

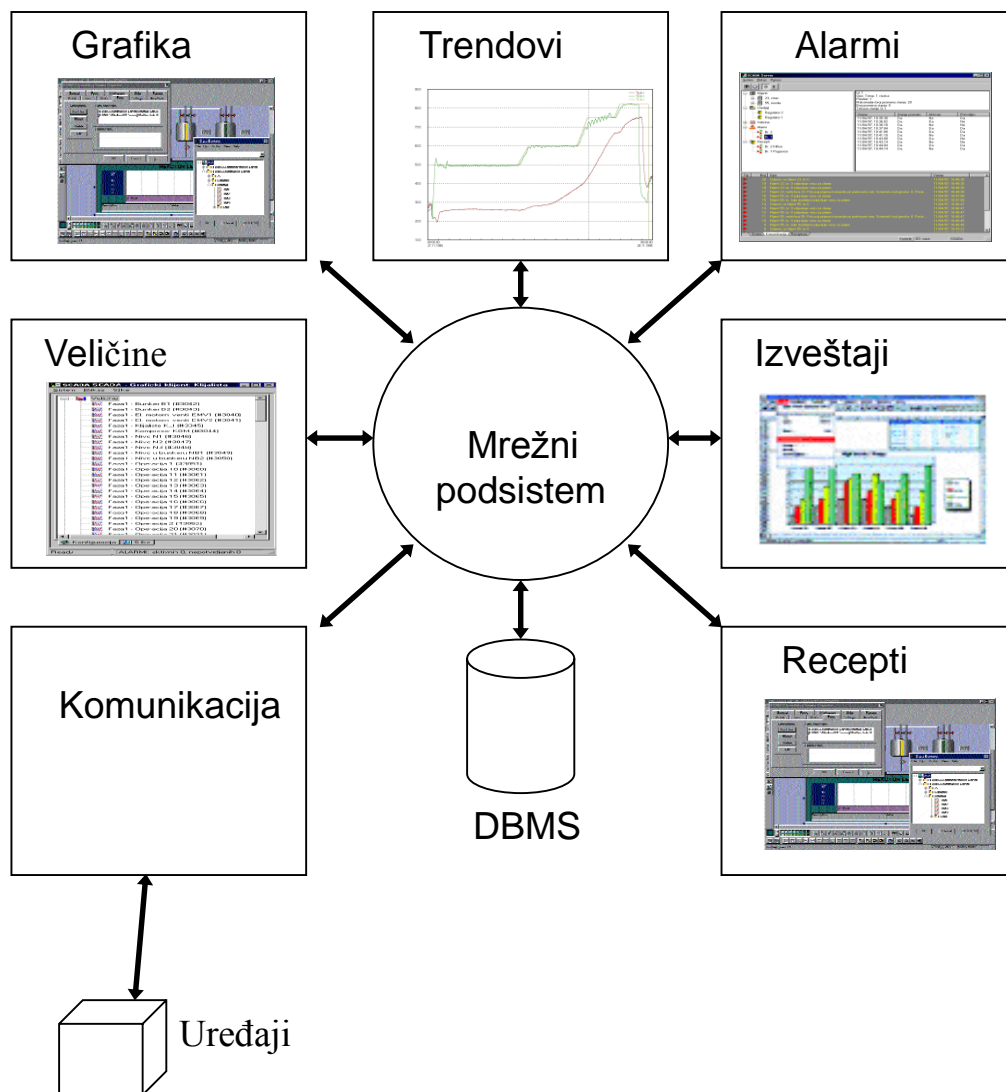
# OPC kurs – čas 1

## Specifikacije i primena

# Sadržaj kursa

- Čas 1: OPC fondacija i specifikacije
- Čas 2: OPC DA i HDA specifikacije
- Čas 3: WinCC i OPC DA, sa primerima
- Čas 4: VB code za povezivanje na OPC
- Čas 5 i 6: Laboratoriski rad

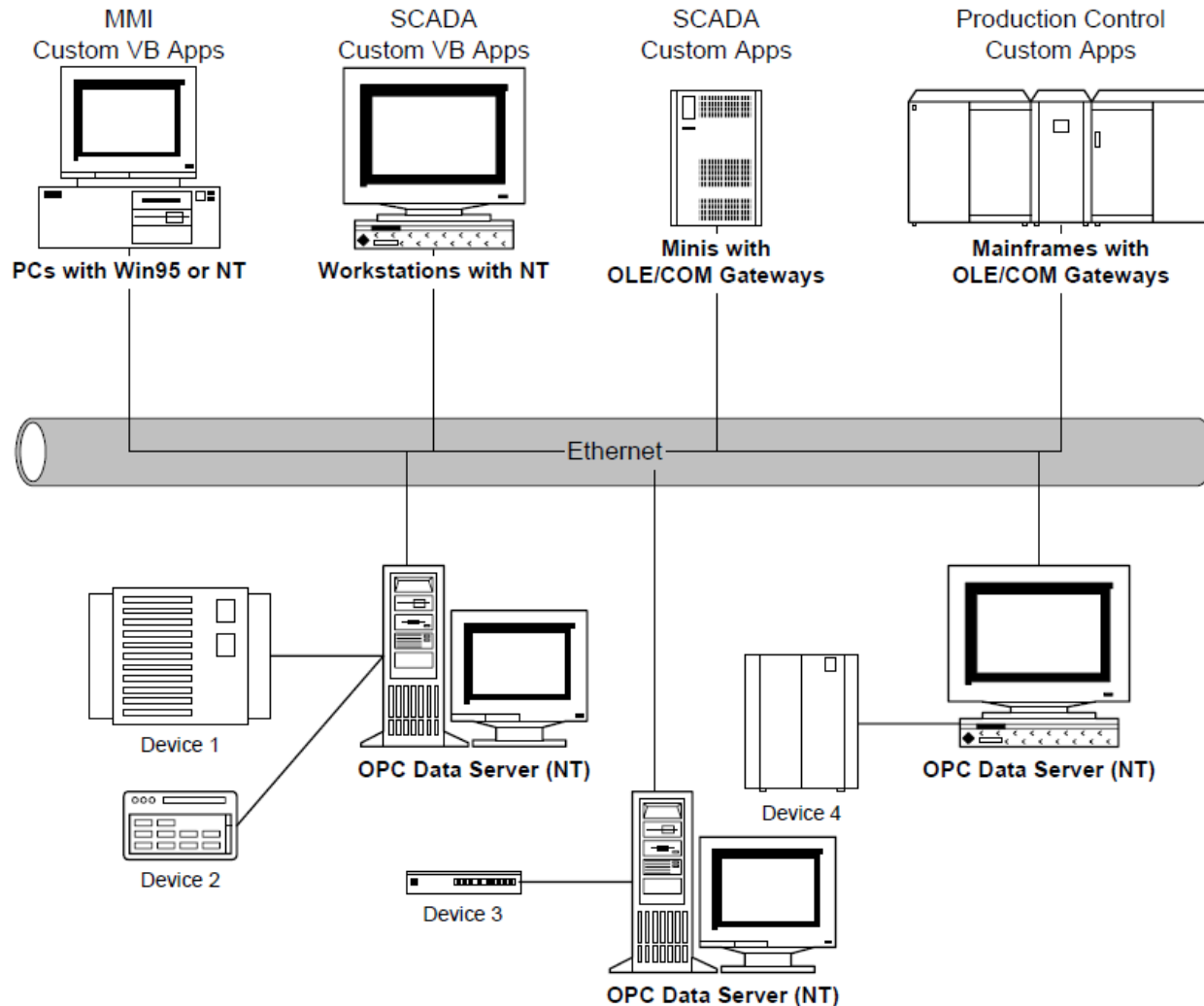
# Arhitektura SCADA sistema



# OPC fondacija

- Nefitabilna organizacija
- Ima za cilj standardizaciju medjuprocene komunikacije u industriji
- Zasnovana na široko prihvaćenim tehnologijama DCOM i WCF
- Preko 500 proizvoda podrzava OPC
- Članovi svi vodeći proizvođači: Microsoft, Omron, Siemens, ABB, Fanuc, Intellution  
...

# Gde pripada OPC



# OPC Specifikacije

- Data Access 1.0
- Data Access 2.0
- Data Access 3.0
- OPC DA Automation 2.0
- OPC HDA 1.10
- OPC HDA Auto 1.00

# Ostale specifikacije

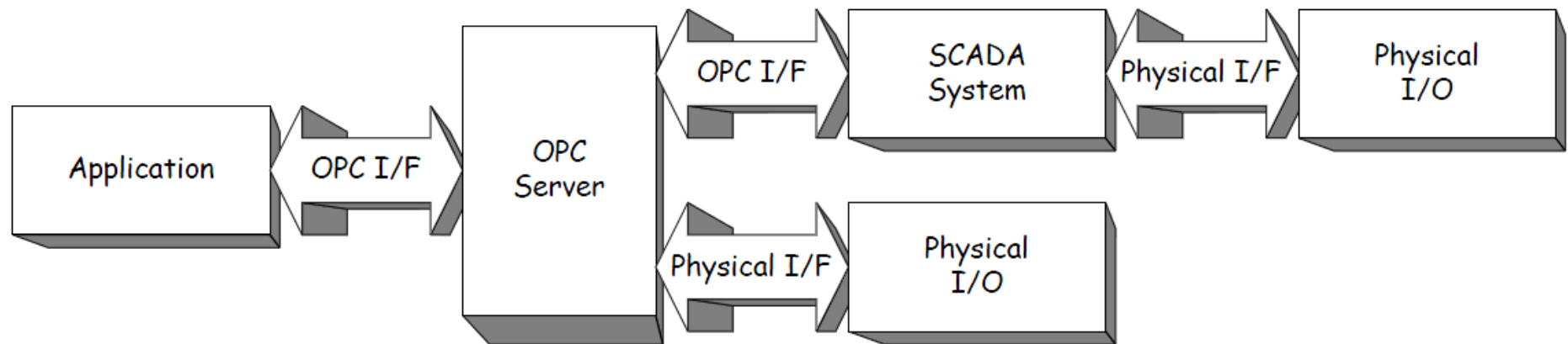
- OPC Alarm and Events 1.10
- OPC Batch 2.00
- OPC Data Exchange (DX) 1.00
- OPC XML DA

