1. Product Description

The ArchiteX is a software tool for asset management of industrial plants that uses FDT/DTM technology working as a FDT Frame Application. It has the objective of enabling the configuration, maintenance and diagnostic of smart measurement devices from different vendors. The application delivers access to the graphical interface provided by DTMs which is a piece of software developed by device manufacturers to give access to the required parameters for configuration and operation of the device, providing a UI for the user.

In the ArchiteX the user can create, edit and manage a network topology that represents the devices connected to an industrial automation process. This topology can be manually done, rapidly built by scanning a communication device or by importing the topology from another project using a standard FDT XML format shared between different FDT Frame Application.

Once the topology is created the DTM functions can be accessed easily to execute maintenance procedures without the necessity to go individually to the location of each instrument. This makes the ArchiteX a powerful and useful tool in the management of smart instrumentation device context.

1.1. Product Features

- DTM Catalog;
- Create projects using DTMs;
- Create network topologies:
  - Add DTMs;
  - Remove DTMs;
  - Scan topology;
  - Edit tag;
- Import/Export topology;
- Connect/Disconnect to DTMs;
- Upload/Download;
- DTM UI functions, like:
  - Parameters;
  - Diagnosis;
  - Calibration;

- Message log.

2. Requisites

The ArchiteX application presents the following requisites for its installation and use:

	Architex
OS	Windows 7® (32 bits ou 64 bits) Windows 10 ® (64 bits) Windows 11 ® (64 bits)
Processor	1.6 GHz (minimum) 2.5 GHz (recommended)
Disk Space	1 GB
RAM Memory	2 GB (minimum) 4 GB (recommended)
Resolution	1024 x 768 (recommended)
Language	Any

Table 1: Requisites

3. Network Topology

In the left area the application shows the network topology, where the structure of the devices in the project is shown considering the hierarchy of communication in the network. Each device shows its tag, device type, state and the channel (if applicable) of the parent to which it is connected.

There are four states that the DTMs can be:

- **Disconnected:** The DTM is not connected to a physical device (gray square);
- **Communication Set:** The DTM is ready and waiting to connect to a physical device (yellow triangle);
- **Connected:** The DTM is connected to a physical device (green circle);
- **Busy:** The DTM is busy executing some operation, such as an upload/download or a scan, and cannot do any other action at the moment (orange circle with a line in the middle);

In the network topology the user selects the DTM to execute operations with, such as connecting, starting an upload or adding a DTM as a child. Every DTM also has a default function configured, which can be accessed by a double-click in the device in the network topology.

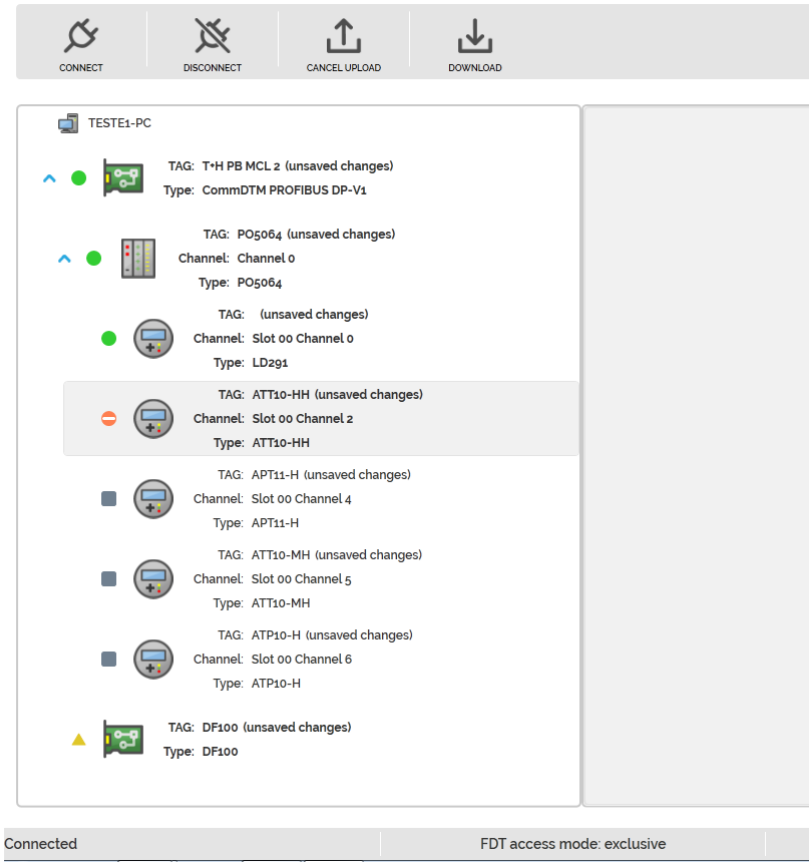

Figure 1: Network Topology

4. DTM UI Container

In the center of the window are embedded the DTM UIs opened by DTM functions. The DTM functions are all the capabilities that the manufacturers of the DTMs provide for the usage of their devices, which may include (but are not limited to) change parameters of the device, execute calibration, simulations, run diagnostics, etc. Multiple UIs can be opened at the same time and they will be organized in tabs identified by the device tag for easier visualization/selection.

