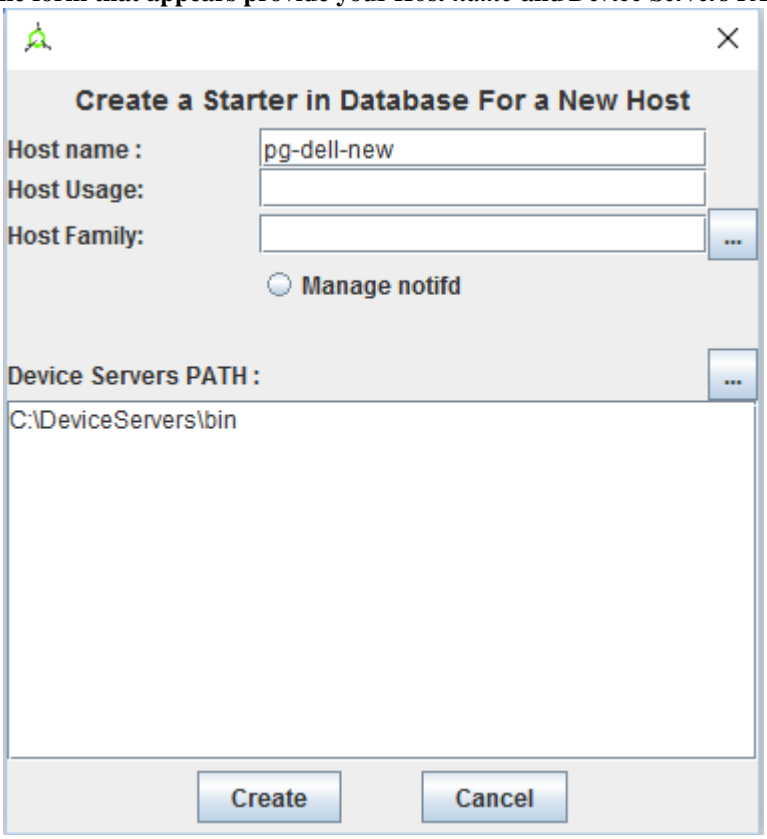
1.4 Running *Device Servers*

The recommended way of running device servers is to use **Starter** service. Then you may use **NSSM** as for **DataBaseds**. Assuming you have downloaded it and copied to the Tango bin folder please follow:

- Open Command Line as Administrator (if it is not yet open).
- Prepare folder for *Device Servers* executable:

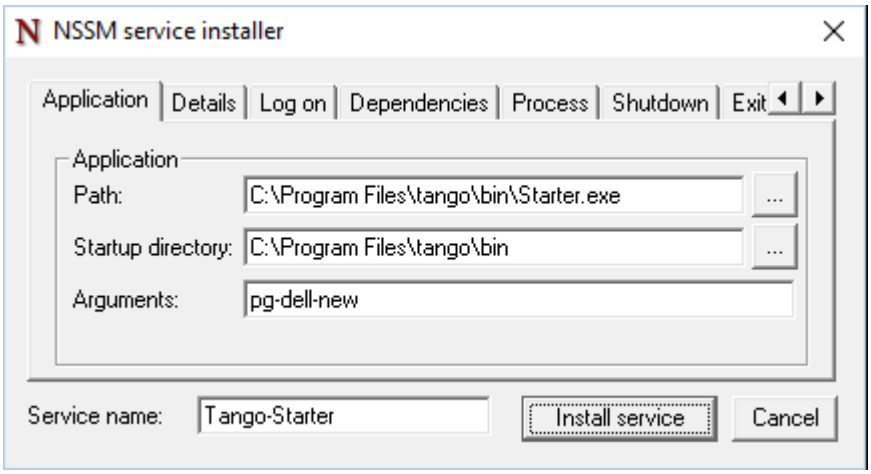
  Note: To let your device servers start with **Starter** service their executables have to be in a path without spaces. This is a limitation of the current **Starter** implementation.

