

# Features

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Version 3.0 (RC1)

**PVSS II**<sup>®</sup>  
by ETM

# Key Objectives



- Increasing of **performance** and **optimizations**
- Reduction of **memory** requirements
- Improved **fault tolerance** and **stability**
- **Simplification** of parameterization
- Improved **redundancy** configuration
- Reengineering of **distributed systems**
- Improved **quality standards**

# Performance & Resources



- Increased archiving performance for the **value archives**
- Increased archiving performance for the **alarm archives**
- Reduced **start-up** time (System start)
- Increased **engineering** performance (ASCII-Manager-Input)
- Reduced memory consumption (Configs, identification,...)

# Fault Tolerance and Stability



- Improved overload handling
  - » Detection of load source, classification of load, alive monitoring
  - » Short temporary overloads will be buffered as before and processed without loss of events
  - » Longterm overloads will lead to intelligent data discarding
- Detection of **parameterization faults**
  - » Query Limits in time and size
- **Telegram verification**
  - » Non-PVSS telegrams (Port scans etc.) are rejected in advance

# Redundancy



- Significantly simplified **parameterization**
- Accelerated **redundancy replication**
- Increased **operability** during replication
- **Redundant network connections** (LAN) between all PVSS II managers
  - » Two network interface cards / two logic networks
  - » Internal alive monitoring and automated hand-over
  - » Eg.: UI-Event, Event-Driver, Event-Event, Dist-Dist



- New operating mode: **SPLIT MODE**
  - » Splitting up a redundant server pair into two single systems for testing purposes (Leading system / test system)
  - » Remote user interfaces can choose which server to connect
  - » Automatic return to redundancy based on the selected system (Leading or testing system)
- New Panel: **System Overview**
  - » Single systems, distributed systems, redundant systems as well as mixed systems can be monitored
  - » The fault state is calculated first on initialization and actualized continuously (optimal state is 0)
  - » All managers, TCP connections, selected datapoint elements, RAM and hard disk capacity will be monitored

# System Overview Panel



PVSS: System overview

sysL1\_1 sysL2\_2

1 2 3

pcitco94

RAM 63.0%

61.0%

Errorstate

OK

DM EM

Archive	CTRL and other	Driver	Dist
0 ValueArchive_0000	2 archiv_client.ctl, alertHorn.c	1 SIM	2 sysL2_2
1 01) 5 minutes archive			1 sysL1_1
2 02) Hour archive			
3 03) Day archive			
4 04) Command archive			
5 05) State archive			

Current user: root Thursday 22.01.2004 6:23:38 PM Windows User Interface #2 (PCITCO91), sysL1\_1:

# Distributed Systems



- Entirely new **core technology**
- Significantly simplified **parameterization**
- Applicable for **more than 100 systems**
- Reduced **memory consumption**
- Selection for which managers a **remote identification** is requested
- Managers in between are only „**routing**“ messages – no hotlink administration
- **Datapoint types** may be **different** on all systems
- **Redundant networks** possible also between Dist-Managers, alive telegrams



# Quality Optimization



- **Code reviews**, optimizations
- Expansion of **testing division** at ETM
- Massive extension of **automated standard tests**:
  - » Automated background tests (daily)
  - » Automated surface tests (Rational Robot)
- New **bug feature tracking** system / close integration with source code administration
- Intensive **cooperation** with test and design crew at **CERN**
- Release in **three stages**
  - » **Pre-Beta** (almost 2 months)
  - » Expanded **Beta** phase (more than 7 months)

# Numerous New Features



- User interface
- Archiving
- User security / FDA Compliance
- Network management
- OPC Alarms&Events
- Drivers
- Licensing

# Remote Installation UI (Windows)



- Installation of a remote PVSS II **user interface** without a CD-ROM via WEB access
- Target computer opens a browser and requests a client UI from an HTTP site (SCADA server)
- **No access to file system** required, communication via 2 TCP ports
- Automated **installation**
- User interface may run in a **browser** (Internet Explorer)
- **Automated update** after changes (of the server system / application)
- **Low administration effort**