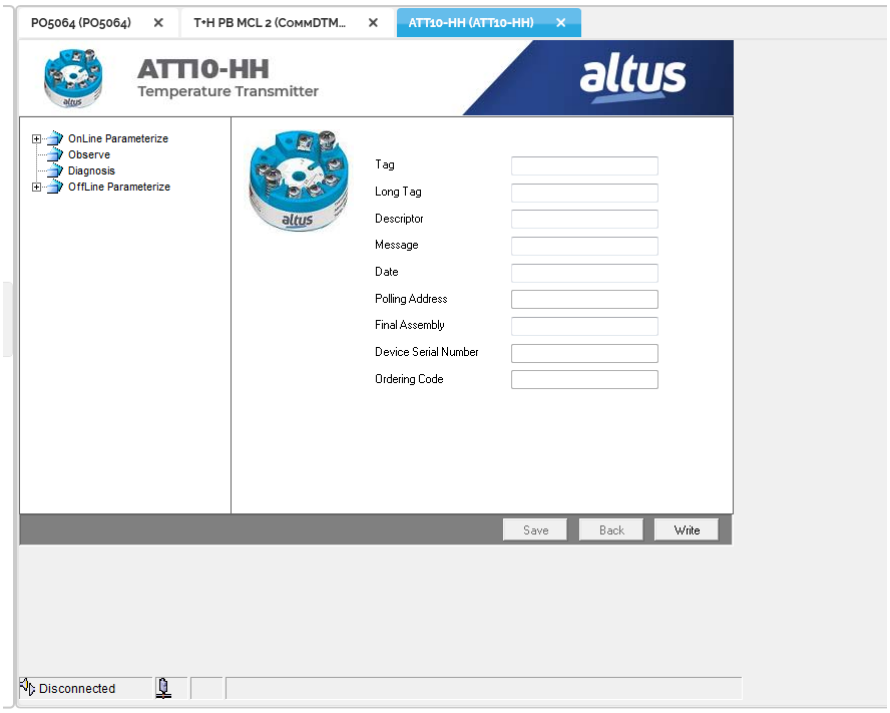

Figure 2: DTM UI Container

5. DTM Catalog

The DTM catalog can be accessed by a button in the right side of the top menu. It consists of a table containing the DTMs that are installed in the computer where the application is running. The table includes the relevant information about each DTM, such as name, version, vendor and FDT version.

It is through the catalog that the user can add DTMs to the topology. The DTM will be added as a child of the DTM that is selected in the network topology. If no device is selected the DTM will be added in the root of the topology. When the parent has more than one channel the application will show a window for the user to select the desired channel.

When new DTMs are installed in the computer the catalog must be updated in order to show the new DTMs. This update can be executed by a button in the top menu as well, next to the catalog button. The application will notify the user upon start when new DTMs are detected in the computer.

The items in the catalog can be grouped by different types of information. They are:

- Device Type
- Vendor
- Device Classification
- Protocol

Based on the grouping option selected the items can be filtered.

