

OPC UA
DEVELOPMENT TRAINING

OPC UA ADMINISTRATION

AGENDA

- ADMINISTRATION
- CONFIGURATION
- TROUBLESHOOTING

OPC UA ADMINISTRATION

- Tutorial as PDF available from

https://technosoftware.com/documents/OPC_UA_NET_Standard_Installation_Guide.pdf

AGENDA

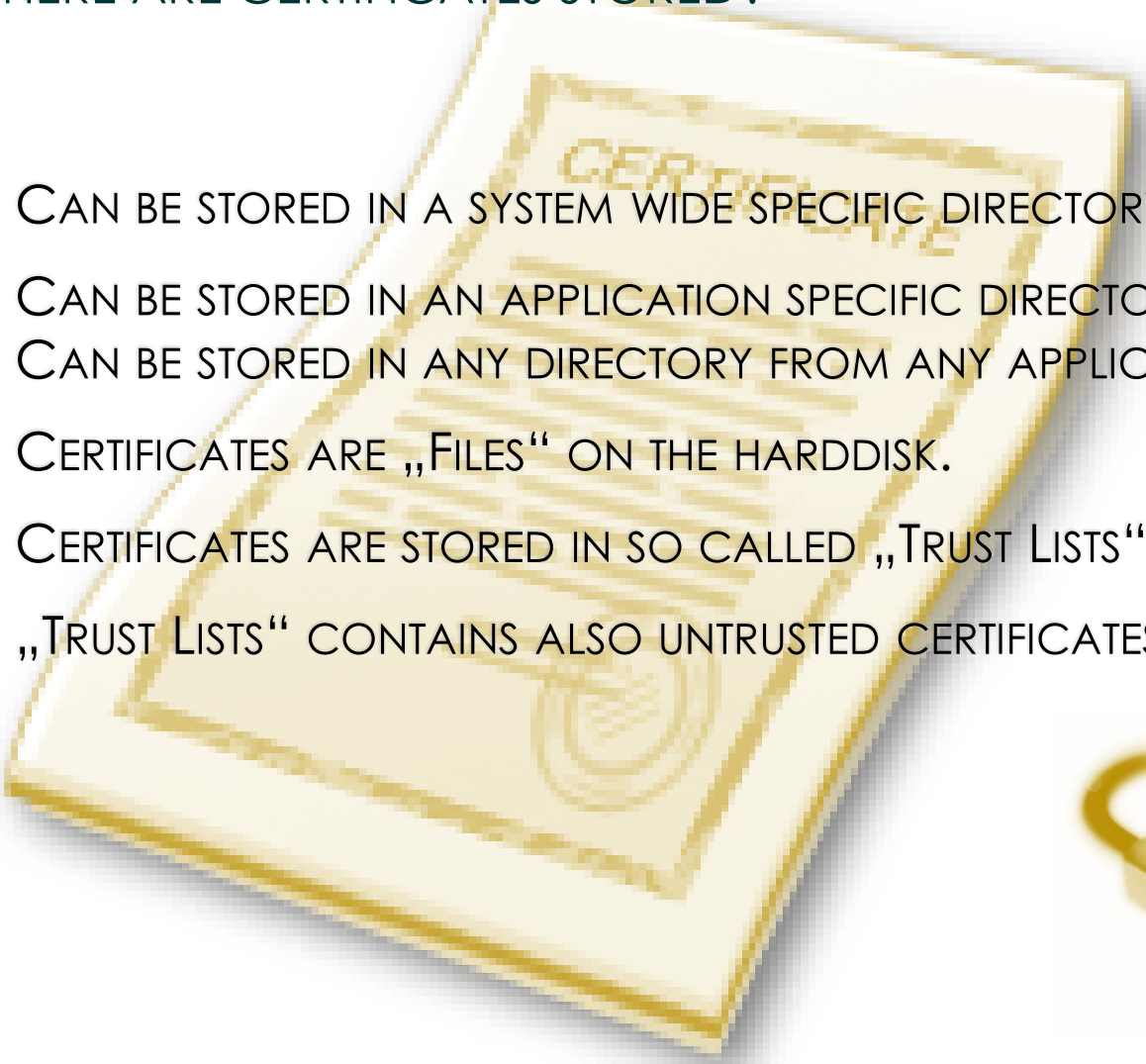
- Administration
  - Introduction in certificates and how they work
- Configuration
  - Introduction into the OPC UA Configuration Tool
  - Introduction into the Local Discovery Server (LDS)
  - Introduction into the Global Discovery Server (GDS)
- Troubleshooting
  - Differences OPC UA and Classic OPC, Possible Issues

ADMINISTRATION
WHAT ARE CERTIFICATES?