# New Alarms & Event Screen



- **Split-Screen:** Two separate resizable table areas
- New graphical **representation** (text color, font style, several different font styles within one row)
- Freely adjustable **column order and visibility**
- **Freely extendable:** New columns definable, formatting of alert attributes, calculation of new information (integration of own DLL's)

# Enhanced Trending



- **Zooming** of trend area with the mouse (dragging)
- Reduced **space for scales**
- **Background color** for scale and trend area adjustable separately
- Enhanced **scale inscription** (even time indications, font adaption, ...)
- **Context menu** on Trend
- **Logarithmic scales**



- **User authorisation from Windows**
- **Automatic logout after inactivity**
- **Cyclic authorisation**
- **Command logging**
- **Audit-Trail** (List reporting of all commands and system events)

# Manager Monitoring



- Console/Service/pv2mon are replaced by background process: „**PMON – Process Monitor**“ (Linux & Windows)
- Clear separation between **process supervision** and project administration
- **Administration interface** now also implemented as PVSS II panels
- PMON provides **SNMP** and **HTTP-Interface**
- Project status also requestable from a standard **WEB browser**
- New powerful **LogViewer**

- **Project administration panel provides an overview** of currently existing PVSS II projects
- **Several functions** make the handling of PVSS II projects easier
  - » Extraction of **hardware code**
  - » **Registration** of projects
  - » **Copying** of projects (with/without registration)
  - » ...
- **Revised Console** panel
  - » Automatically assigned **manager numbers**
  - » Representation of **manager status**
  - » **Protection** against changes
  - » ...



# Database and Interfacing



- Extensions to **Mass Parametrization**
  - » Revision, more PowerConfigs, representation in PARA
  - » New format V4 (1 DPE per line)
- CTRL-ADO compliant **database access on LINUX:**
  - » Native interfaces for Oracle, MySQL, UNIX-ODBC
- **Information-Server** supports MySQL (in addition to Oracle, MS-SQL-Server and Access)

# Database and Interfacing



- Extensions to **OLE-DB Provider**
  - » OLE-DB access to alarms
  - » OLE-DB access to identification data (description, unit, format ...)
  - » Secure communication independent from DCOM!
  - » Prioritization of queries



- **Timer for**
  - » Day and week programs, all possibilities of timedFunc()
  - » Periodic tasks, singular tasks, time lists
- **Reaction programs**
  - » Automatic reactions to value changes
- **Executable actions**
  - » Set a datapoint element, value change of a list of DPE
  - » Activation of a recipe
  - » Execution of a control script
  - » Reminder alarm, reminder popup
- **Easy to use graphical user interface**
- **Holiday program / special days list**



- True online **language switch**
- Pure **server licensing**
- **Dongle** (Windows) or hardware dependent **software key**
- **Port-Scan-Security**
- **IP access control lists** for all managers possible  
(It can be defined which computers are allowed to communicate with PVSS, wildcard definitions possible)
- Enlarged **WMF library** (400+ scaleable, vector oriented illustrations concerning automation)
- **Rotation** of WMFs and BMPs at runtime



- Several **new features in table** (cell colors, font settings,...)
- “**EventSelectionChanged**“ indicates tab change
- **Enable / Disable**: graphics modified automatically
- **Preview** in file selector in Native Gedi (.pnl, .gif, .bmp, .wmf)
- **Handling of large panels** improved (own GDI object handling)
- **Sequenical loading** of panels (Decluttering)
- Trackable **size** and (**pixel**) **position** of a module
- **Modul size != panel size**