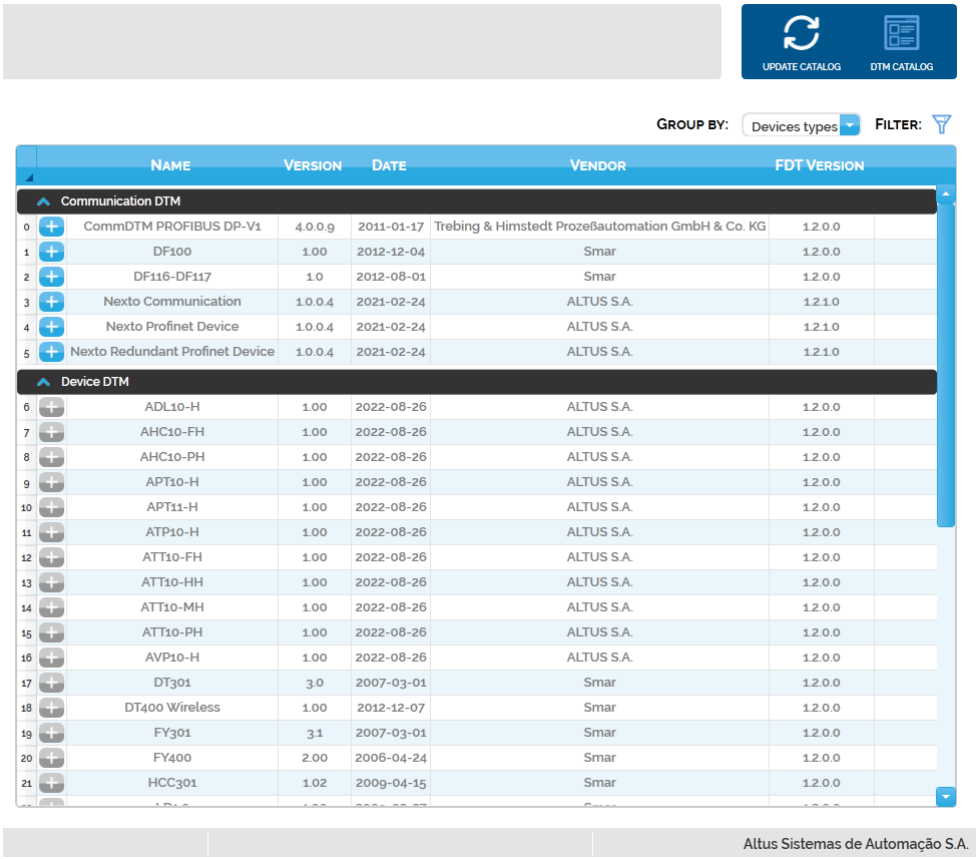

Figure 3: DTM Catalog

6. Log Window

The log window can be opened in the view menu. It shows the messages reported by the application and by the DTMs present in the topology. The log window has the objective of allowing the user to have access to detailed information to analyze problems in the use of the devices.

In each message in the log window are shown the severity, the time in which the message was reported, the origin, the device and the text of the message.

The log window offers the possibility to search for text in the messages and to filter them based on the severity.

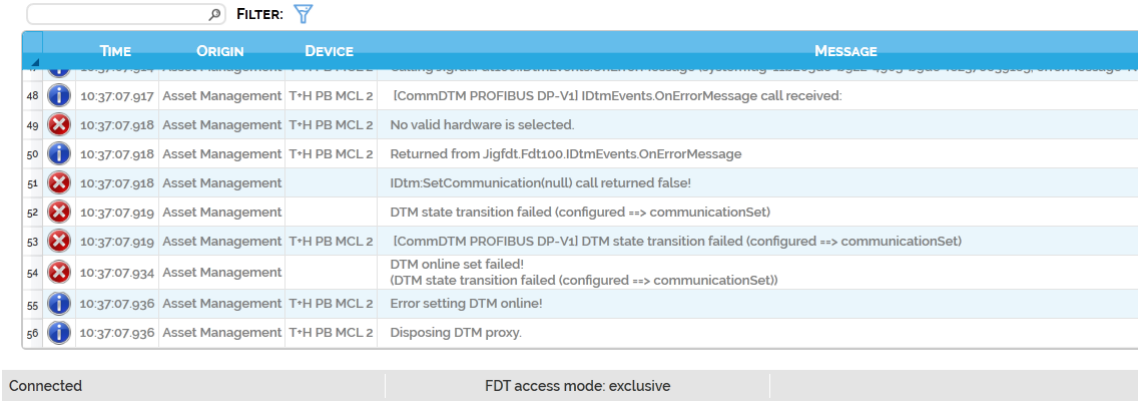

Figure 4: Log Window

7. Topology

Topology operations are commands in the application that can change the topology and might cause changes to more than one DTM at a time. The available topology operations are listed below.

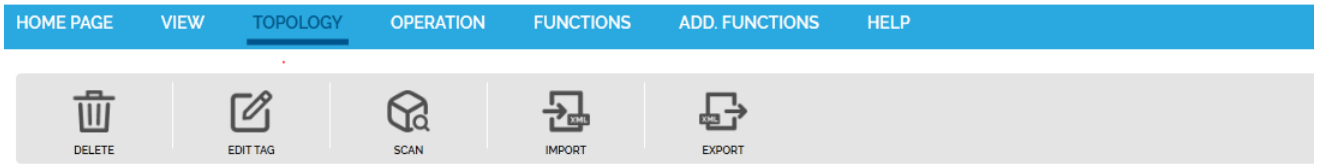

Figure 5: Topology Operations

7.1. Delete

The delete function removes the device currently selected and all its children from the network topology.