- A CERTIFICATE IS A DIGITAL EQUIVALENT OF A PASSPORT.
- AN ENCRYPTED FILE FOR UNIQUELY IDENTIFYING AN OBJECT.
- CERTIFICATES CAN REPRESENT AN APPLICATION OR A HUMAN BEING.
- CERTIFICATES ARE USED FOR VALIDATING PERSONS AND APPLICATIONS.
- CERTIFICATES ARE A FORM OF AUTHENTICATION.
- CERTIFICATE TECHNOLOGY IS WIDELY USED

ADMINISTRATION

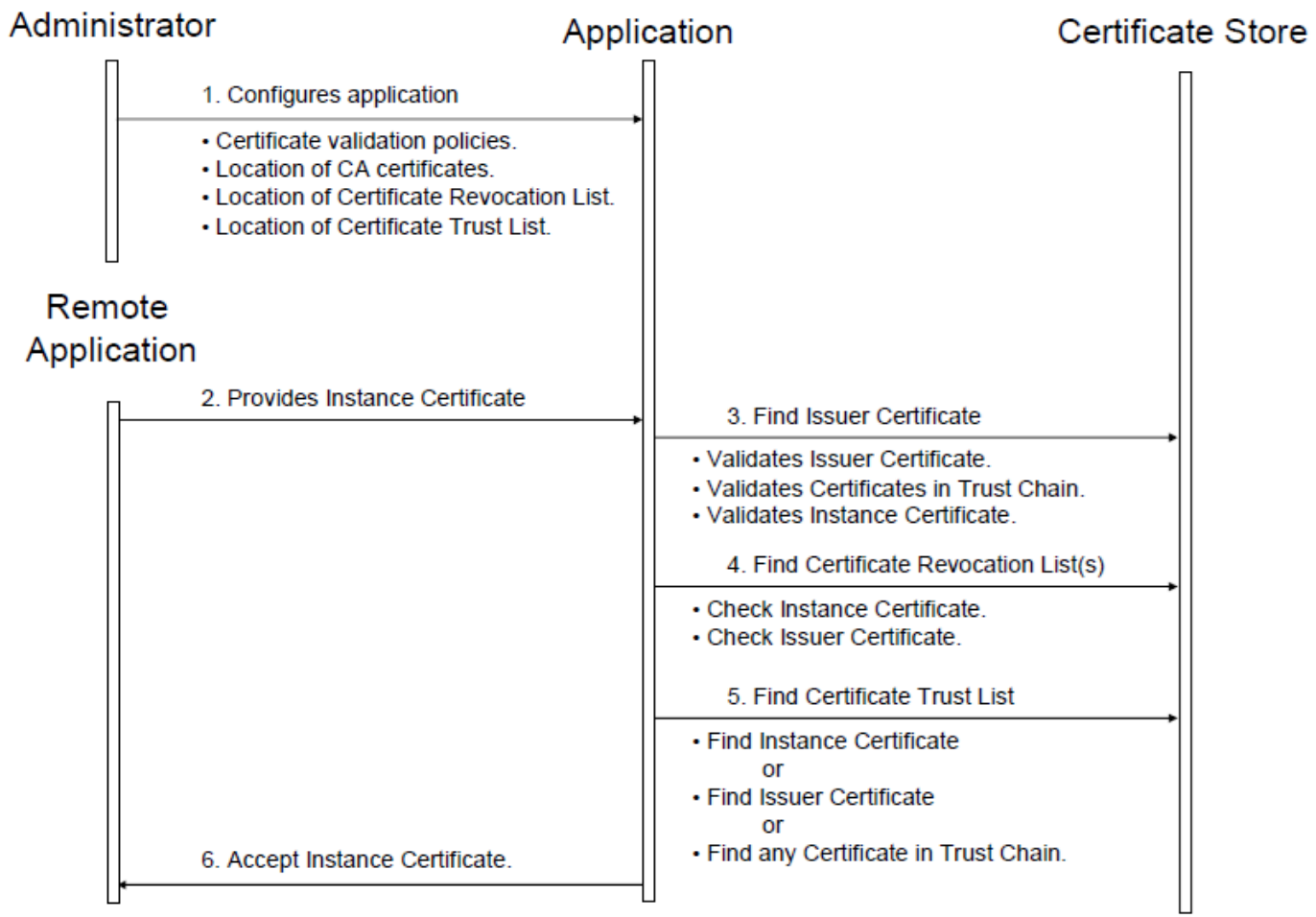
WHERE ARE CERTIFICATES STORED?



- CAN BE STORED IN A SYSTEM WIDE SPECIFIC DIRECTORY.
- CAN BE STORED IN AN APPLICATION SPECIFIC DIRECTORY.
  CAN BE STORED IN ANY DIRECTORY FROM ANY APPLICATION.
- CERTIFICATES ARE „FILES“ ON THE HARDDISK.
- CERTIFICATES ARE STORED IN SO CALLED „TRUST LISTS“.
- „TRUST LISTS“ CONTAINS ALSO UNTRUSTED CERTIFICATES.

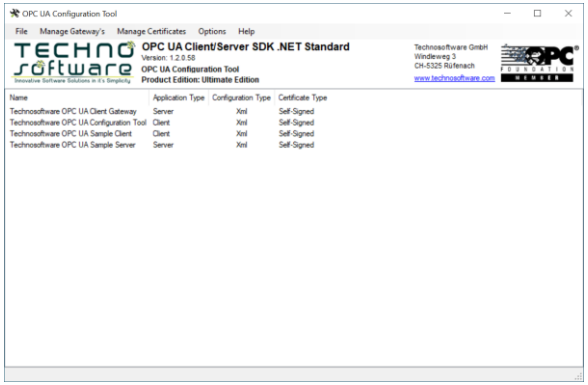
ADMINISTRATION

HOW ARE CERTIFICATES VALIDATED?