# OPC Unified Architecture

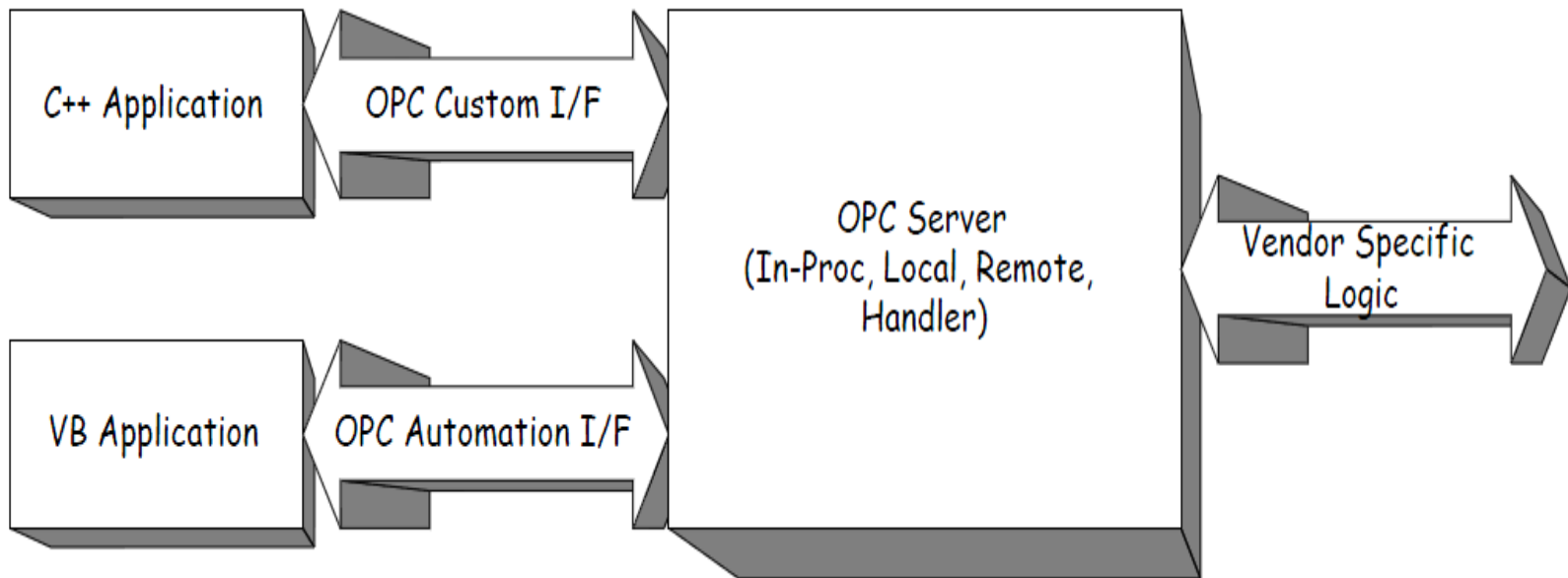
- Objedinjeni model (DA, HDA, AE...)
- Zasnovana je na WCF-u
- Mogućnost izmene modela i View-ovi
- Integrisana sigurnost podataka
- Još nije široko prihvaćena
- Neško komplikovaniji model podataka, većina SCADA je još ne podržava



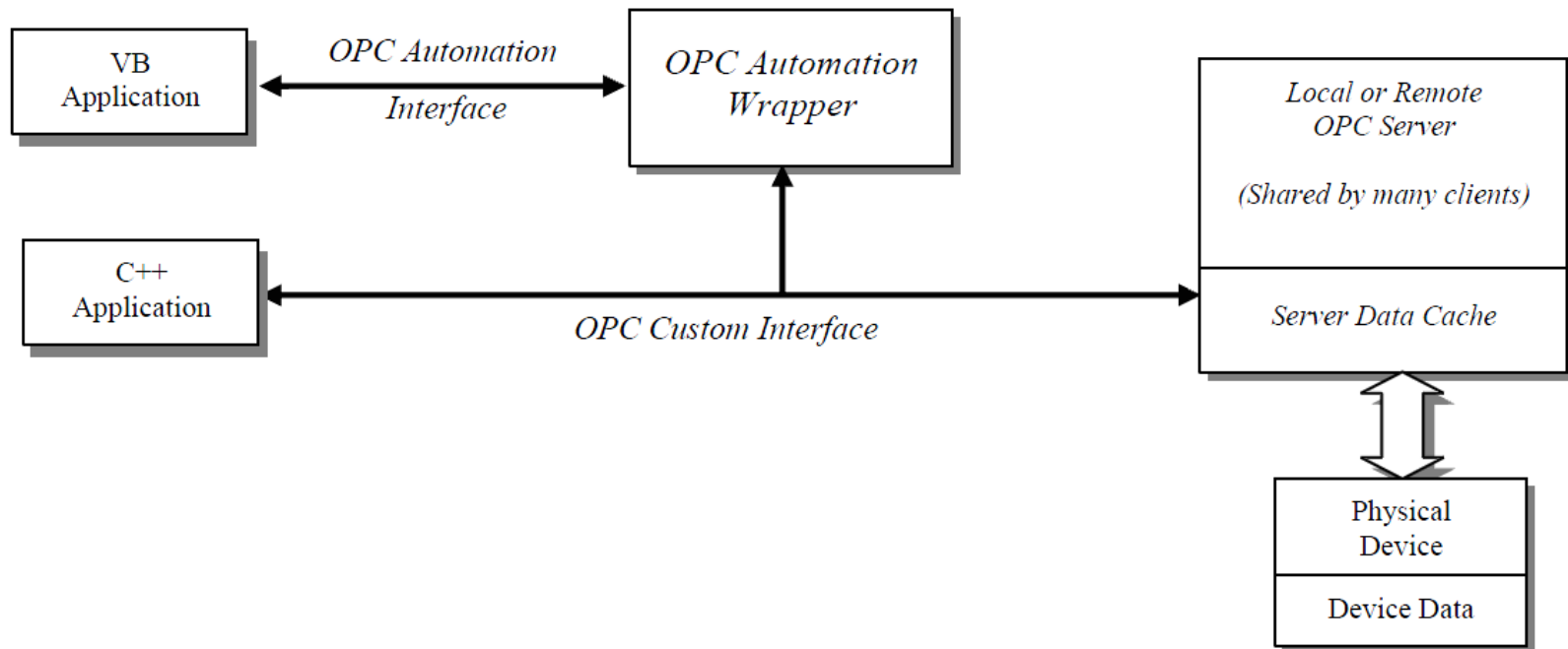
# Klijent-server arhitektura



# Custom i Automation integracija



# Wrapper-i za Automation interfejse



# OPC kurs – čas 2

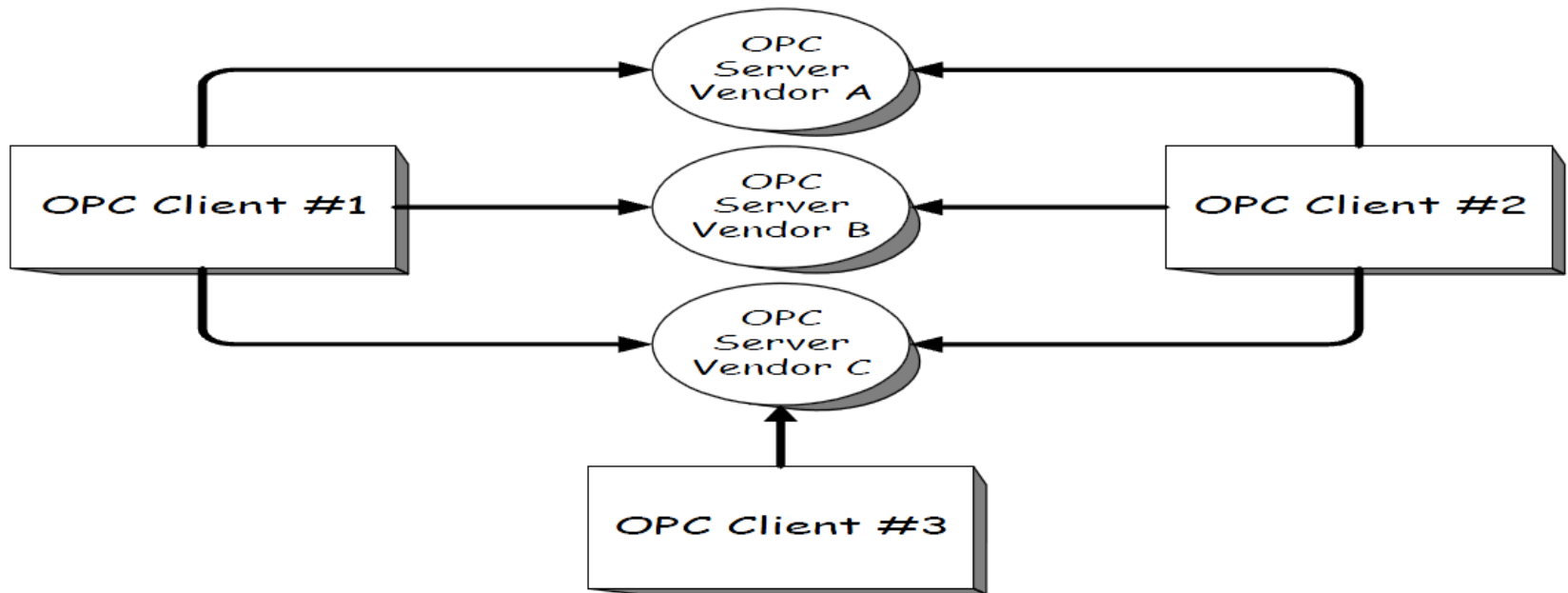
## OPC DA i HDA

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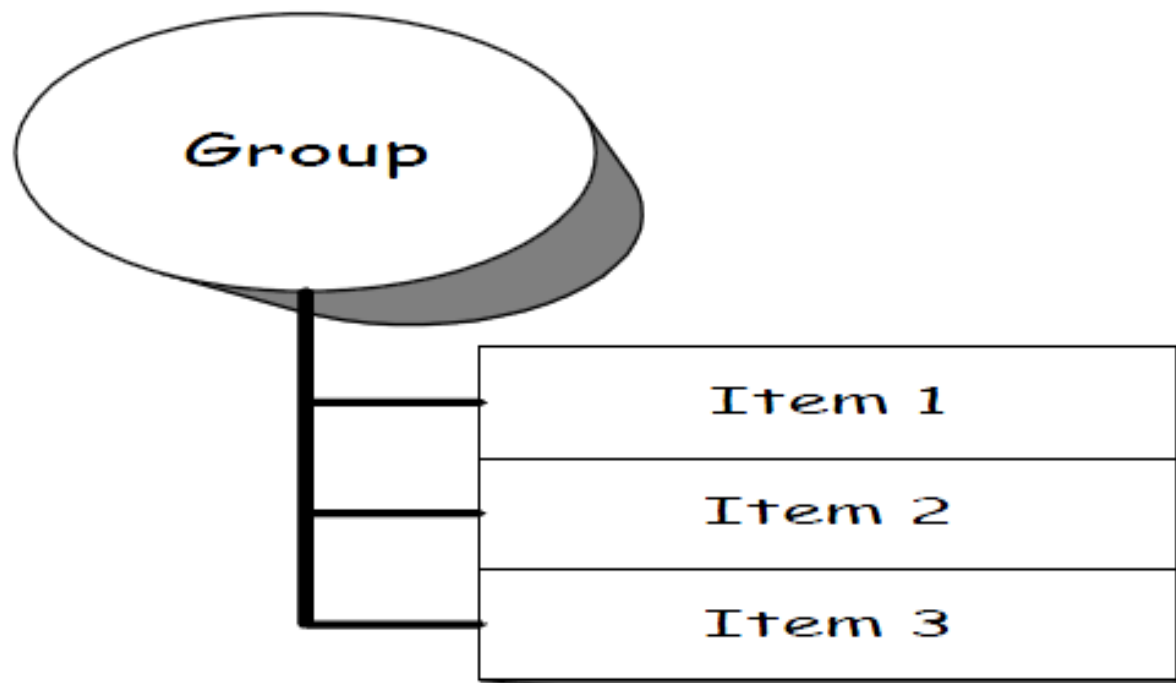
# Sadržaj 2. časa

- Komponente DA specifikacije
- Interfejsi DA specifikacije
- Read, Write sinhrono i asinhrono
- Komponente HDA specifikacije
- Interfejsi i metode HDA

# OPC DA specifikacija



# OPC grupe i veličine



# OPC Data Access Server

- Omogućava **brz** pristup **trenutnim** vrednostima veličina
- – Pored vrednosti očitavaju se i vremenska značka (*timestamp*) i kvalitet vrednosti
  - Veličine mogu imati dodatne podatke – osobine, poput: granice vrednosti, inž. jedinica, granice alarma, ...
- Sinhroni i asinhroni pristup vrednostima: očitavanje i zapis
  - Sinhroni pristup je namenjen jednostavnim klijentima koji pristupaju malom broju veličina.