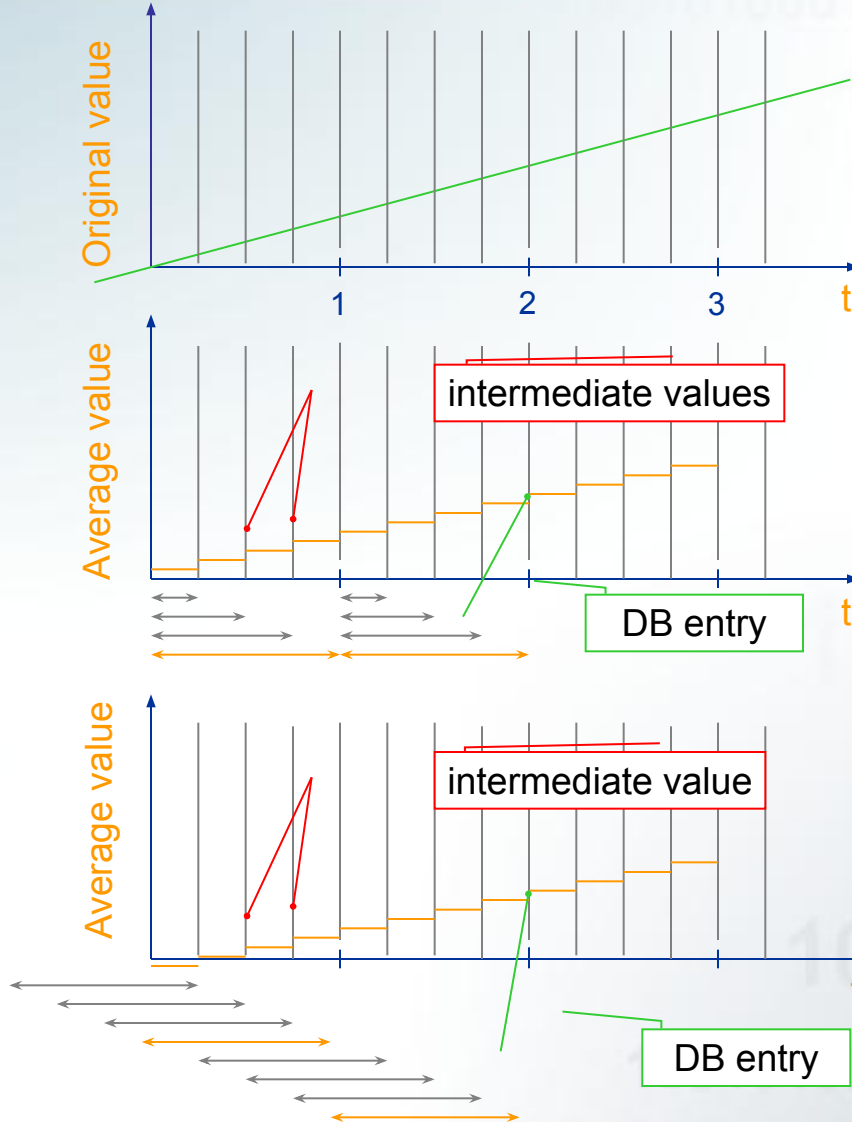


- **Backtracking of sum alerts** (Detect the triggering alarm)
- Maximal number of managers: **254**
- Transforming IP address  $\leftrightarrow$  computer name (**DNS**)
- **Error handler discards multiple repeats** of the same error message (decreases needless flow of messages (LogViewer))
- **Load statement** for libraries in Ctrl (*#uses "myNewCtrlLib.ctl"*)
- **shield.txt** (not only *shield* without an extension) will be identified too



- **Floating calculation** of statistical datapoint functions
  - » “intermediate value“ to a main interval
  - » Calculation over the period of a main interval starting from points in time that lie between
  - » E.g.: Calculation of an hourly value (e.g.: average value) in each case at the full quarter of an hour for the previous hour. Only the values that are calculated on the full hour will be archived.
  - » This new method can be used alternatively to the already applicable “calculation of intermediate values“ for the considered interval (fixed time slot)

# Miscellaneous



- Statistical datapoint function calculates the statistic parameter of each main interval (e.g. 1 hour).
- Statistical datapoint functions allow to calculate intermediate values (e.g. 15 minute intervals) during a main interval.
- The intermediate values will not be stored in the database.
- The database entry will only be done at the end of the main interval (e.g. 1 hour).