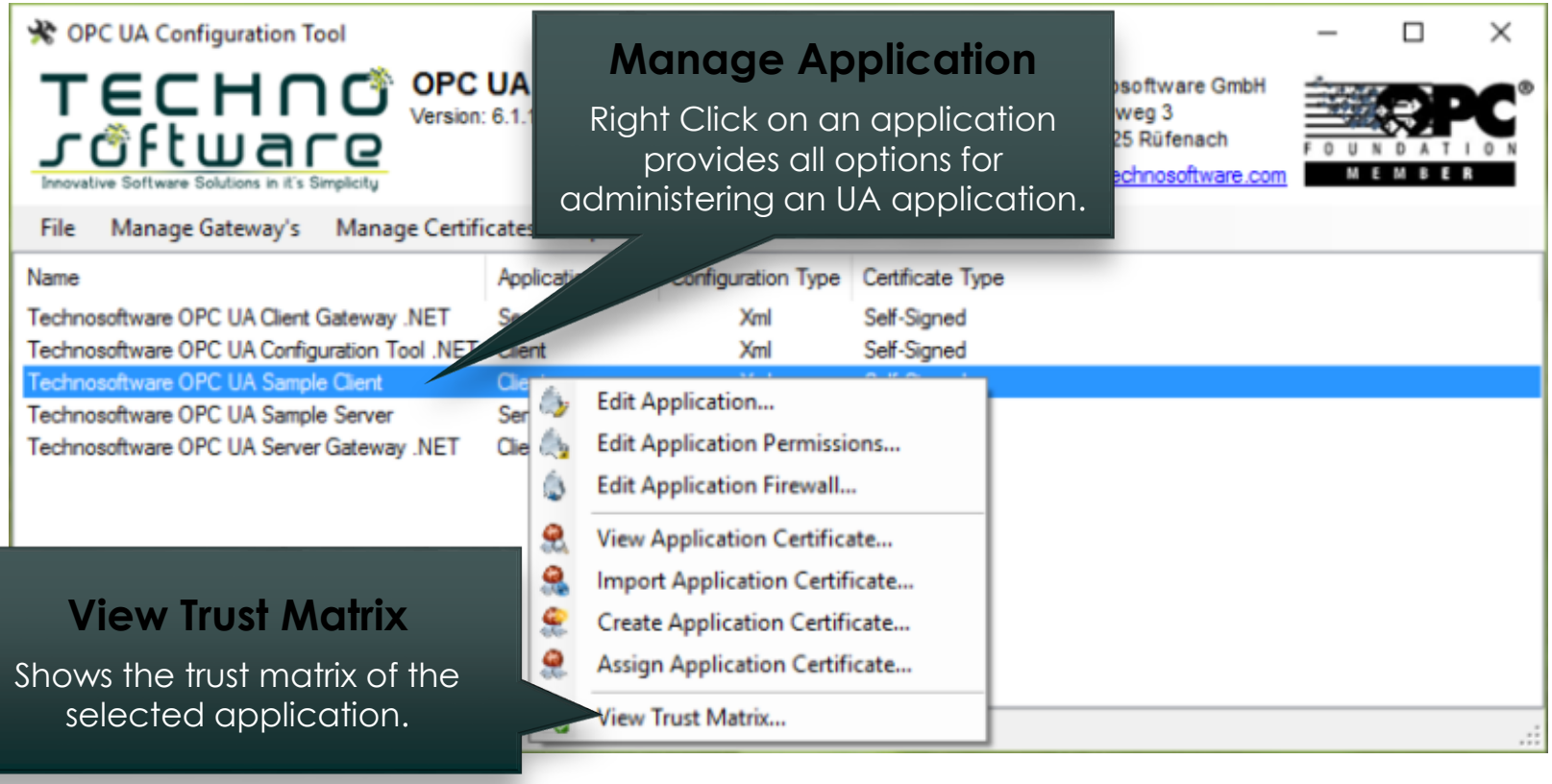
OPC UA CONFIGURATION TOOL

- One Tool for all settings
- „Application“ Management:
  - Configuration of the certificate directories
  - View, Import, Edit of the trusted certificates
  - Export certificates
  - User Access Management