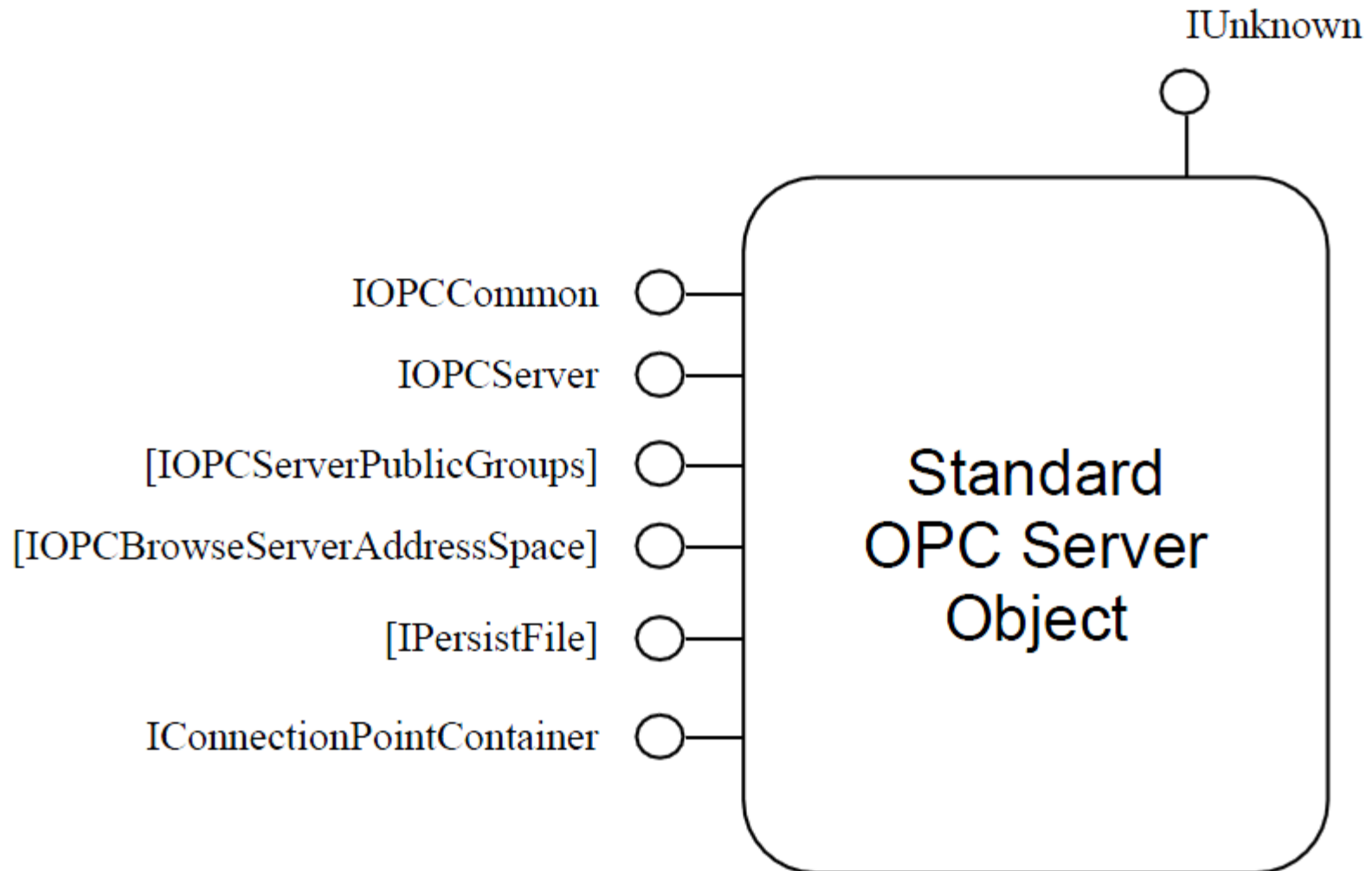
Duplira se skeniranje vrednosti veličina – što server sam radi
  - Asinhroni pristup minimizuje upotrebu CPU i mreže



# OPC Data Access Server

- Klijenti mogu grupisati veličine prema potrebi  
Na nivou grupe veličina se omogućava:
  - Kontinualna konzistencija podataka (*deadband*, *update rate*)
  - Pretplata na promene vrednosti veličina - *PUSH* model sinhronizacije
- Mehanizam dojava samo promenjenih vrednosti
  - Smanjuje saobraćaj između servera i klijenta
  - Upotreba mrtve zone (*deadband-a*) sprečava prenos malih promena –(poput šuma)
  - Odložena dojava (*update rate*) sprečava česte dojave
  - omogućava klijentu da definiše minimalan period između dojava sa servera
- Asinhronne operacije smanjuju neaktivnost klijenta

# OPC Server objekat



# *Cache/Device* podaci

- Kod čitanja vrednosti veličina klijent zahteva podatke iz
  - Lokalne memorije servera – *Cache*
  - Uređaja – *Device*
- Pristup uređaju može biti spor
- Upis vrednosti podrazumeva da se pristupa uređaju

## *Timestamp*

- Je vremenska značka koja se pridružuje vrednosti svaki put kada se očita iz uređaja
- Nije trenutak kada se vrednost promeni
- Poslednji trenutak kada je server očitao vrednost
  - Ili trenutak do koga zna da se vrednosti nije promenila

# *Deadband i Update Rate*

- Proređuju dojave servera kod asinhronih operacija očitavanja vrednosti veličina
- *Deadband* – mrtva zona eliminiše male promene vrednosti (poput šuma)
- *Update rate* omogućava klijentu da odloži dojave sa servera

## Tipovi vrednosti veličina

- Opisuju se tipom VARIANT
  - I2, I4, R4, R8, CY, DATE, BSTR, BOOL, UI1
  - Nizom vrednosti VT\_ARRAY prethodnih tipova
- Server propisuje kanonički tip za svaku veličinu
- Klijent može tražiti isporuku vrednosti u izmenjenom tipu (specifikacija propisuje pravila konverzije tipova)

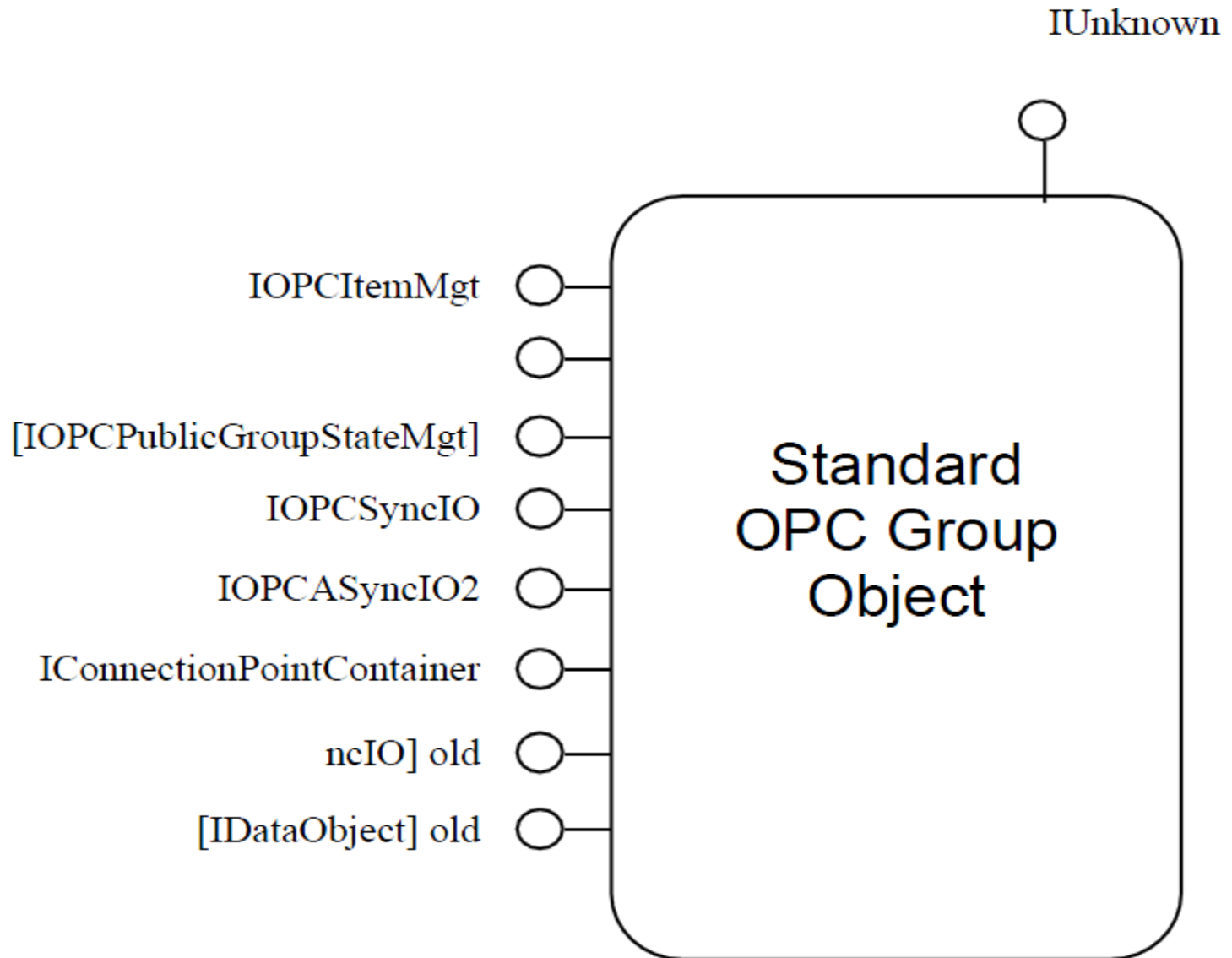
# “Adresni prostor”

- Predstavlja organizaciju veličina u serveru
- Može biti
  - Hijerarijski
  - Ravan

```
<ROOT>
PLC_STATION_1 (branch)
  ANALOG_VALUES (branch)
    40001 (leaf)
    40002
  ...
...
```

```
<ROOT>
AREA1 (branch)
  REACTOR10 (branch)
    TIC1001 (branch)
      CURRENT_VALUE (leaf)
      SETPOINT
      ALARM_STATUS
      LOOP_DESCRIPTION
    TIC1002
      CURRENT_VALUE
    ...
  REACTOR11
  ...
AREA2
...
```

# OPC Group objekat



# OPC Server interfejsi (1)

- **IOPCCommon**
- **HRESULT SetLocaleID ()**
- **HRESULT GetLocaleID ()**
- **HRESULT QueryAvailableLocaleIDs ()**
- **HRESULT GetErrorString ()**
- **HRESULT SetClientName ()**