To remove a device from the topology it must be disconnected and its UIs should not be open.

7.2. Edit Tag

The edit tag function allows the user to change the name that represents the DTM in the network topology. This tag is bound only to the project and has no relation with the tag defined internally in the device that can be accessed and edited in a DTM UI.

Some DTMs will not allow the tag defined internally to be edited in any of their UIs, or they may provide different rules for the format of values allowed. By having this project-only tag, ArchiteX guarantees the user can have all its devices using a standard tag format that can be edited in the same type of user interface and without affecting the behavior of any devices.

7.3. Scan

The scan functionality has the purpose of automatically creating the device topology by scanning the channels of a communication or a gateway device and identifying the correct device connected to each channel. This allows users to quickly build projects with a large number of devices without having to manually add each device.

The scanned DTM must be selected, configured and ready for connection so that the application can correctly scan the device channels.

The scan functionality will only work with DTMs which implement the scan procedures internally.

After the scan operation is completed, a window is shown to the user containing the device results found. The results are shown in tabs for each channel that responded the scan and each tab contains a table with the possible DTMs to represent the device. When possible, the adequate DTM will be automatically selected, but the user can change the selection for the channels that have more than one option.

If a device is identified in a channel but none of the DTMs in the catalog matches it, then all the devices in the catalog are shown for the user to select one.

After the user clicks to apply, the selected devices are added to the network topology automatically.

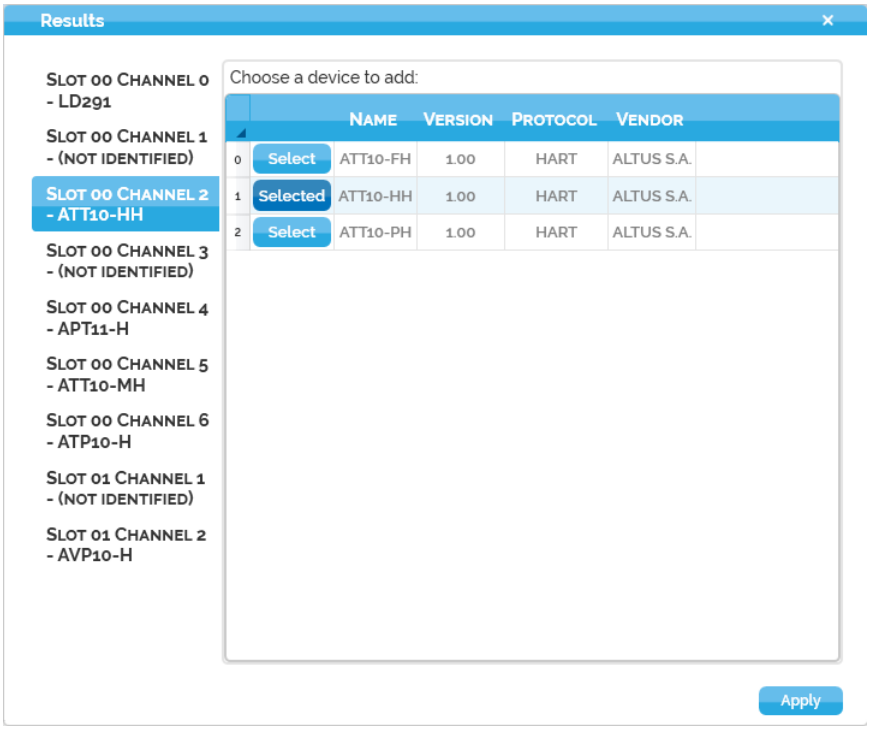

Figure 6: Scan Window

7.4. Export and Import

The export function allows the user to create a .xml file containing the topology of devices in a standard and structured form. That file uses a standard FDT XML format so it can be imported in another Architex project (or even in another Frame Application, if the function is implemented).

If no device is selected in the network topology then all the topology will be exported. If one device is selected, then this device and its children will be exported. A DTM can only be exported if it is disconnected.

The import function allows to load a .xml file containing a topology as long as it is using the standard FDT XML format. If no device is selected then the topology will be added in the root element of the network topology. If a device is selected, then the topology will be added as a child of the selected device.

The imported topology must be compatible with the selected device for the importation to work properly. If the selected device has more than one channel, the user must select the channel where the child will be added.

8. DTM Operations

DTM operations are commands in the application that are executed directly by a single DTM. The DTM operations are listed below.

Figure 7: DTM Operations

8.1. Connect and Disconnect

These commands provide access to start and finish online operations when using DTMs to connect with physical devices. For a DTM to read and write data on the device it represents, it must be connected.