OPC UA CONFIGURATION TOOL
TRUST A CERTIFICATE

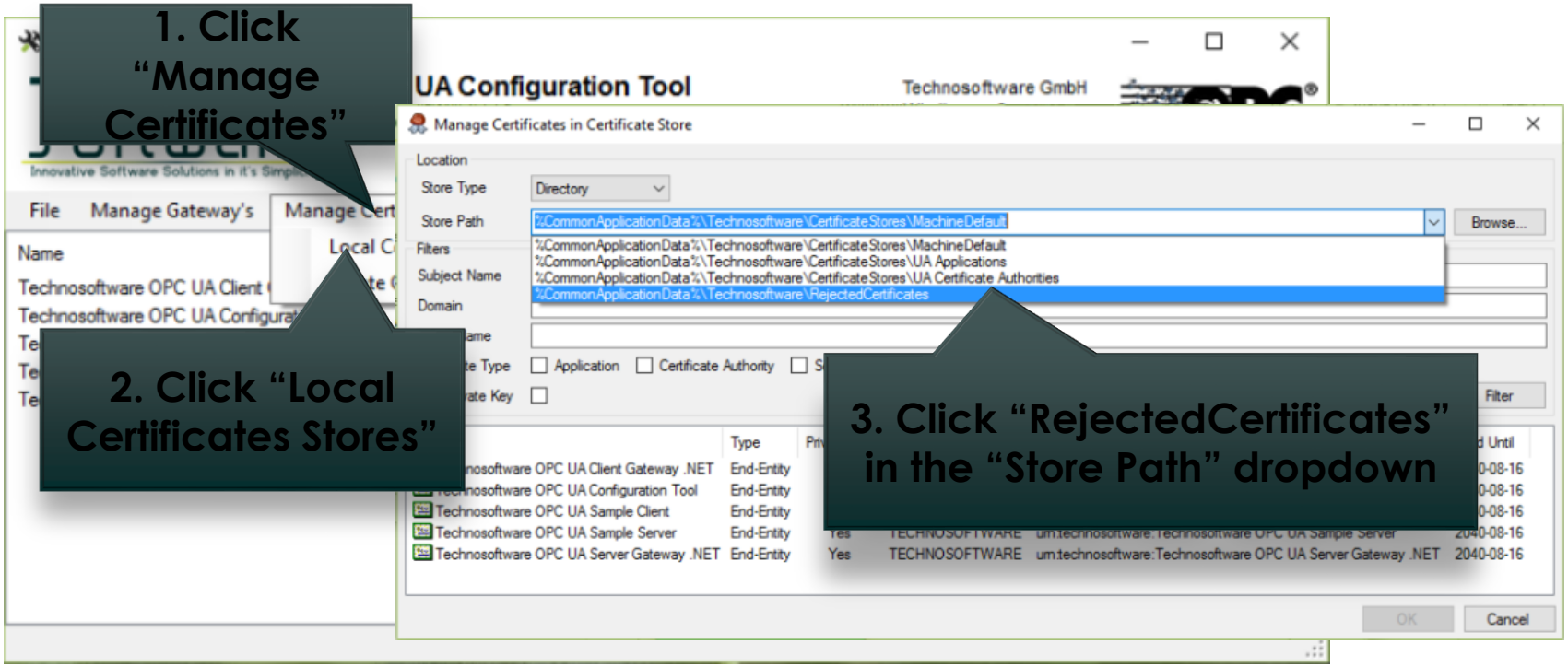
EACH APPLICATION HAS ITS OWN „TRUST LIST“



OPC UA CONFIGURATION TOOL

TRUST A CERTIFICATE

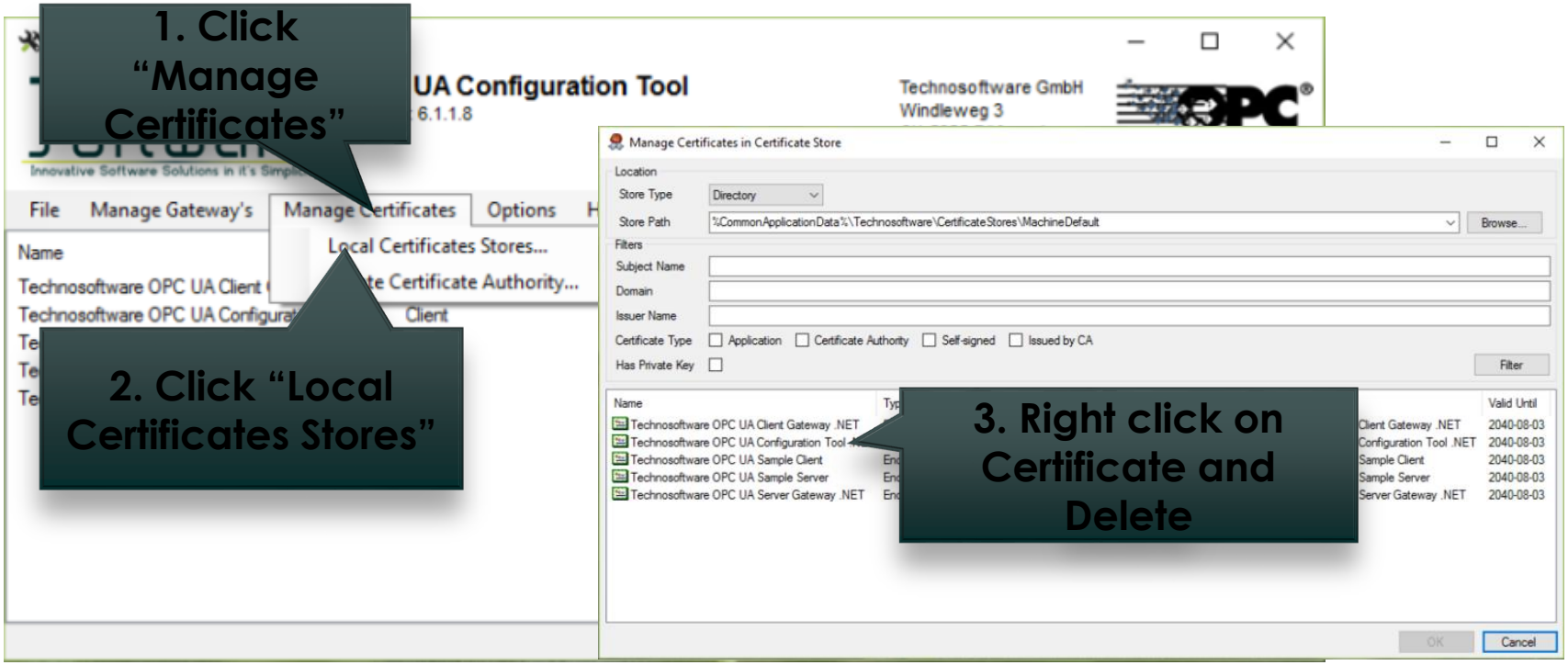
CERTIFICATES ARE DECLINED IF NOT EXPLICITLY TRUSTED