- New functionality: **FLOATING CALCULATION**
- Within the main interval floating intervals will be calculated for a full interval period (e.g. every 15 minutes for the full previous hour).
- The calculation period (constant) for intermediate values is exactly that of the main interval (e.g. 1 hour)
- Floating calculated intermediate values will not be stored in the database.



# Miscellaneous



- **Areas** extends user authorization concept
- **Translator tool:** comfortable user interface for translating a project (incl. dictionary function)
- New **smoothing-method:** % of the previous value



- **Hierarchy** of config files
  - » *config.level* for the project overall settings, e.g. *loadCtrlLibs*
  - » *config.redu* for (project overall) redundancy settings, e.g. *FwdDp, copyDP*
  - » *config.<platform>* for (project overall) platform specific settings, e.g. *FontMapping*
- **Consistent parameterization** of manager connections
  - » Format is always „*host1-1, host1-2:port\$...*“
  - » Data and Event can be parameterized as *data = ...* resp. *event = ...*
- All **connection states** will be stored in the datapoint type *\_ManagerConnections*

# Miscellaneous



- **Registration** has been adjusted (progs file)
- New **command line options** for PVSS00NV and PVSS00ui
  - » -centered
  - » -projAdmin
  - » -console



- **New data types**
  - » *mixed* – is equivalent to *anytype*, but adopts the data type newly on each assignment.
  - » *mapping* – Associative arrays, includes pairs of keys (e.g. string) and values.
- New possibilities to **declare variables** (similar to C++)
- **CTRL functions** can have a variable number of parameters
- **Waiting CTRL functions** (e.g. `dpGet()`) can be used in nested functions calls



## ■ Project administration

- » **paRegProj()**
- » paGetProjs()
- » paGetProjAttr()
- » paSetProjAttr()
- » paGetProjRemoteInstallable()
- » paSetProjRemoteInstallable()
- » **paGetProjRunnable()**
- » paSetProjRunnable()
- » paMkRemProjName()
- » paSplitRemProjName()
- » palsValidProj()
- » palsValidProj()
- » **paCheckProj()**
- » **paDelProj()**
- » paProjName2Path()
- » paProjName2InstallDir()
- » paProjInstallDir2Name()
- » paGetSubProjs()
- » paSetSubProjs()
- » paGetSuperProjs()
- » paCreateProj()
- » paUpdateProj()
- » **paCopyProj()**



- Handling of the **config file**
  - » **paCfgReadValue()** – Reads a value that refers to a key in a section.
  - » **paCfgReadValueDflt()** – Reading with default value, if the key does not exist.
  - » **paCfgReadValueList ()** – Reads all values of a key which occurs more than one time.
  - » **paCfgDeleteValue()** – Deletes all entries of the defined key or key/value pair in a section.
  - » **paCfgInsertValue()** – Adds a key/value pair in the defined section of the config file.
  - » **paCfgReplaceValue()** – Replaces the value in all key/value pairs that are equal to the defined one.
  - » **paCfgDeleteSection()** – Delete the section and all keys of that specified section.
  - » **paCfgInsertSection()** – Add a new section.



- **Authorization of the operating system**
  - » **getAllOSGroups()** – Returns all groups of the current domain.
  - » **getAllOSUsers()** – Returns all users of the current domains.
  - » **getCurrentDomainName()** – Returns the current domain.
  - » **getCurrentOSUser()** – Returns the user name, the full name, the description and the user group of the current Windows user.
  - » **getWindowsEvents()** – Returns the requested Windows actions.
  - » **verifyOSUser()** – Proves if a user account is locked or not.



- File handling
  - » **remove()** – Deletes the file or the directory
  - » **rename()** – Renames the file or the directory
- Stops a manager
  - » **exit()** – Closes a manager via CTRL
- SMS via GSM
  - » **sendSMS()** – Sends a SMS message
  - » **readSMS()** – reads a SMS message
- Trend
  - » **curveScaleBackCol()** – This function enables to change the background color of the y-axis scale.