# OPC Server interfejsi (2)

- **IOPCServer**
- HRESULT **AddGroup**(szName, bActive, dwRequestedUpdateRate, hClientGroup, pTimeBias, pPercentDeadband, dwLCID, phServerGroup, pRevisedUpdateRate, riid, ppUnk)
- HRESULT **GetErrorString**()
- HRESULT **GetGroupName**()
- HRESULT **GetStatus**()
- HRESULT **RemoveGroup**()
- HRESULT **CreateGroupEnumerator**()



# OPC Server interfejsi (3)

- **IOPCItemProperties**
- HRESULT **QueryAvailableProperties**(szItemID, pdwCount, ppPropertyIDs, ppDescriptions, ppvtDataTypes );
- HRESULT **GetItemProperties** (szItemID, dwCount, pdwPropertyIDs, ppvData, ppErrors );
- HRESULT **LookupItemIDs**( szItemID, dwCount, pdwPropertyIDs, ppszNewItemIDs, ppErrors );

# OPC Server interfejsi (4)

- **IOPCBrowseServerAddressSpace (optional)**
- **HRESULT QueryOrganization**(pNameSpaceType );
- **HRESULT ChangeBrowsePosition**(dwBrowseDirection, szString );
- **HRESULT BrowseOPCItemIDs**( dwBrowseFilterType, szFilterCriteria, vtDataTypeFilter, dwAccessRightsFilter, pplEnumString );
- **HRESULT GetItemID**( szItemDataID, szItemID );
- **HRESULT BrowseAccessPaths**( szItemID, pplEnumString );

# OPC Group interfejsi (1)

- **IOPCGroupStateMgt**
- HRESULT **GetState**(pUpdateRate, pActive, ppName, pTimeBias, pPercentDeadband, pLCID, phClientGroup, phServerGroup)
- HRESULT **SetState**(pRequestedUpdateRate, pRevisedUpdateRate, pActive, pTimeBias, pPercentDeadband, pLCID, phClientGroup)
- HRESULT **SetName**(szName);
- HRESULT **CloneGroup**(szName, riid, ppUnk);

# OPC Group interfejsi (2)

- **IOPCSyncIO**
- HRESULT **Read**(dwSource, dwCount, phServer, ppltemValues, ppErrors)
- HRESULT **Write**(dwCount, phServer, pltemValues, ppErrors)
- **IOPCAsyncIO2**
- HRESULT **Read**(dwCount, phServer, dwTransactionID, pdwCancelID, ppErrors,)
- HRESULT **Write**(dwCount, phServer, pltemValues, dwTransactionID, pdwCancelID, ppErrors);
- HRESULT **Cancel2** (dwCancelID);
- HRESULT **Refresh2**(dwSource, dwTransactionID, pdwCancelID);
- HRESULT **SetEnable**(bEnable);
- HRESULT **GetEnable**(pbEnable);

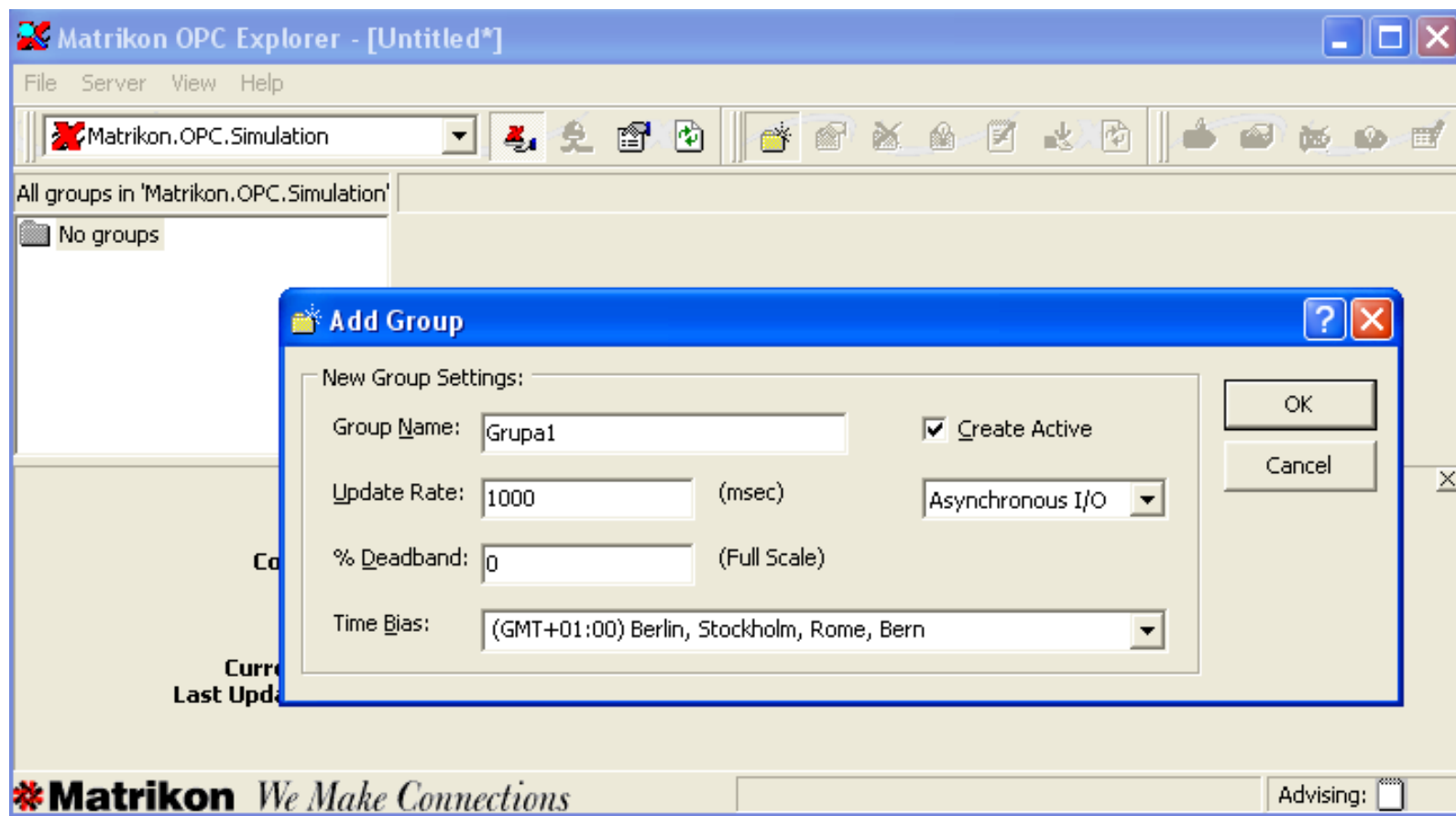
# OPC Group Interfejsi (3)

- **IOPCItemMgt**
- HRESULT **AddItems**(dwCount, pltemArray, ppAddResults, ppErrors)
- HRESULT **ValidateItems**(dwCount, pltemArray, bBlobUpdate, ppValidationResults, ppErrors)
- HRESULT **RemoveItems**(dwCount, phServer, ppErrors)
- HRESULT **SetActiveState**(dwCount, phServer, bActive, ppErrors)
- HRESULT **SetClientHandles**(dwCount, phServer, phClient, ppErrors)
- HRESULT **SetDatatypes**(dwCount, phServer, pRequestedDatatypes, ppErrors)
- HRESULT **CreateEnumerator**(riid, ppUnk)

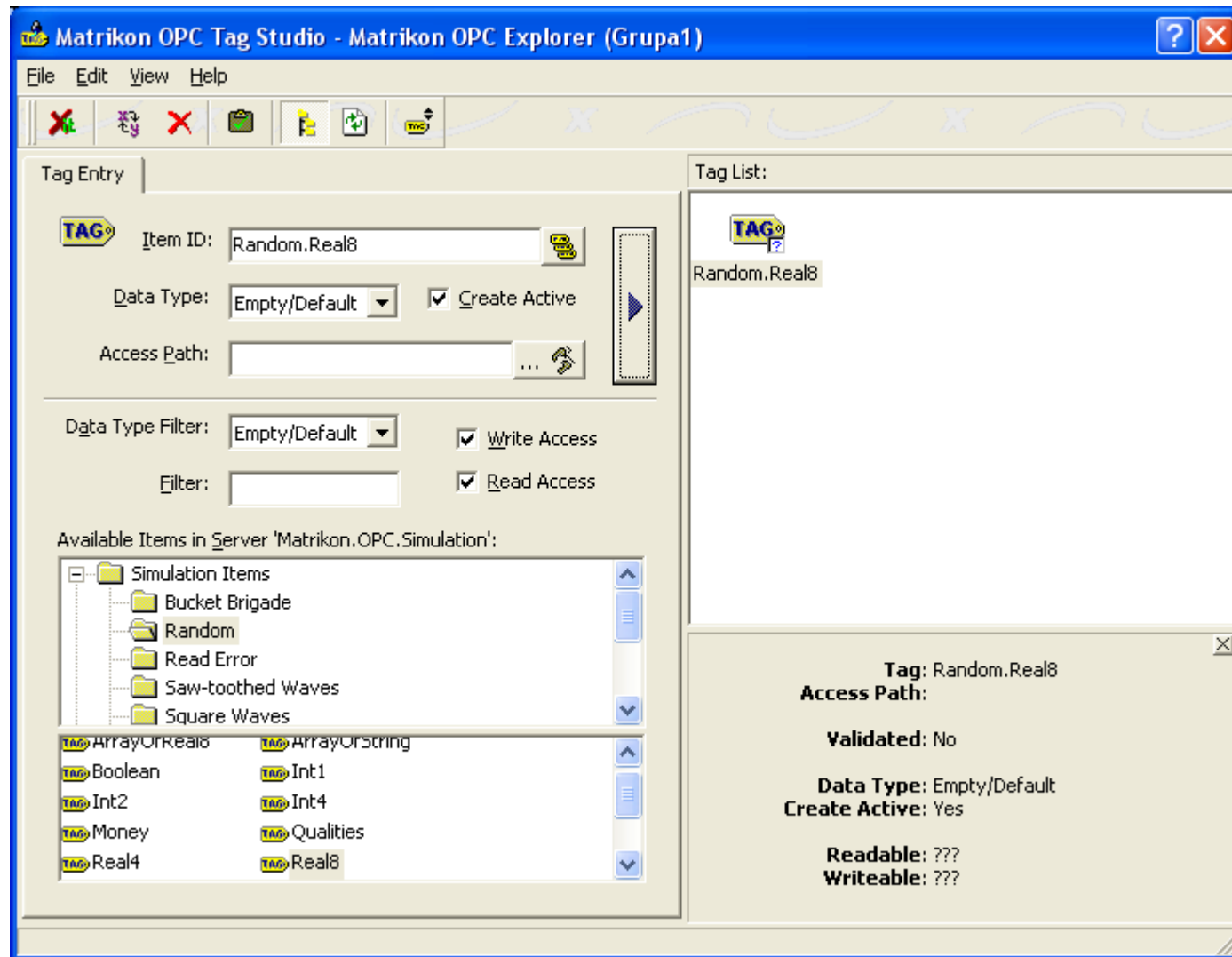
# OPC klijentski interfejsi

- **IOPCDataCallback**
- HRESULT **OnReadComplete**(dwTransid, hGroup, hrMasterquality, hrMastererror, dwCount, phClientItems, pvValues, pwQualities, pftTimeStamps, pErrors,);
- HRESULT **OnWriteComplete**(dwTransid, hGroup, hrMastererr, dwCount, phClientItems, pErrors);
- HRESULT **OnCancelComplete**(dwTransid, hGroup);
- HRESULT **OnDataChange**(dwTransid, hGroup, hrMasterquality, hrMastererror, dwCount, phClientItems, pvValues, pwQualities, pftTimeStamps, pErrors,);

# Povezivanje i dodavanje grupe



# Dodavanje veličina u grupu





# Očitavanje-izmena vrednosti

The screenshot displays the Matrikon OPC Explorer interface. The main window shows a tree view with 'Matrikon.OPC.Simulation' and a table of items under 'Grupa1'. A 'Write Values' dialog box is open, showing the 'Multiple Value' tab. The dialog contains a table with the following data:

Item ID	Current Value	Data Type	New Value
Random.Real8	6769.7294409	Double Float	2596.33641537

The dialog also includes 'OK', 'Cancel', and 'Apply' buttons at the bottom. The background window shows the 'Contents of 'Grupa1'' table with the following data:

Item ID	Access Path	Status	Value	Timestamp	Quality
Random.Real8		Active	5058.1951353	1/8/2011 8:30:41 AM	Good, non-specific

The Matrikon logo and tagline 'We Make Connection' are visible in the bottom left corner of the main window.