OPC UA CONFIGURATION TOOL

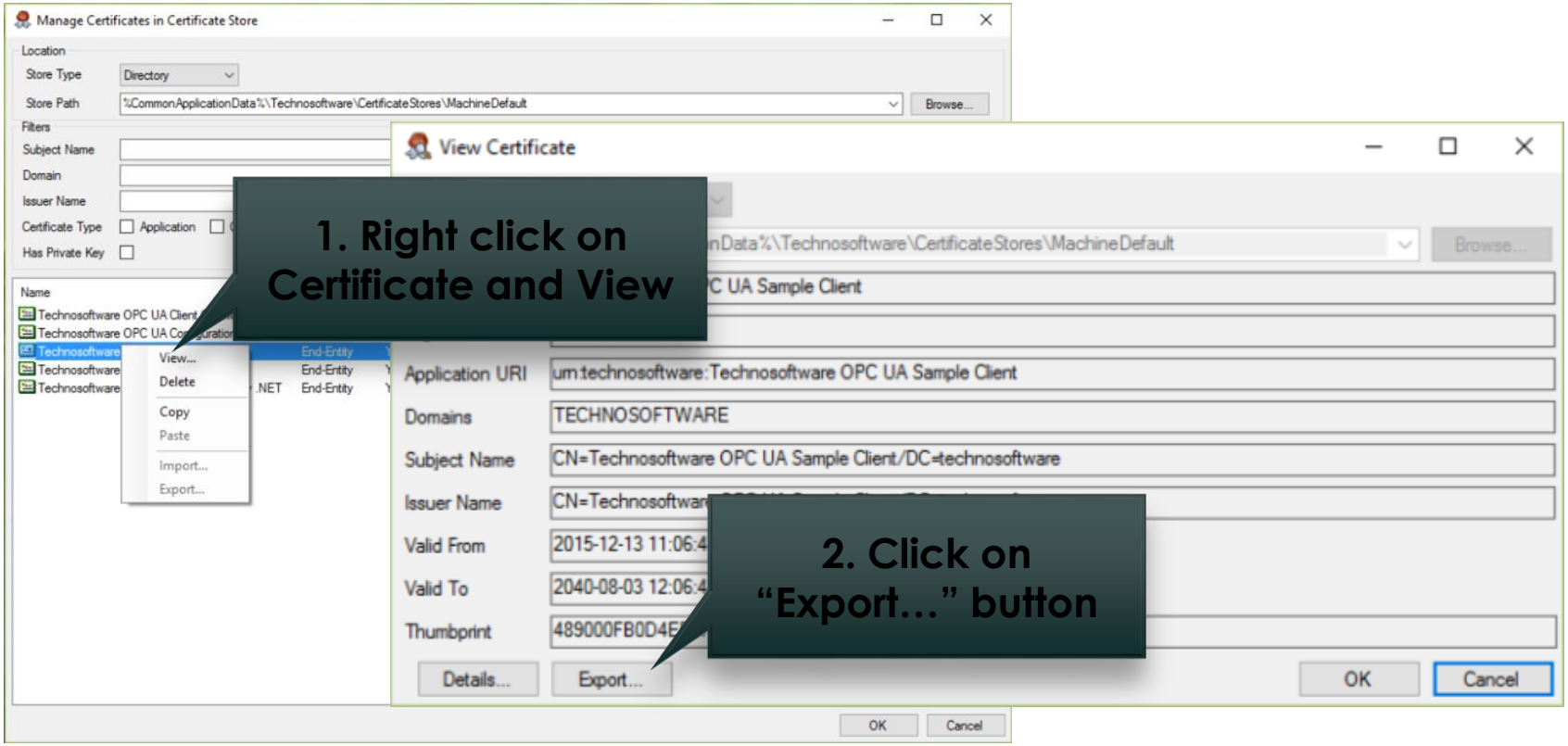
REMOVE A CERTIFICATE

DELETE/ LOCK OF CERTIFICATES SHOULD BLOCK THE COMMUNICATION OF UA CLIENTS AND SERVERS



OPC UA CONFIGURATION TOOL
EXPORT A CERTIFICATE

CERTIFICATES CAN BE EXPORTED TO BE ABLE TO IMPORT THEM AN ANOTHER UA APPLICATION



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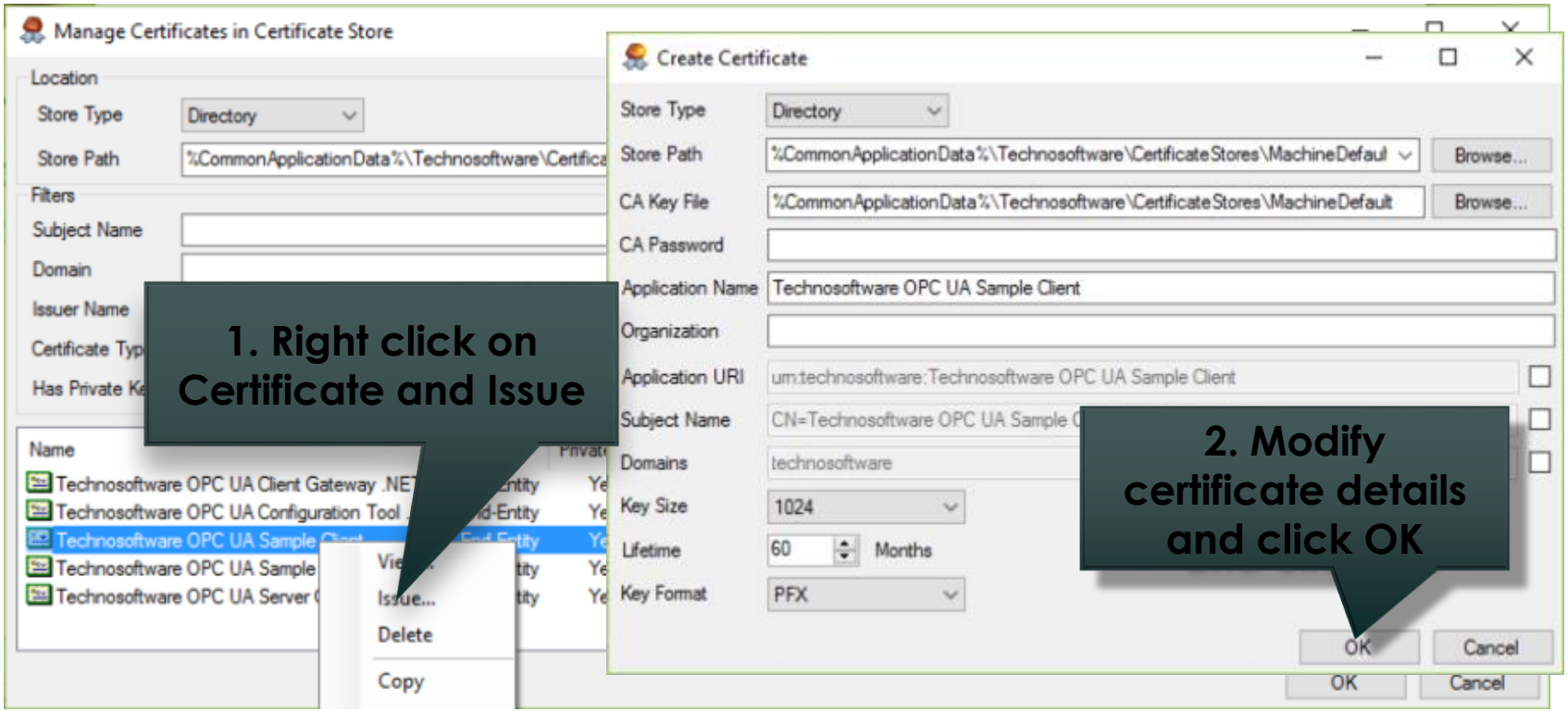
OPC UA CONFIGURATION TOOL
RENEW A CERTIFICATE