  - Create a directory for *Device Servers*. Let it be `C:DeviceServersbin` with **mkdir c:DeviceServersbin**
  - Change to the Tango bin directory with command (**cd "%TANGO_ROOT%bin"**)
  - Copy **TangoTest** *Device Server* to the newly crated folder: **copy TangoTest.exe c:DeviceServersbin**
- **Add entry about the Starter device server you will start on your computer:**
  - Start a tool called **Astor**. You may use either Windows *Start* menu or call **tango-astor.bat**
  - In *Astor* window select menu *Command* → *Add a New Host*
  - **In the form that appears provide your *Host name* and *Device Servers PATH*.**



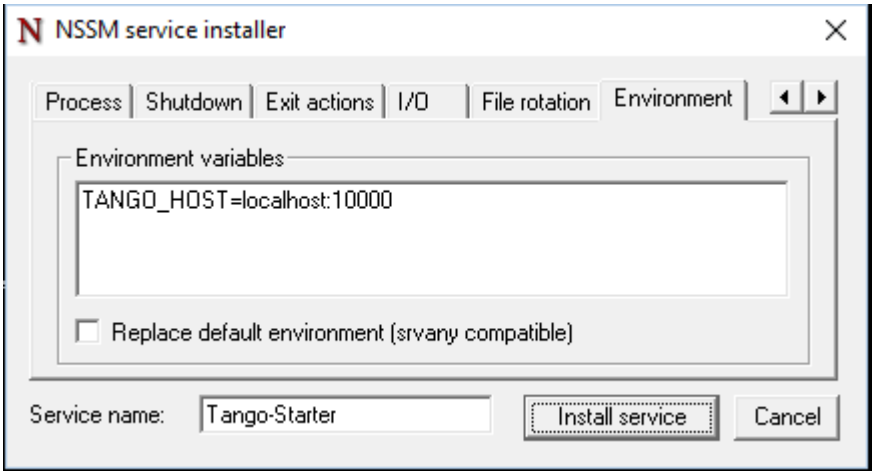
  - Accept with *Create*
  - Go back to **Command Line**

- **Install Starter service:**
  - Invoke **nssm.exe install Tango-DataBaseds**.
  - In the Application tab provide information as follows:

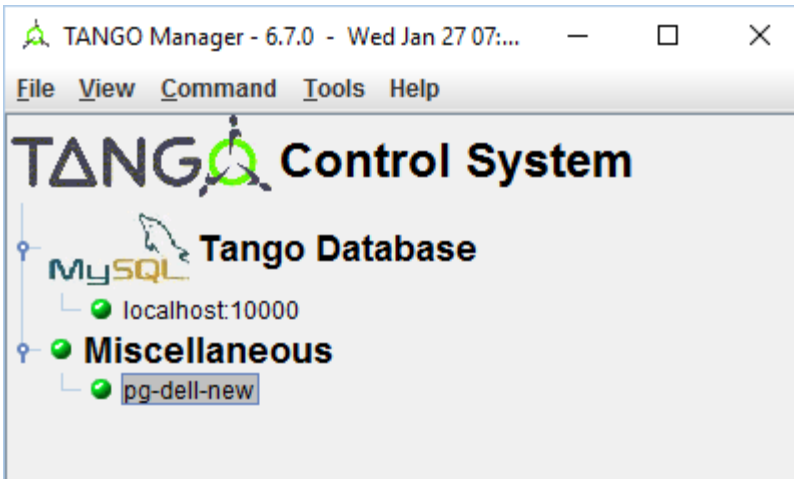


Adjust if your installation path is different. In *Arguments* exchange `pg-dell-new` with the proper name of your host.