# OPC Historical Data Access Server

- Opisuju interfejse bitne za
  - skladištenje vrednosti veličina
  - očitavanje ranije prikupljenih/skladištenih vrednosti
- Specifikacije predviđaju postojanje
  - jednostavnijih servera koji bi implementirali samo osnovne funkcionalnosti istorijskog servera
  - složenih servera kod kojih se vrše filtracije podataka, statistička obrada, kompresija podataka i sl.
- I ovde je predviđen mehanizam dojave kao najefikasniji način prenosa podataka između klijenata i servera.

# Osnovni koncepti HDA

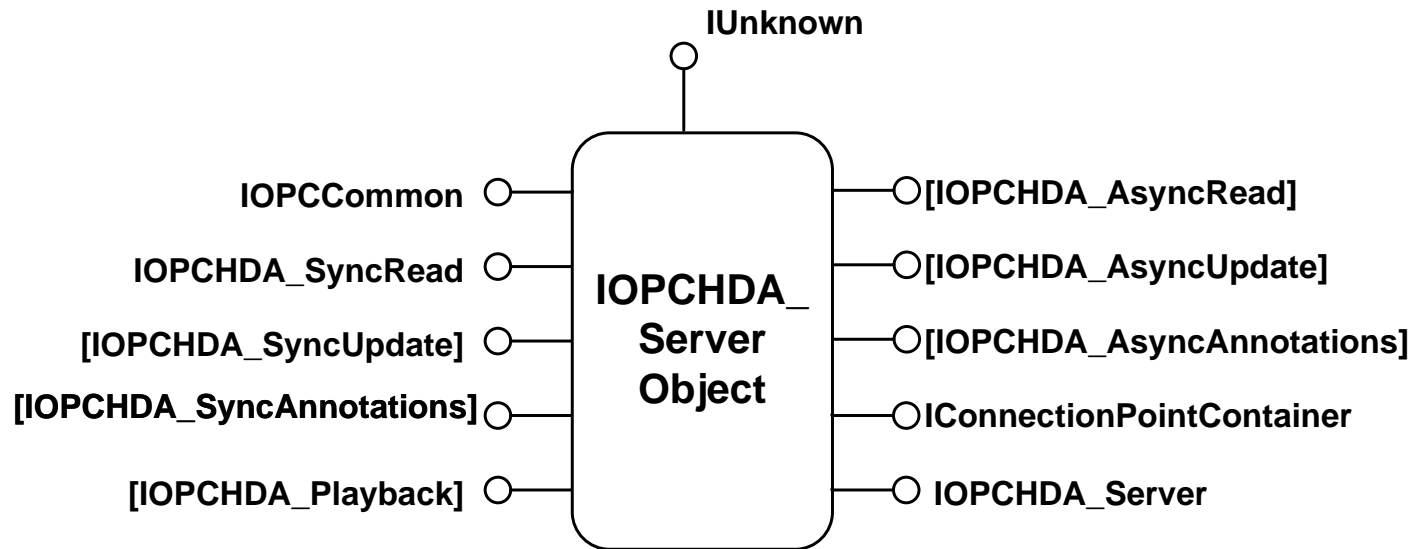
Postoje veličine i imaju osobine (kao u OPC DA)

- Klijent specificira period od interesa
  - granične vrednosti (*bounding values*) perioda
- Vrednosti veličina mogu biti:
  - Sirovi podaci (*raw data*) – skladišteni podaci (mogu biti kompresovani)
  - Agregirane vrednosti – avg, min, max ...
  - Anotacije – korisnik može komentare dodeliti veličinama (uz vremensku značku) i očitati ih
  - Interpolirani podaci – vrednosti veličina dobijene linearnom interpolacijom
  - Modifikovane vrednosti – promenjene nakon skladištenja u server

# OPC HDA objektni model

## Historian Server Model

(Two Objects)



# IOPCHDA\_Server

- Očitavanje atributa koje server podržava

HRESULT **GetItemAttributes** (pdwCount , ppdwAttrID, ppszAttrName, ppszAttrDesc, ppvtAttrDataType)

- Očitavanje načina agregacije podataka koje server podržava

HRESULT **GetAggregates** (pdwCount , ppdwAggrID, ppszAggrName, ppszAggrDesc)

- Tekući status servera

HRESULT **GetHistorianStatus** (pwStatus, pftCurrentTime, pftStartTime, pwMajorVersion, pwMinorVersion, pwBuildNumber, pdwMaxReturnValues, ppszStatusString, ppszVendorInfo)

- Veza server i klijent HANDLE-ova veličina

HRESULT **GetItemHandles** (dwCount, pszItemID, phClient, pphServer, ppErrors)

- Uklanjanje veza server i klijent HANDLE-ova veličina

HRESULT **ReleaseItemHandles** (dwCount, phServer, ppErrors)

- Provera da li date veličine poznaje server

HRESULT **ValidateItemIDs** (dwCount, pszItemID, ppErrors)

- Pokazivač na OPCHDA\_BROWSER interfejs

HRESULT **CreateBrowse** (dwCount, pdwAttrID, pOperator, vFilter, pphBrowser, ppErrors)

# IOPCHDA\_Browser

- Očitavanje svih elemenata hijerarhije: grana, čvorova, naziva veličina preko IEnumString interfejsa

HRESULT **GetEnum** (dwBrowseType, pplEnumString)

- Promena pozicije u hijerarhiji

HRESULT **ChangeBrowsePosition** (dwBrowseDirection, szString)

- Preuzimanje identifikatora (HANDLE) date veličine

HRESULT **GetItemID** (szNode, pszItemID)

- Veza server i klijent HANDLE-ova veličina

HRESULT **GetItemHandles** (dwCount, pszItemID, phClient, ppServer, ppErrors)

- Tekuća pozicija u hijerarhiji

HRESULT **GetBranchPosition** (pszBranchPos)

# IOPCHDA\_SyncRead

- Očitavanje sirovih podataka iz istorije  
HRESULT **ReadRaw** (htStartTime, htEndTime, dwNumValues, bBounds, dwNumItems, phServer, ppltemValues, ppErrors)
- Očitavanje agregiranih podataka iz istorije  
HRESULT **ReadProcessed** (htStartTime, htEndTime, ftResampleInterval, dwNumItems, phServer, haAggregate, ppltemValues, ppErrors)
- Očitavanje podataka za date trenutke  
HRESULT **ReadAtTime** (dwNumTimeStamps, ftTimeStamps, dwNumItems, phServer, ppltemValues, ppErrors)
- Očitavanje modifikovanih vrednosti  
HRESULT **ReadModified** (htStartTime, htEndTime, dwNumValues, dwNumItems, phServer, ppltemValues, ppErrors)
- Očitavanje atributa veličina  
HRESULT **ReadAttribute** (htStartTime, htEndTime, hServer, dwNumAttributes, pdwAttributeIDs, ppAttributeValues, ppErrors)

# IOPCHDA\_SyncUpdate (optional)

- Koje metode ovog interfejsa su podržane  
HRESULT **QueryCapabilities** (pCapabilities)
- Dodavanje istorijskih vrednosti  
HRESULT **Insert** (dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, ppErrors)
- Zamena vrednosti  
HRESULT **Replace** (dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, ppErrors)
- Kombinacija prethodna 2 metoda  
HRESULT **InsertReplace** (dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, ppErrors)
- Brisanje vrednosti (podataka)  
HRESULT **DeleteRaw** (htStartTime, htEndTime, dwNumItems, phServer, ppErrors)  
HRESULT **DeleteAtTime** (dwNumItems, phServer, ftTimeStamps, ppErrors)



# IOPCHDA\_AsyncRead (optional)

- Asinhrono očitavanje sirovih podataka  
HRESULT **ReadRaw** (dwTransactionID, htStartTime, htEndTime, dwNumValues, bBounds, dwNumItems, phServer, pdwCancelID, ppErrors)  
(očitane vrednosti se naknadno posleduju pozivom  
[IOPCHDA\\_DataCallback::OnReadComplete](#) metode)
- HRESULT **AdviseRaw** (dwTransactionID, htStartTime, ftUpdateInterval, dwNumItems, phServer, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnDataChange](#)
- HRESULT **ReadProcessed** (dwTransactionID, htStartTime, htEndTime, ftResampleInterval, dwNumItems, phServer, haAggregate, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnReadComplete](#)
- HRESULT **AdviseProcessed** (dwTransactionID, htStartTime, ftResampleInterval, dwNumItems, phServer, haAggregate, dwNumIntervals, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnDataChange](#)
- HRESULT **ReadAtTime** (dwTransactionID, dwNumTimeStamps, ftTimeStamps, dwNumItems, phServer, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnReadComplete](#)
- HRESULT **ReadModified** (dwTransactionID, htStartTime, htEndTime, dwNumValues, dwNumItems, phServer, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnReadModifiedComplete](#)
- HRESULT **ReadAttribute** (dwTransactionID, htStartTime, htEndTime, hServer, dwNumAttributes, dwAttributeIDs, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnReadAttributesComplete](#)
- HRESULT **Cancel** (dwCancelID)  
[IOPCHDA\\_DataCallback::OnCancelComplete](#).