CERTIFICATES HAS AN EXPIRATION DATE BUILT-IN

PERIODICALLY CERTIFICATES MUST BE RENEWED

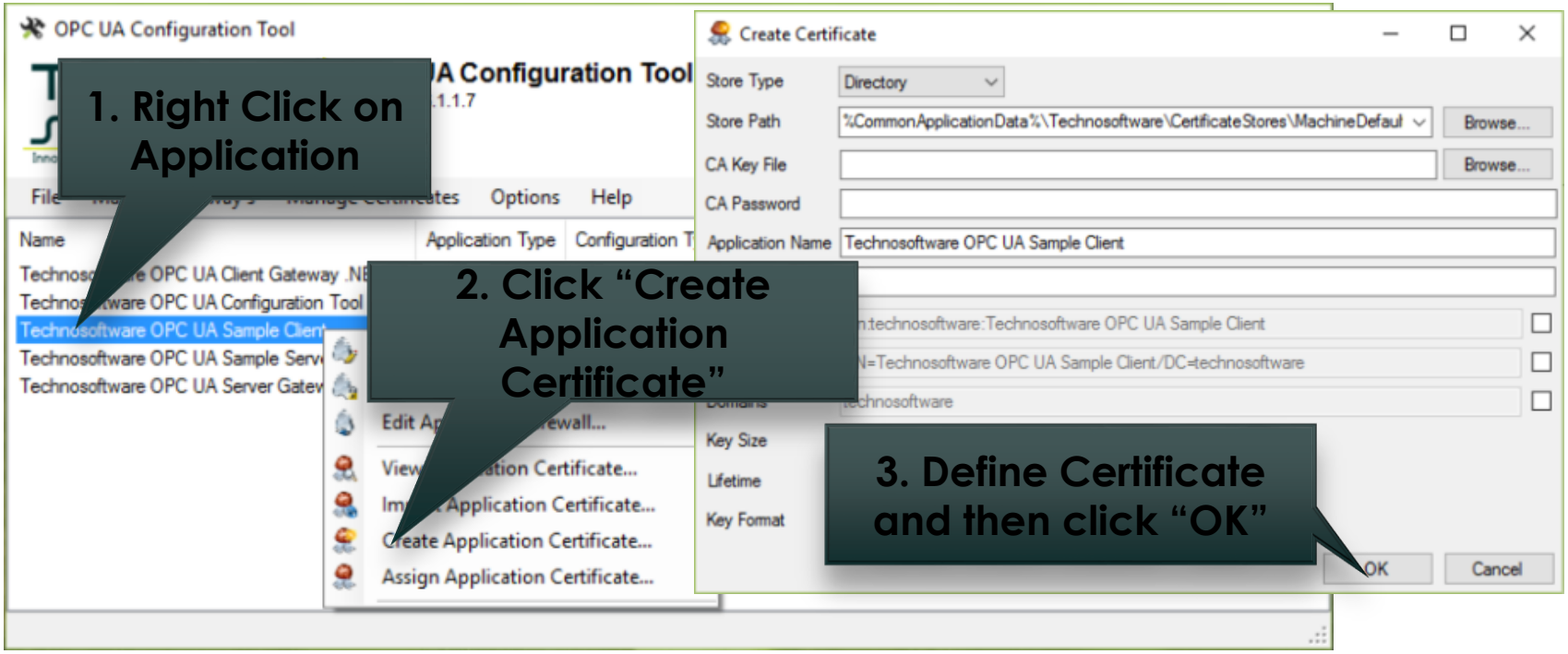


OPC UA CONFIGURATION TOOL
CREATE A CERTIFICATE

CERTIFICATES MUST BE CREATED ON THE TARGET SYSTEM

SOME APPLICATIONS OFFERS „SELF-SIGNED“ CERTIFICATES

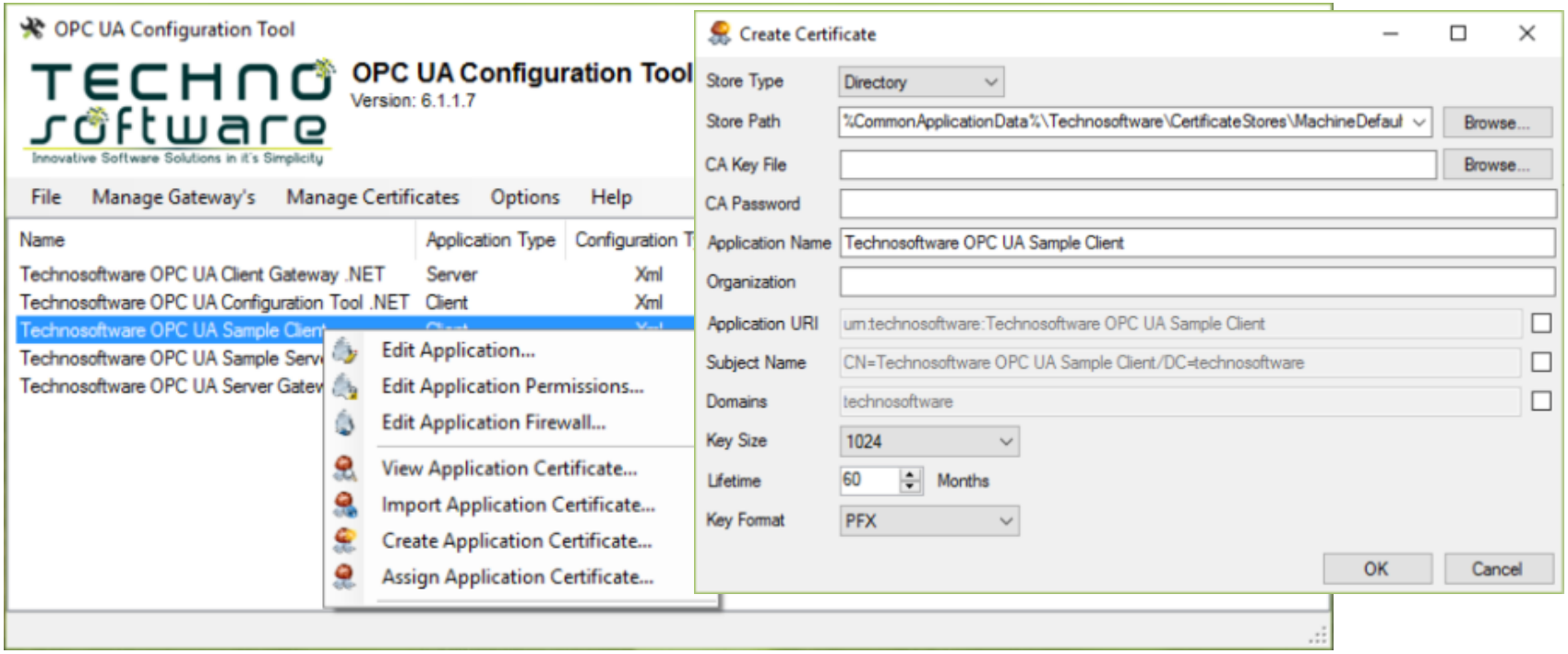
NEW CERTIFICATES CAN BE CREATED WITH THE CONFIGURATION TOOL



OPC UA CONFIGURATION TOOL
DISTRIBUTE CERTIFICATES

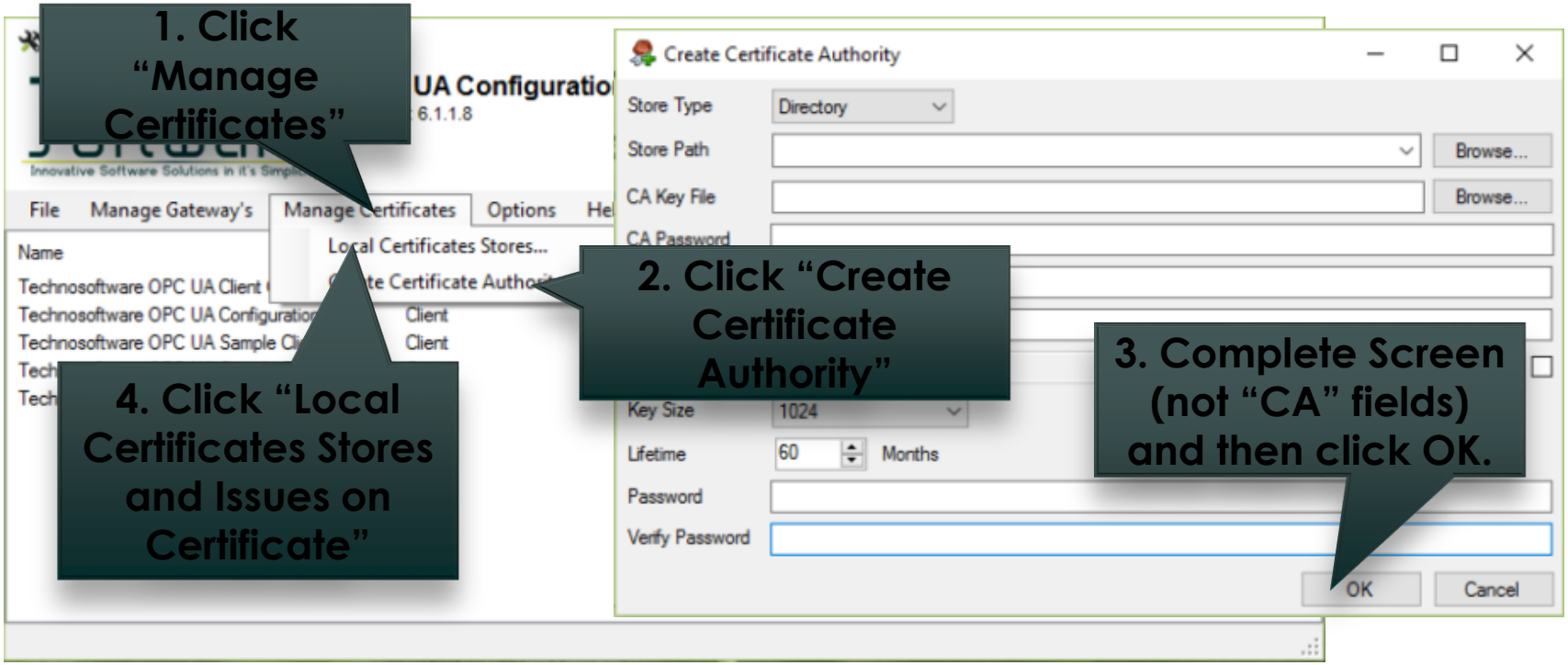
CERTIFICATES CAN NOT BE DISTRIBUTED BECAUSE OF SYSTEM SPECIFIC DATA BUILT-IN

CERTIFICATES MUST BE CREATED ON THE TARGET SYSTEM



OPC UA CONFIGURATION TOOL
CERTIFICATE AUTHORITY (CA)

CERTIFICATION AUTHORITIES (VERISIGN, …) SHOULD BE USED
IT'S POSSIBLE TO BE A CA. SIMPLE MANAGEMENT BECAUSE ONLY THE CA MUST BE TRUSTED AND NOT A SPECIFIC CERTIFICATE



DISCOVERY SERVER
OVERVIEW

- The discovery process allows Clients to find Servers on the network and then discover how to connect to the Server.
- Clients and Servers can be on the same host, on different hosts in the same subnet, or even on completely different locations in an administrative domain.