  - In the Environment tab provide TANGO_HOST variable, like:



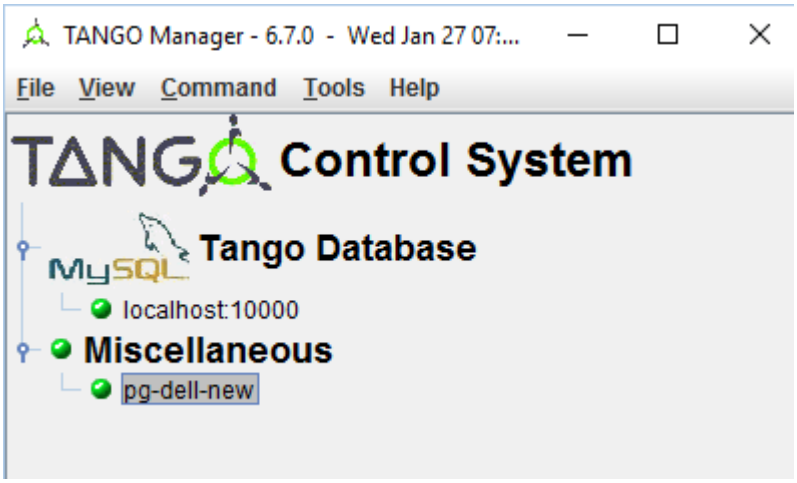
  - Click :guilabel:.
  - Start the service: **nssm.exe start Tango-Starter**.
  - Go back to **Astor**.
  - After a while you will see a green led next to your host name:



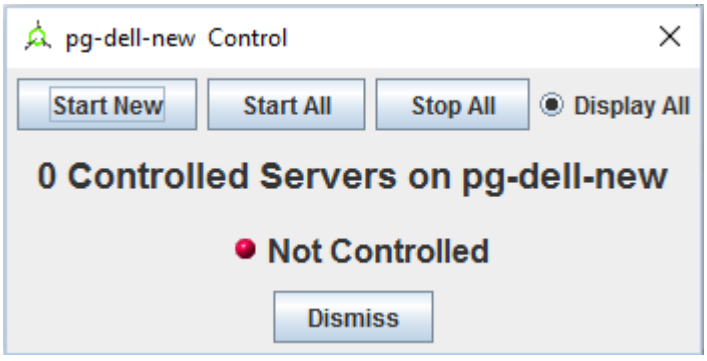
- Run **TangoTest** device server:

  You may test the configuration by starting prefigured TangoTest device.

  – Start **Astor** if it is not running.