When a DTM attempts to establish connection, all of its parents will be automatically connected too. When a DTM is connected the available functions may change, allowing action such as upload and download of parameters.

Similar to the connection, when a parent DTM is disconnected, all of its children are disconnected too.

8.2. Upload and Download

These commands allow exchange of information between the physical device and the information saved in the ArchiteX project. The upload will read parameters from the physical device and save them to the project. The download will load parameters saved in the project and send them to physical device the DTM represents.

The device must be connected to be possible to execute these operations. Some DTMs allow these operation to be cancelled midway.

9. DTM Functions

The DTM functions are commands executed by the DTM itself. Each DTM will provide its own set of functions as defined by the manufacturers of the devices. The great majority of DTM functions opens an user interface, which is added to the tabs of the UI container in the center of the application. There will also be some functions that provide documentation by opening a PDF or other type of file, as well as some that will provide configuration by opening a web page.

They can be divided in two types: standard functions and additional functions. The standard functions are defined by the FDT/DTM Specification and the DTMs can implement some or none of those functions. The additional functions do not follow any standard and are customized by the DTM manufacturer.

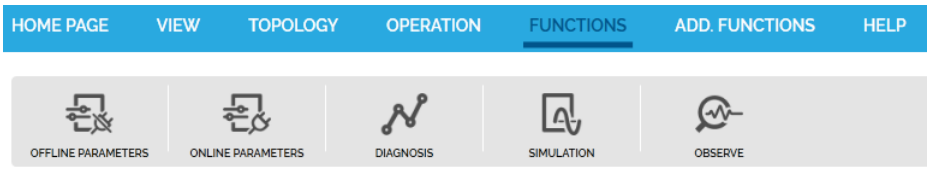

Figure 8: DTM Functions

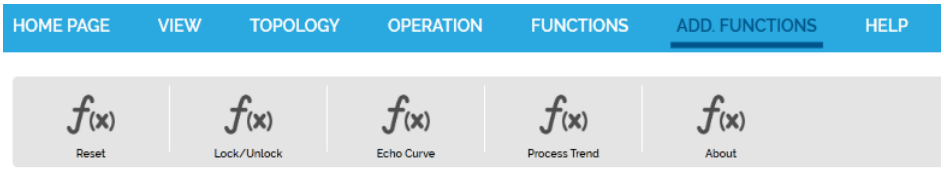

Figure 9: Additional Functions

10. Manuals

For further technical details, configuration, installation and programming, the table below should be consulted.

The table below is only a guide of some relevant documents that can be useful during the use, maintenance, and programming of this product.

Code	Description	Language
MU299609	MasterTool IEC XE User Manual	English
MU299048	Manual de Utilização MasterTool IEC XE	Portuguese
CE109511	PO5064 Technical Characteristics	English
CT109511	Características Técnicas do PO5064	Portuguese
CE109321	PO1114 Technical Characteristics	English
CT109321	Características Técnicas do PO1114	Portuguese
CE109416	PO2134 Technical Characteristics	English
CT109416	Características Técnicas do PO2134	Portuguese
CE114315	NX6014 Technical Characteristics	English
CT114315	Características Técnicas do NX6014	Portuguese
CE114408	NX6134 Technical Characteristics	English
CT114408	Características Técnicas do NX6134	Portuguese
MU209020	Manual de Utilização Rede HART sobre PROFIBUS	Portuguese
CE157850	APT10 Technical Characteristics	English
CT157850	Características Técnicas do APT10	Portuguese
CE157851	ADL10 Technical Characteristics	English
CT157851	Características Técnicas do ADL10	Portuguese
CE157852	APT11 Technical Characteristics	English
CT157852	Características Técnicas do APT11	Portuguese
CE157853	ATT10-FH Technical Characteristics	English
CT157853	Características Técnicas do ATT10-FH	Portuguese
CE157854	ATT10-HH Technical Characteristics	English
CT157854	Características Técnicas do ATT10-HH	Portuguese
CE157855	ATT10-MH Technical Characteristics	English
CT157855	Características Técnicas do ATT10-MH	Portuguese
CE157856	ATP10 Technical Characteristics	English
CT157856	Características Técnicas do ATP10	Portuguese
CE157857	AVP10 Technical Characteristics	English
CT157857	Características Técnicas do AVP10	Portuguese
CE157858	ACI10-BH Technical Characteristics	English
CT157858	Características Técnicas do ACI-BH	Portuguese
CE157850	ACI10-UH Technical Characteristics	English
CT157850	Características Técnicas do ACI10-UH	Portuguese

Table 2: Related Documents