- The Discovery Services are specified in Part 4.
- They are implemented by individual Servers and by dedicated DiscoveryServers.

DISCOVERY SERVER
OVERVIEW

- The following dedicated DiscoveryServers provide a way for Clients to discover registered OPC UA Servers in different situations:
  - A LocalDiscoveryServer (LDS) maintains discovery information for all Servers that have registered with it, usually all Servers available on the host that it runs on.
  - A GlobalDiscoveryServer (GDS) maintains discovery information for OPC UA Applications available in an administrative domain.

DISCOVERY SERVER
LOCAL DISOVERY SERVER (LDS)

- The OPC Foundation maintains a LDS for Windows as Distributable available for registered users.
- Source Code of the LDS is available for OPC Foundation Members.
- A LDS for operating systems other then Windows is not available directly from the OPC Foundation.

DISCOVERY SERVER
GLOBAL DISOVERY SERVER (GDS)

- A GDS is an OPC UA Server which allows Clients to search for Servers in the administrative domain. It may also provide Certificate Services.
- It provides Methods that allow applications to search for other applications.
- The OPC Foundation provides sample source code of a GDS in C#/.NET 4.5

TROUBLESHOOTING
UA VS CLASSIC OPC

UA

- Same issues as for all applications using TCP / IP
- Certificate Management

Classic OPC

- Same issues as for all applications using TCP / IP
- COM/DCOM permissions
- Domain vs. Workgroup
- Usage different versions of Windows

TROUBLESHOOTING
POSSIBLE ISSUES

- Firewalls

  - Prevents TCP socket connection
  - Blocked Port
  - NAT: IP unfamiliar; Wrong Forwarding

- Certificates

  - Certificate not trusted
  - Certificate expired
  - Revoked certificate
  - Certificate not valid

- Permissions

  - Missing permissions
  - Access denied

- Network

  - Network latency
  - Communication with interruptions
  - Faulty Equipment

TROUBLESHOOTING
ERROR PREVENTION

- Creation of application-specific troubleshooting documentation that is easy to find.
- Steps which can be automated should not need to be performed manually by the user.
- Usage of tools for the automation of:
  - Creating an application certificate and adding it to the „Trust-List“.
  - Opening of the used TCP Ports in the Windows Firewall.