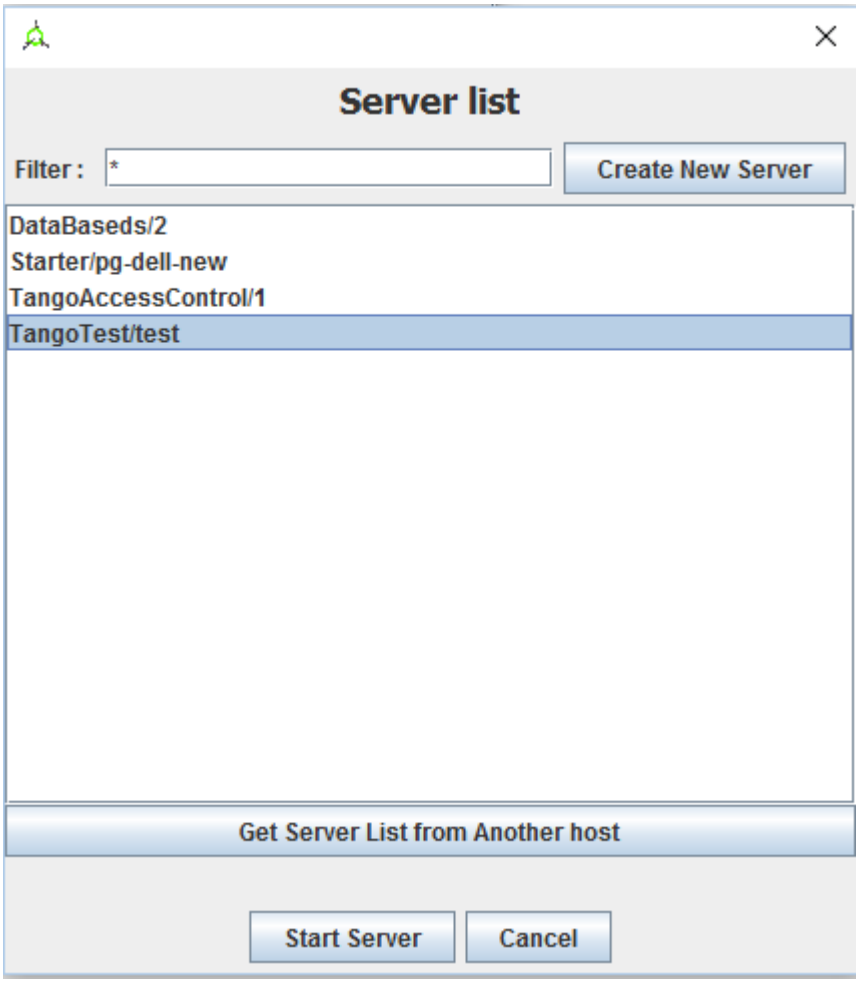


  – Double Click on your computer name to open *Control Panel*. It opens a window as below:



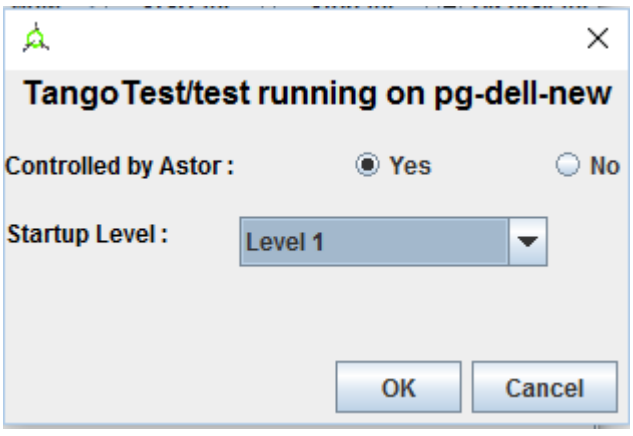
  – Click *Start new*.

  – In the open window select *TangoTest/test*:



– Click *Start Server*.

– In the open window select *Controlled by Astro -> Yes*, and *Startup Level -> Level 1*.



– When you click *OK* it should start the server. After a while you should see:

- **Running your *Device Servers*:**
  - You need to copy an executable to the folder configured for **Starter**. In our example it is `C:DeviceServersbin`.
  - Then use **Astor**. After opening *Control panel* for your computer (double clicking on a label) and selection *Start New*...
  - Select *Create New Server* and follow a wizard.

1.5 What's next

You should check PyTango and Taurus library and tools to cope with scripting and GUIs for Tango *PyTango and Taurus on Windows*.

1.6 Typical issues

CHAPTER

TWO

PYTANGO AND TAURUS ON WINDOWS

CHAPTER

THREE

GLOSSARY

device server, device servers Device Server is a program (executable) which is able to create :term:'device' of certain classes...

device Device is a key concept of Tango Controls. It is an object providing access to its *attributes*, *pipes* and *commands*. Device is...

attribute, attributes An attribute is...

command, commands A command is...

pipe, pipes A pipe is...

Tango Host Each Tango Controls system/deployment has to have at least one running DataBaseds *device server*. The machine on which DataBaseds *device server* is running has a role of so called *Tango Host*. *DataBaseds* is a device server providing configuration information to all other components of the system as well as a runtime catalog of the components/devices. It allows (among others) client applications to find devices in distributed environment.

CHAPTER

FOUR

INDICES AND TABLES

- *genindex*
- *modindex*
- *search*