# IOPCHDA\_AsyncUpdate (optional)

- HRESULT **QueryCapabilities** (pCapabilities)
- HRESULT **Insert** (dwTransactionID, dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, pdwCancelID, ppErrors)  
    IOPCHDA\_DataCallback::OnUpdateComplete
- HRESULT **Replace** (dwTransactionID, dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, pdwCancelID, ppErrors)  
    IOPCHDA\_DataCallback::OnUpdateComplete
- HRESULT **InsertReplace** (dwTransactionID, dwNumItems, phServer, ftTimeStamps, vDataValues, pdwQualities, pdwCancelID, ppErrors)  
    IOPCHDA\_DataCallback::OnUpdateComplete
- HRESULT **DeleteRaw** (dwTransactionID, htStartTime, htEndTime, dwNumItems, phServer, pdwCancelID, ppErrors)  
    IOPCHDA\_DataCallback::OnUpdateComplete
- HRESULT **DeleteAtTime** (dwTransactionID, dwNumItems, phServer, ftTimeStamps, pdwCancelID, ppErrors)  
    IOPCHDA\_DataCallback::OnUpdateComplete
- HRESULT **Cancel** (dwCancelID)  
    IOPCHDA\_DataCallback::OnUpdateComplete

# IOPCHDA\_Playback (optional)

- HRESULT **ReadRawWithUpdate** (dwTransactionID, htStartTime, htEndTime, dwNumValues, ftUpdateDuration, ftUpdateInterval, dwNumItems, phServer, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnPlayback](#)
- HRESULT **ReadProcessedWithUpdate** (dwTransactionID, htStartTime, htEndTime, ftResampleInterval, dwNumIntervals, ftUpdateInterval, dwNumItems, phServer, haAggregate, pdwCancelID, ppErrors)  
[IOPCHDA\\_DataCallback::OnPlayback](#)
- HRESULT **Cancel** (dwCancelID)  
[IOPCHDA\\_DataCallback::OnCancelComplete](#)

# Osnove osobine AE

- Obaveštava klijenta kada se desi događaj ili alarm
  - vrednost parametra premaši zadate granice
  - promene stanja
  - ...
- Podržava *Area-je*
- Podržava filtriranje dojava
  - *EVENT*
  - *CATEGORY*
  - *SEVERITY*
  - *AREA*
  - *SOURCE*

# Osnovni pojmovi (AE)

- *Alarm* je nenormalno stanje (*condition*) i tretira se kao specijalan *condition*.
- *Condition* je stanje servera ili nekog od njegovih objekata
  - Npr. FIC101 može imati “LevelAlarm”
- *Condition* može imati *sub-condition*
  - Npr. “LevelAlarm” može imati “LowLowAlarm”, “LowAlarm”, “HighAlarm”, “HighHighAlarm”.
- Događaj (*Event*) može a ne mora biti uslovljen *condition*-om
  - Npr. Ulaz u stanje “LowAlarm” ili “SystemError”

# Metode OPC XML-DA servera

- GetStatus
- GetProperties
- Browse
- Read
- Write
- Subscribe
- SubscriptionPolledRefresh
- SubscriptionCancel

# OPC kurs – čas 3

## WinCC i OPC

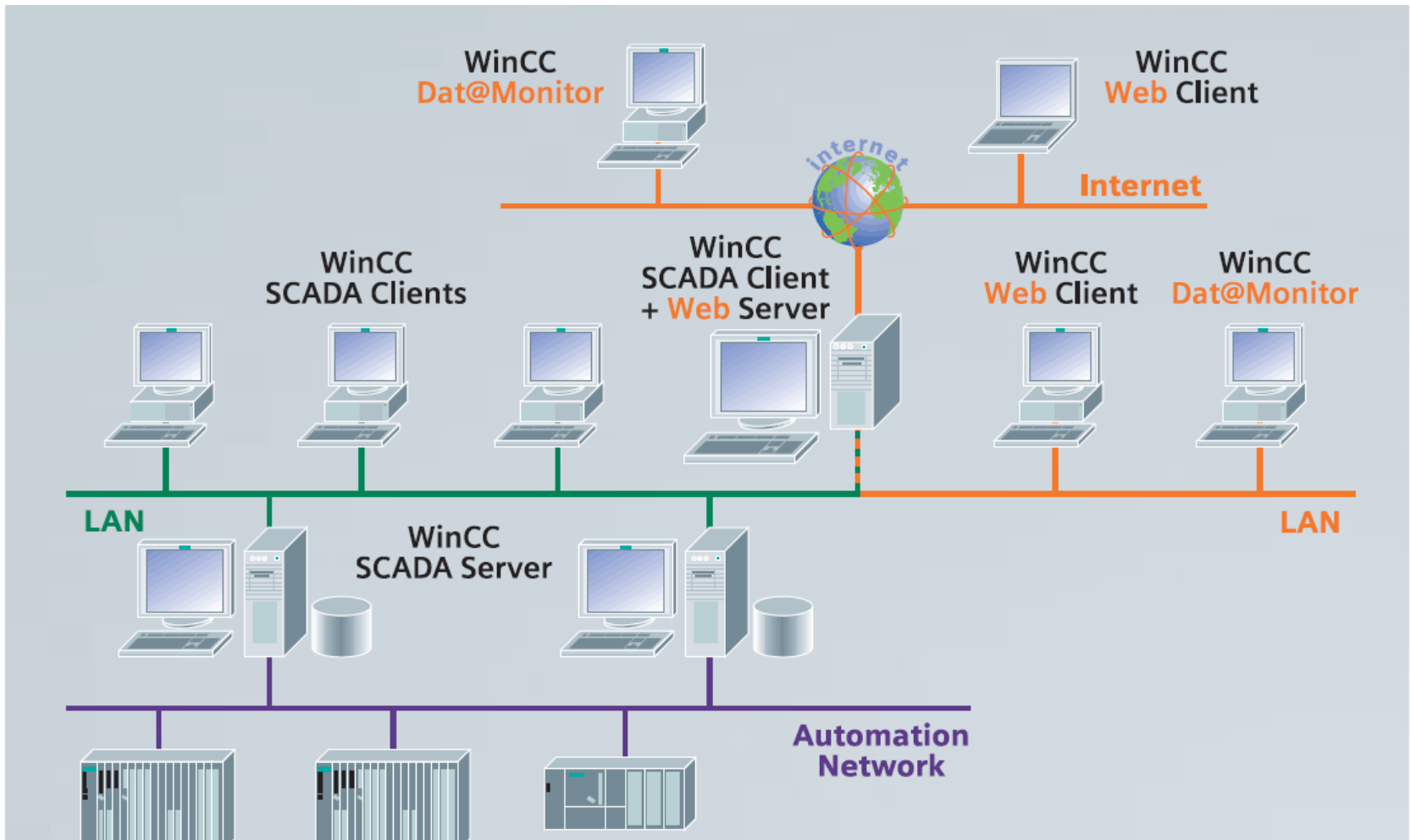
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srdjanvu@uns.ac.rs

# Sadržaj 3. časa

- WinCC integracija
- WinCC i OPC
- Primer povezivanja na OPC server
- WinCC i WinCC Flexible
- WinCC i Matrikon



# WinCC mreža



# Instalacija

**Select Components** [X]

Activate or deactivate the components which should be installed or deinstalled, respectively.

Components

<input checked="" type="checkbox"/> WinCC	226 MB	<input checked="" type="checkbox"/> Data Access	4 MB
<input checked="" type="checkbox"/> Help	11 MB	<input checked="" type="checkbox"/> Alarm & Events	2 MB
<input checked="" type="checkbox"/> Communication	4 MB	<input checked="" type="checkbox"/> Historical Data Access	2 MB
<input checked="" type="checkbox"/> OPC Server	13 MB	<input checked="" type="checkbox"/> - Write Access Historical Data	2 MB
<input type="checkbox"/> Options	0 MB	<input checked="" type="checkbox"/> XML Data Access	2 MB

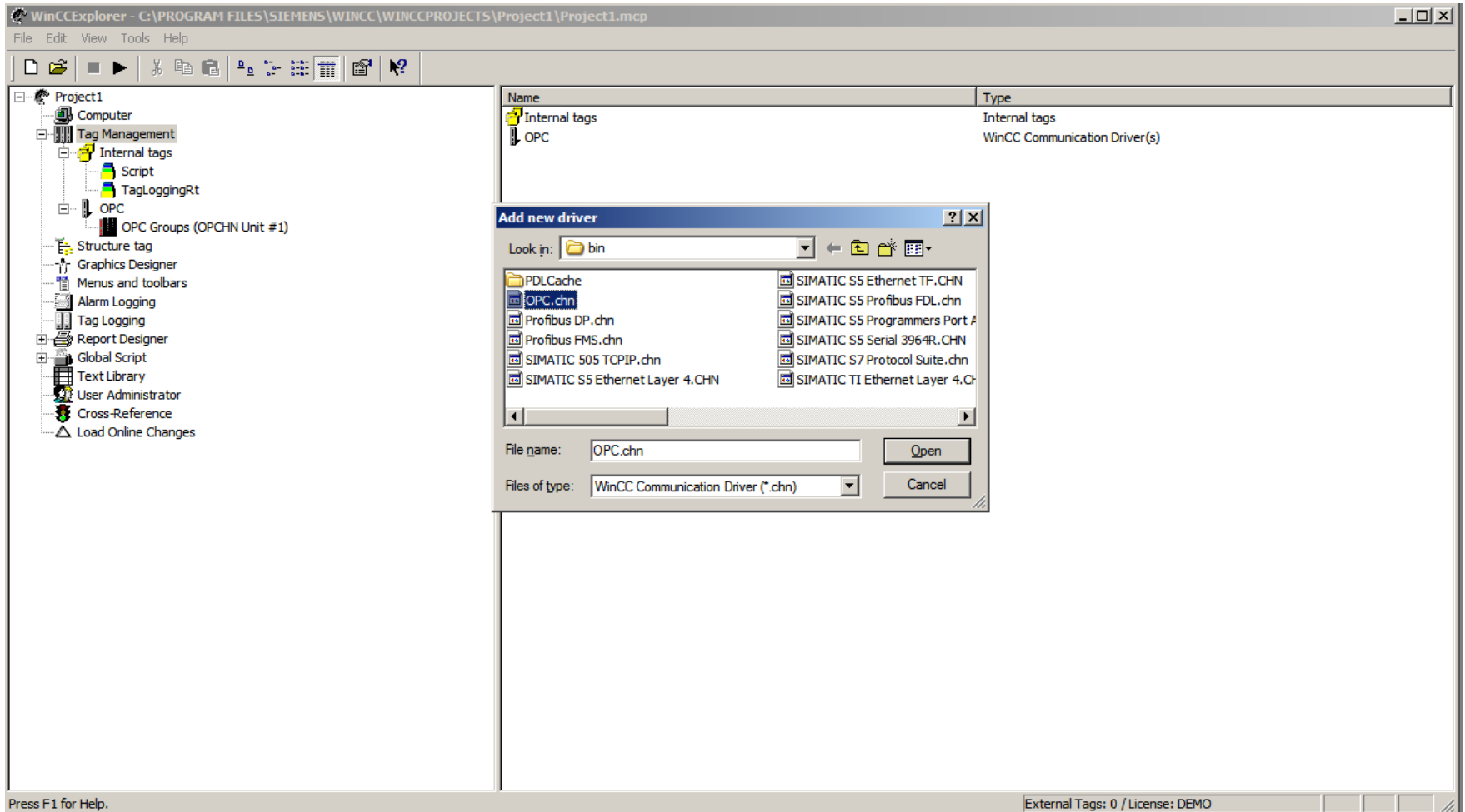
Description

Historical Data Access with writeaccess (Update). The following software components are required for this:  
Historical Data Access