- IP conversion
  - » **getHostName()** – Returns the IP address of the specified host name.
  - » **getHostByAddr()** – Returns the host name of the specified IP address.
- UI, CTRL, DP
  - » **emSendMail()** – Function for sending e-mails via SMTP. Several recipients can be addressed.
  - » **nameCheck()** – Replaces the function *dpNameCheck()*. Traces the name of a datapoint etc. and checks if it contains only permitted characters.
  - » **makeDynAnytype()** – Returns a *dyn\_anytype* with *n* elements.
  - » **startSound()** – Works for Linux also.
  - » **stopSound()** – Works for Linux also.
  - » **isConnOpen()** – Checks if the connection to a manager exists.



- UI, CTRL
  - » **popupMessage()** – Opens a pop-up on a user-defined UI
  - » **dpTypeGet()** – Returns the structure of a datapoint type.
  - » **getScreenSize()** – Returns the current size of the screen.
  - » **switchLang()** – Performs the online language switch.
- UI
  - » **ModuleOnWithPanel()** – If used with  $x = -1$  and  $y = -1$  in the UI the panel will be opened centered.
  - » **myDisplayName()** – Returns the display name.
  - » **moduleOff()** – Closes a module without a connection to the Event-Manager.
  - » **moduleOn()** – Opens a module without connection to the Event-Manager and opens the specified root panel (in the defined size) immediately.



- After successful Data-Access now the new **standard to perform central alarm management independent from manufacturer**
- **PVSS II OPC A&E Server**
  - » PVSS provides alarm data to a superior third-party system and “reading” of acknowledgements from them
- **PVSS II OPC A&E Client**
  - » Subordinated systems providing alarm data into PVSS II – they will be centrally displayed (Transmission of acknowledgements to the sub-systems)
- Consistent displays on all hierarchy levels – **regardless of where the acknowledgement has been done**



- **Simple Network Management Protocol for monitoring** of devices and applications in the **network**
- **Manager SNMP V2, agent SNMP V3**
- PVSS II is **able to provide** its own state information (like a device)
- PVSS II can do **network monitoring** for other devices and systems
- Analysis and response to recognized errors are directly done by the process-control system
- **Access security** through V3



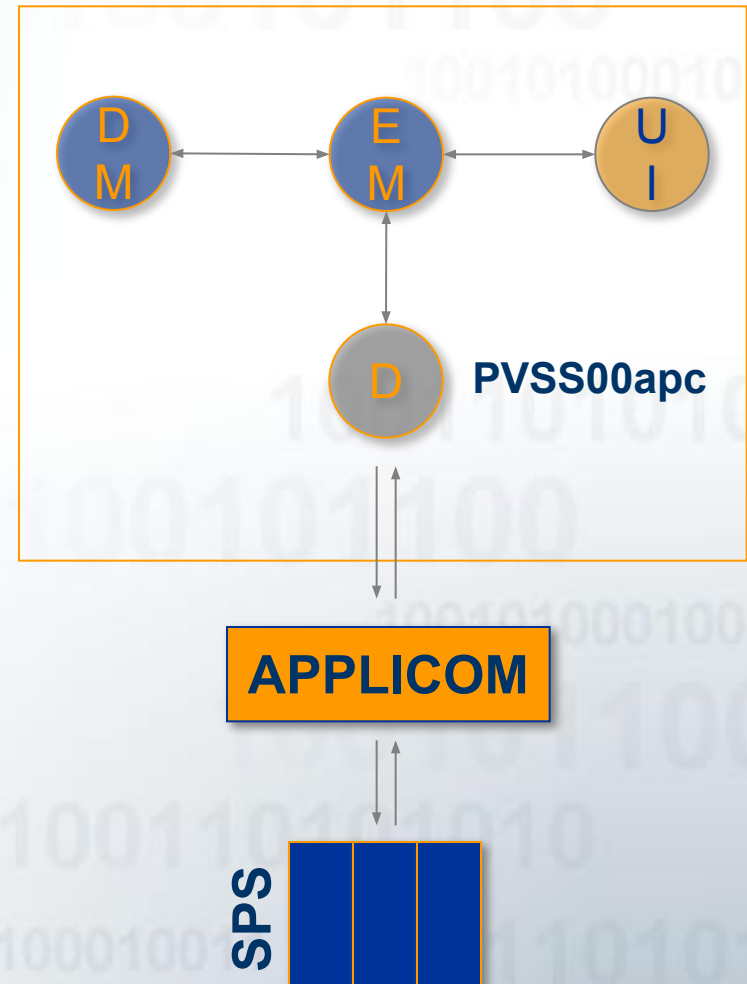
- In addition to “input” and “output” “**bidirectional**” data direction is possible as well
- **Transition bit** for immediate command display in the UI with command control
  - » If a command is set in the UI, it will be taken over into the process image with the note „IN TRANSITION“ – the transition bit will not be deleted until the same value has been received mirrored.
  - » If the command does not return mirrored, the value in the process image falls back into the previous state - the command setting has failed.
- All cyclic drivers can work with unified **polling groups**