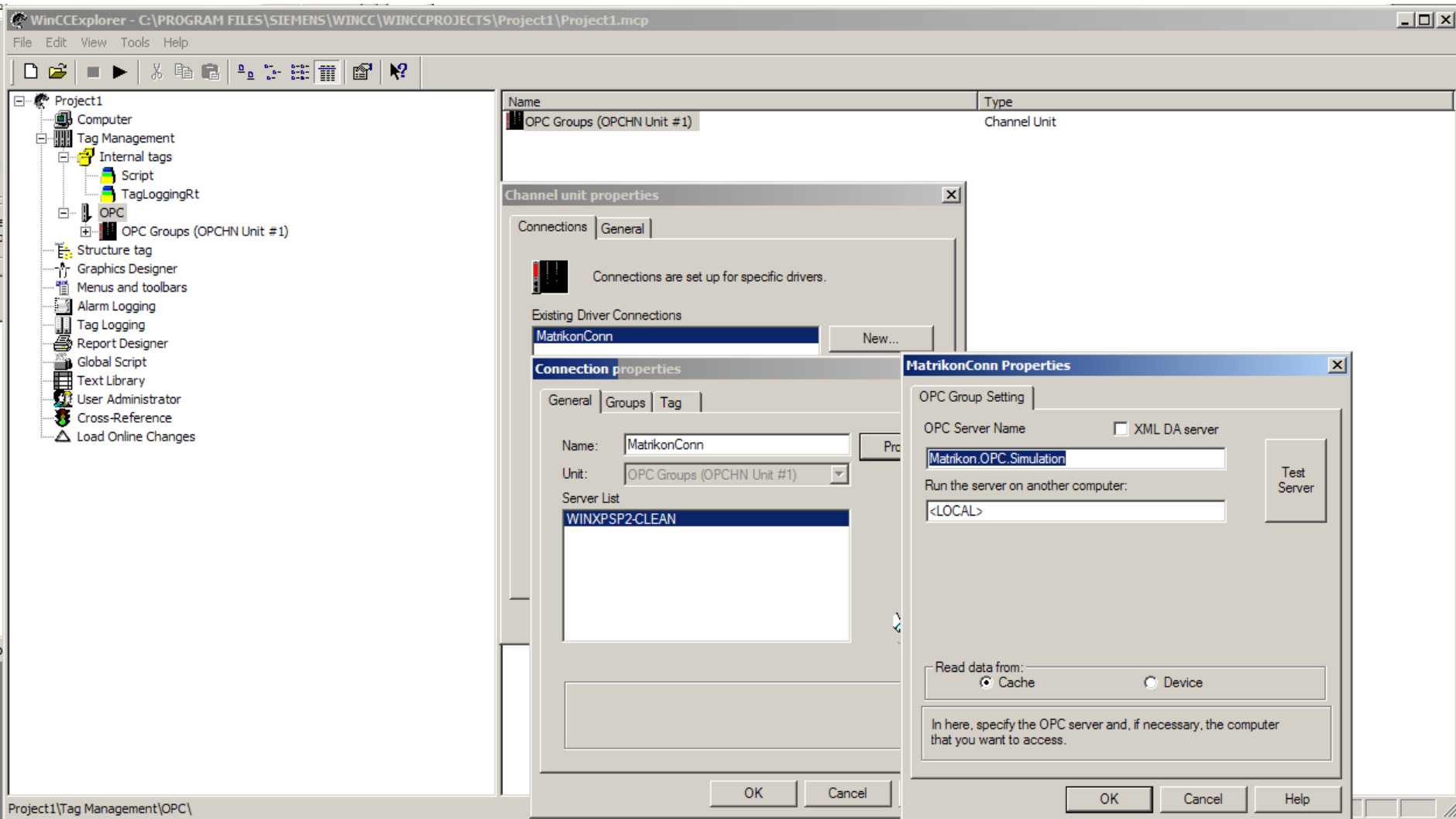
Available: 38049 MB

< Back    Next >    Cancel

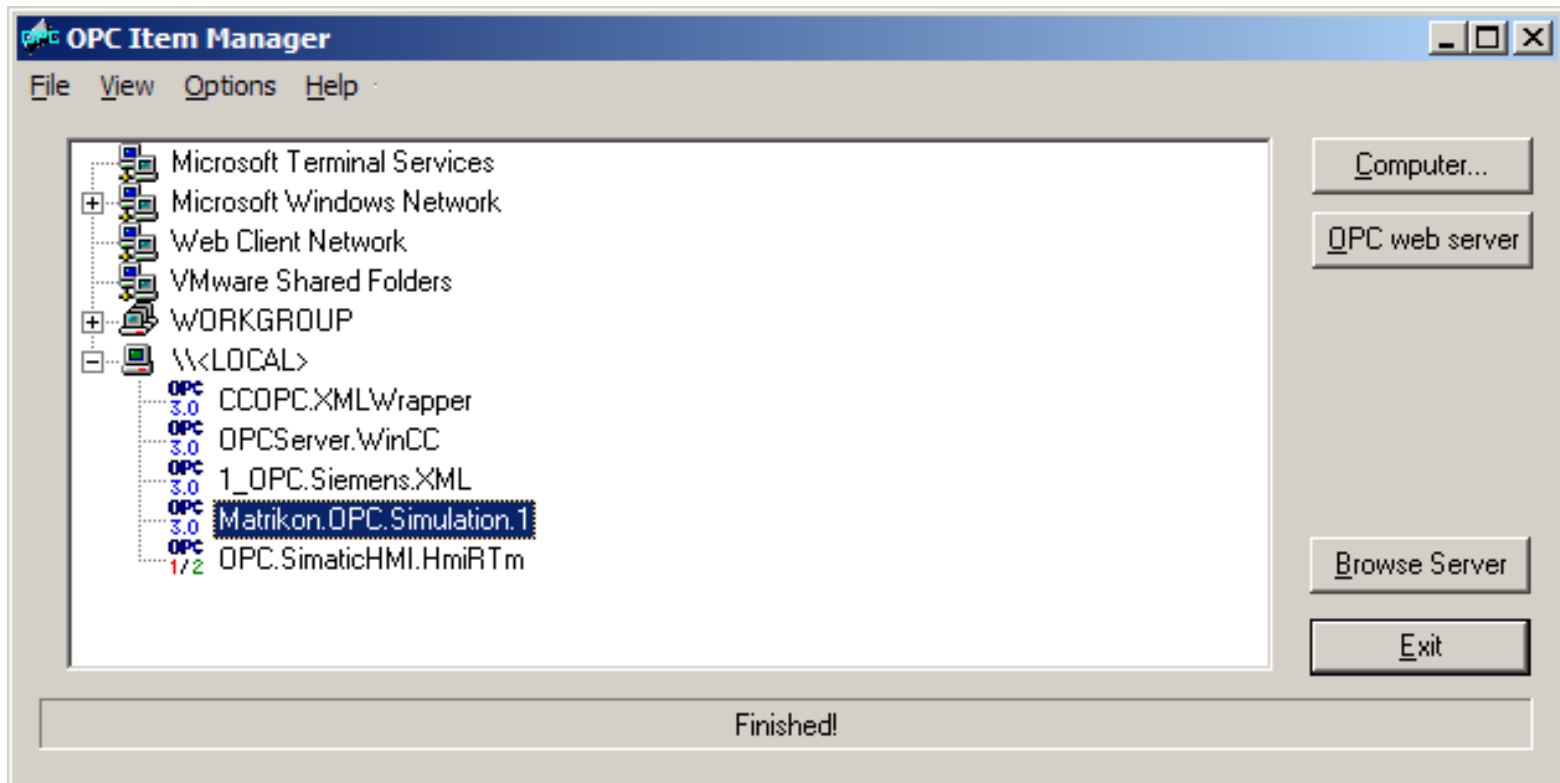
# WinCC Driver



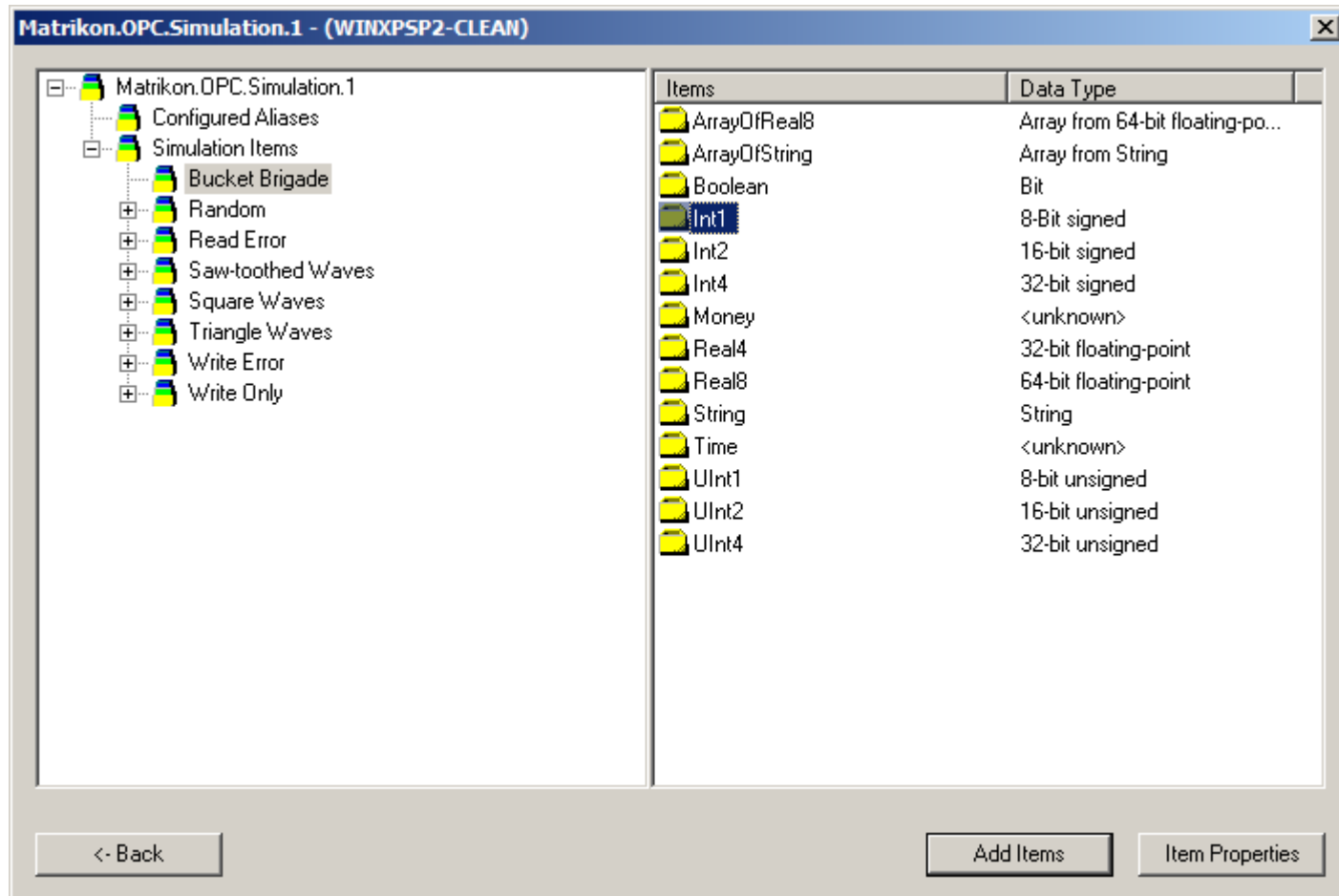
# Izbor OPC Servera



# Povezivanje sa serverom



# Formiranje Grupe i dodavanje Item-a



# WinCC kao OPC Server

The screenshot displays the MatrikonOPC Explorer interface. The left pane shows a tree view of the OPC server hierarchy. The right pane shows the contents of 'Grupa1', which includes a single item 'WinCCInternal' with a value of 12. The bottom section provides server and group information.

**MatrikonOPC Explorer - [Untitled\*]**

File Server Group Item View Help

Grupa1

- Localhost '\\WINXPSP2-CLEAN'
- 1\_OPC.Siemens.XML
- CCOPC.XMLWrapper
- Matrikon.OPC.Simulation.1
  - Grupa
- OPC.SimaticHMI.HmiRTm
- OPCServer.WinCC
  - Grupa1
- OPCServerAE.WinCC.1
- OPCServerHDA.WinCC.1
- Network Neighborhood
- Other Network Computers

**Contents of 'Grupa1'**

Item ID	Access Path	Value	Quality	Timestamp
WinCCInternal		12	Good, non-spec...	01/11/2011 11:46:03.267...

**Server Info**

Server: OPCServer.WinCC

Connected: Yes

State: Running

Groups: 1

Total Items: 1

Current Local Time: 01/11/2011 11:57:50.580 AM

Update Local Time: 01/11/2011 11:46:03.923 AM

**Group Info**

Group: Grupa1

Connected (Async I/O): Yes (2.0)

Active: Yes

Items: 1

Current Update Rate: 1000 ms

Percent Deadband: 0.00%

Data Change Rate: 0.00 Items/Sec

**MatrikonOPC eLearning**  
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# WinCC Flexible - Connection

UNLICENSED VERSION - WinCC flexible 2004 Advanced - Project.hmi

Project Edit View Insert Format Faceplates Options Window Help

English (United States)

**Project**

- Project
  - Device\_1(MP 370 15" Touch)
    - Screens
      - Add Screen
      - Template
      - Screen\_1
    - Communication
      - Tags
      - Connections
      - Cycles
    - Alarm Management
      - Analog Alarms
      - Discrete Alarms
      - Settings
    - Recipes
    - Historical Data
    - Scripts
    - Reports
    - Text and Graphics Lists
    - Runtime User Administration
    - Device Settings
      - Device Settings
      - Languages and Fonts
      - Screen Navigation
      - Navigation Control Settings
      - Scheduler
    - Language Settings
    - Project Languages
      - Graphics
      - Project Texts
      - Dictionaries
    - Version Management

**Connections**

Name	Communication driver	Online	Comment
Matrikon	OPC	On	
WinCC	OPC	On	

**Parameters** Area pointer

MP 370 15" Touch

Interface

OPC

**Device OPC client**

Only PCs could be an OPC client for remote OPC servers

Station

**Device OPC server**

OPC server name

OPCServer.WinCC

Remote computer name

OPC Server

- Local Server
  - Matrikon.OPC.Simulation
  - 1\_OPC.Siemens.XML
  - OPCServer.WinCC
  - CCOPC.XMLWrapper
  - OPC.SimaticHMI.HmiRTm



# WinCC Flexible Tags

UNLICENSED VERSION - WinCC flexible 2004 Advanced - Project.hmi

Project Edit View Insert Format Faceplates Options Window Help

English (United States)

Project

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      - Reports
      - Text and Graphics Lists
      - Runtime User Administration
      - Device Settings
        - Device Settings and Fonts
        - Screen Navigation
        - Navigation Control Settings
        - Scheduler
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Screen\_1 Device Settings Tags Connections

## TAGS

Name	Connection	Data type	Symbol	Address	Array count	Acquisition cycle	Comment
Tag_1	Matrikon	Double	Triangle Waves.Real8	Triangle Waves.Real8	1	1 s	
Tag_2	<Internal tag>	Long	<Undefined>	<No address>	1	1 s	
Tag_3	Matrikon	Char	Triangle Waves.Int1	Triangle Waves.Int1	1	1 s	
Tag_4	WinCC	Char	WinCCInternal	WinCCInternal	1	1 s	

Address Space

- OPCServer.WinCC
  - @LOCALMACHINE::
    - Internal tags
      - Script
      - TagLoggingRt
      - List of all structure instance
      - List of all tags
      - OPC

Item	Canonical Data Type	Access Rights	ItemID
@ConnectedRTClient	unsigned short(VT_UI2)	Read/Writeable	@ConnectedRTClients
@CurrentUser	OLE Automation string	Read/Writeable	@CurrentUser
@CurrentUserName	OLE Automation string	Read/Writeable	@CurrentUserName
@DataSourceNameRT	OLE Automation string	Read/Writeable	@DataSourceNameRT
@DeltaLoaded	unsigned int(VT_UI4)	Read/Writeable	@DeltaLoaded
@LocalMachineName	OLE Automation string	Read/Writeable	@LocalMachineName
@RedundantServer	unsigned short(VT_UI2)	Read/Writeable	@RedundantServerSt...
@SCRIPT_COUNT_...	unsigned int(VT_UI4)	Read/Writeable	@SCRIPT_COUNT_A...
@SCRIPT_COUNT_...	unsigned int(VT_UI4)	Read/Writeable	@SCRIPT_COUNT_RE...
@SCRIPT_COUNT_...	unsigned int(VT_UI4)	Read/Writeable	@SCRIPT_COUNT_TA...
@ServerName	OLE Automation string	Read/Writeable	@ServerName
@TLGRT_AVERAGE...	8 byte real(VT_R8)	Read/Writeable	@TLGRT_AVERAGE_T...
@TLGRT_SIZEOF...	8 byte real(VT_R8)	Read/Writeable	@TLGRT_SIZEOF_NLL...
@TLGRT_SIZEOF...	8 byte real(VT_R8)	Read/Writeable	@TLGRT_SIZEOF_NO...
@TLGRT_TAGS_PE...	8 byte real(VT_R8)	Read/Writeable	@TLGRT_TAGS_PER...
Int1	signed char(VT_I1)	Read/Writeable	Int1
WinCCInternal	signed char(VT_I1)	Read/Writeable	WinCCInternal

Properties

# Ostali OPC Server

- Omron
- Intellution IFIX
- Fanuc
- Wonderware
- National Instruments

OPC kurs – čas 4  
Pritup veličinama preko OPC DA

Srđan Vukmirović

# Sadržaj 4. časa

- Kako prisupiti veličinama iz WinCC
- Izmena vrednosti veličine
- Očitavanje vrednosti veličina
- Excel klijent

# VB klijent za pristup veličinama

- Visual Basic je jednostavan za upotrebu i pristupačan
- Fleksibilan je i lak za kontrolu
- Nije objektno orijentisan
- Interpreter je i lako se integriše u druge proizvode
- Podrzan od strane: Word, Excel, IFix, Omron, Siemens i mnogi drugi

# Korak 1: povezivanje sa serverom

```
Dim server As OPCServer  
Set server = New OPCServer  
server.Connect "Matrikon.OPC.Simulation"
```

## Korak 2: Formiranje grupe

```
Dim grupa As OPCGroup  
Set grupa = server.OPCGroups.Add("NovaGrupa")
```

# Korak 3: Dodavanje Item-a

```
With grupa.OPCItems
    Set Item = .AddItem("Random.Real.8", 1)
    Set Item = .AddItem("Random.Real.4", 2)
    Set Item = .AddItem("Random.Real.2", 3)
End With
```

# Korak 3: Očitavanje veličina

```
Dim srvHandle() As Long
Dim Values() As Variant
Dim Err() As Long
ReDim srvHandle(grupa.OPCItems.Count)

For i = 1 To grupa.OPCItems.Count
    srvHandle(i) = grupa.OPCItems.Item(i).ServerHandle
Next i

Source = 1
grupa.SyncRead Source, grupa.OPCItems.Count, srvHandle, Values, Err
```

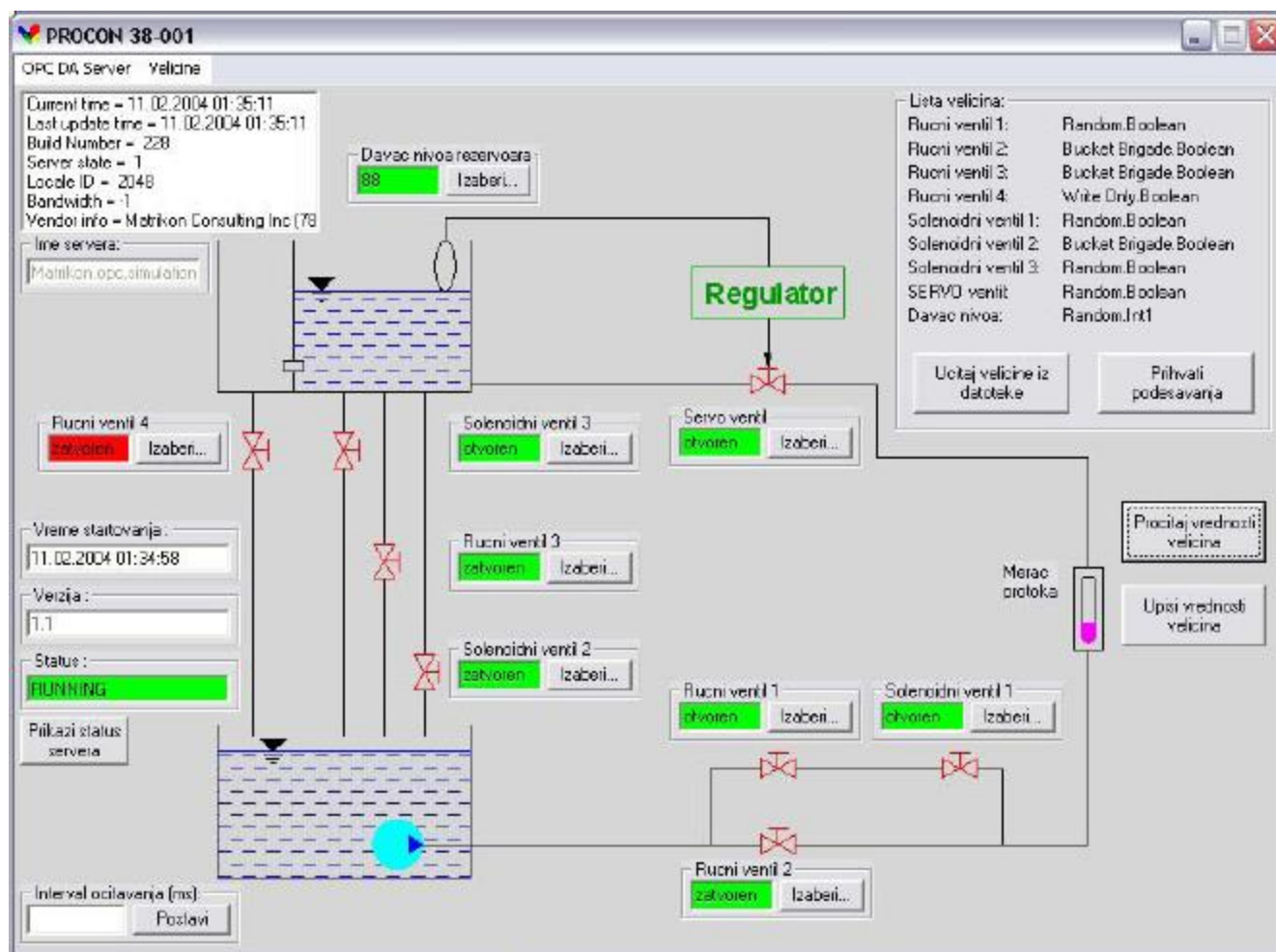


# Korak 4: Izmena veličina

```
i = Values(1)

Values(1) = 1
Values(2) = 2
Values(3) = 3
grupa.SyncWrite grupa.OPCItems.Count, srvHandle, Values, Err
```

# Aplikacija za pritup veličinama



Pitanja?

Praktičan rad