# Drivers - Applicom



- **Applicom** Common Driver Interface for Windows and Linux
  - » Profibus DP (Master/Slave), Profibus FMS, S7 Communications
  - » Siemens S7 Industrial Ethernet, ISO, ...
  - » Siemens MPI, RK512/3964R
  - » Schneider Modicon: Modbus TCP, Ethway
  - » Allen Bradley: Ethernet

## PVSS II



# Driver Optimization



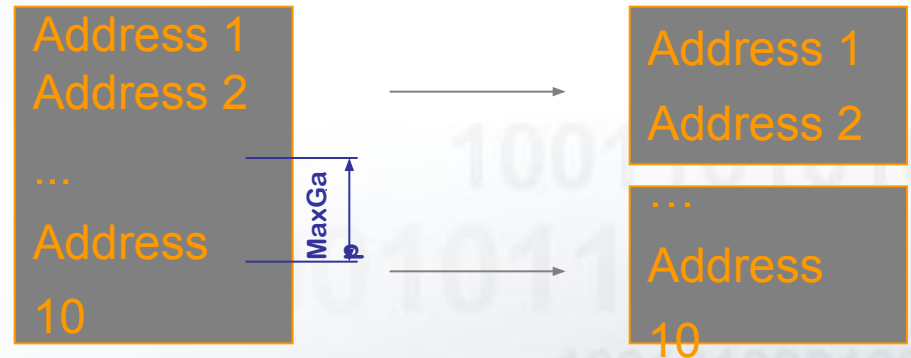
- Data blocking

## 1 Block



Address gap  $\leq$  MaxGap

## 2 Blocks



Address gap  $>$  MaxGap

## PVSS II Report 3.3



- **Spontaneous triggering** of report generation directly out of PVSS II
- **Signature** of the protocol by the inducing user
- **Charge protocols**
- **Tracing of changes** in protocols with input option into XLS-File (Audit-Trail)



# XML for process mimics (panels)



- **Import and Export** of graphical user interfaces (**panels**) in **XML-Format**
- **Integrated in Native Gedi**
- **Command line usable**

## Final version only:



- **Remote user-interfaces:** the identification (loaded on start-up of any manager) can be locally stored on a file. This speeds up the start-up of a user interface especially on slow connections.
- **Know-How-Protection** for partners: encrypted Control libraries and runtime scripts with own license protection
- **Emergency licensing**
- **New Alarm&EventScreen (Included but "under construction")**
- **Remote Installation (Included but "under construction")**

# Next steps



- Beta release:  
**August 22<sup>nd</sup>, 2003**
- Release Candidate :  
**December 5<sup>th</sup>, 2003**
- Final release  
**March 26<sup>th</sup>, 2004**

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