Six things you need to know about Automation Platform.NExT™
Progea presents Automation Platform.NExT™ technology, the next generation platform software for all automation systems.

When starting the Automation Platform.NExT™ project, Progea had something new in mind. They wanted to create a solution that would anticipate the future. They were not thinking of the usual Movicon 11 technology evolution, but something more ambitious, something that would redesign the concepts of automation platform software. What they wanted to achieve may have seemed too new and unexplored terrain when the project hit the drawing board. However, after four years the final result is now ready to change the market with a better way to create and distribute data collection applications (Data Server and Historian) for supervision (SCADA) and operator interfaces (HMI) based on cutting edge and innovative architecture. It is undeniably a revolutionary technology based on the most recent innovations in the IT sector and aligns with the criteria set out in the Industry 4.0.
The software technology designed by Progea exceeds all the expectations of today’s automation design engineers. Progea wanted to develop a modular platform that would guarantee the scalability to modern automation systems and openness that is essential to customizing software systems to the needs of customers who operate in sectors that differ considerably from each other such as manufacturers, energy, oil&gas, water and wastewater, pharmacy, food and beverage sector.

Automation Platform.NExT ™ offers an intuitive configuration environment that enables development of even the most complex projects. This also includes those projects that integrate functional system modules or those designed by third parties that are also easy to insert in the platform. Configuration, communication, visualization, recording, analysis, security, control, enterprise-wide information distribution along with local and geographical distributed data are all available in one unique platform that offers the advantages of total integration with plug-in modularity.

Let’s take a look at the 6 key technological foundations for the software.
Know the six key issues concerning Automation Platform.NExT™

There are many advantages offered by the Automation Platform.NExT™ technology. This is not just another supervisor designed to have the same capabilities. It is all about new technologies that create the foundations for architecture technology of tomorrow’s world.

It is like deciding to buy a hybrid or an electric car: at the end of the day its main purpose is to get you to and from work using the same route every day. However what makes the difference is that you will be using a completely new technology that will enable you able to cover more ground with the amount of resources you consume. What’s more you are contributing to an improved future in terms of both technology and eco-sustainably not to mention pride of ownership. Worth it don’t you think?

Let’s look at six key issues that have emerged in software automation technology and have impact on your business:

1. Why use OPC UA technology?
2. Why use the new generation of WPF and XAML graphics?
3. Why use the SQL Database and Cloud Computing?
4. Why use Plant Intelligence with Charts and Reports over the web?
5. Why have a working environment with security and a plug-in framework?
6. Why use the Web Client HTML5 technology?
The first successful OPC standard – OPC Data Access – was designed to enable read and write access to process data using a client/server interface. This standard was particularly aimed at those HMI and SCADA systems where automation hardware devices of different makes could communicate using one unique software interface. OPC has vastly spread worldwide to now become the interface standard for automation systems at multiple levels of the automation pyramid. It is also used in a multitude of application areas for which it was not originally designed. However OPC-DA suffers because it is dependent on COM and is limited in the mechanisms it uses for remote access which is provided by DCOM. Equipped with this knowledge OPC XML-DA was then created by maintaining the fundamental characteristics of OPC but using a communication infrastructure that was not restricted to a particular producer or a particular software platform type. However, the OPC XML-DA specifications that replaced those of the OPC-DA for software platform versions with Web-based services did not satisfy the requirements needed for the next generation standard technology. Automation control needed faster performance than XML could offer that was also more reliable and secure for network communication. OPC Foundation therefore decided to invest heavily in creating the foundations for a new standard, a communication model that could handle communication requirements and interoperability, concepts which are adopted by the Industry 4.0. They proposed the **OPC Unified Architecture (OPC-UA)**, which results from the objective to create an authentic substitute of all the COM-based versions without jeopardizing functionality and without any problems with security and performance efficiency. It satisfies the need to be platform interface independent and enables rich and extensible data models to be created for describing complex systems.
Interoperability and Openness with OPC UA

The Automation Platform.NExT™ Client-Server has been designed by Progea to guarantee the maximum robustness, openness and interoperability, security and performances. It is for this reason that the platform’s Information Model is totally based on and integrated with OPC UA.

This scheme illustrates the Platform.NExT architecture

The platform is therefore built with a Framework.NET, with the Plug In technology to enable simple and cooperative management of the function models which constitute the Progea platform suite. At the same time these models are totally open to third party models that can be easily integrated to create a basis for an open and flexible automation platform while keeping your investments protected.

The key framework components include the Data Server (I/O Server) and the HMI Client (Movicon.NExT), which communicate by means of the address space in the OPC UA data model to enable openness and independence. For example, the Movicon.NExT™ client can also connect directly to other OPC UA Servers, or the platform’s Data Servers can connect to other OPC UA software, both Client and Server, whether local or by remote control.
I/O Data Server

In order to ensure these requirements the platform is based on a robust and reliable data server that can be viewed and used as a service and an independent application. The server performs all the platforms basic tasks:

1. Communicates with the field devices using the OPC UA Client and Server technology, at both field and managerial levels.
2. Communicates by means of using the I/O Server with specific protocols.
3. Manages the Alarms, including data logging, notifications and statistics.
4. Manages Historians in Relational DB or Cloud
5. Manages control logic
6. Manages Events and Commands

All data managed by the server is available in the Address Space to all Movicon.NExT™ Clients and any other OPC UA Client applications.

Platform.NExT supports all the OPC UA specifications: Data Access (DA), Alarms & Conditions (A&C) and Historical Access (HA).

This architecture ensures maximum interoperability and transparency to create robust and safe applications both local and distributed with full third party interoperability as well. Users get an open and flexible automation system based on standard and future-proof architecture to safeguard the investment.

Requirements satisfied with OPC-UA:

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Why use OPC UA?

The OPC UA technology is not only the exchanging of data between client and server but the essence of the interoperability and connectivity principles of factory information that forms the basis of the Industry 4.0 concepts.

Security and performance are the pillars of the OPC UA cross-platform concept to permit the integration of OPC UA servers by being directly embedded within control devices.

In addition, the OPC UA specification was developed in collaboration with PLCopen to create a standard data model with IEC61131-3 programming. This was not the only thing that happened. In April 2014 additional OPC UA functionalities were defined in IEC61131-3 controller function blocks which transformed the controllers into intelligent units in factory IT communication. This improved and simplified access to data at all levels whether intermediate (SCADA/HMI) or at the apex of the pyramid (MES/ERP). For instance, each device or service within an “intelligent” network must be capable of starting communications and responding to the specific requirements of the other services.

A device (OPC UA Server) can then exchange complex data structures, in vertical and horizontal mode, with other devices connected to the same “intelligent” network from the lowest to the highest level of the IT pyramid structure both locally, over the internet and cloud. This meets the criteria set out by the Industry 4.0 and Internet of Things (IOT), which are predicted as the future architecture requirements of next generation integrated systems.

Let’s picture a production line, for example, with machines of various types made by different companies that can communicate with each other in a client-server network and not only this. A higher level system or service would be able to invoke a method (a supervisor towards the machines, a MES managerial system towards the supervisor or the actual machines) to activate a production recipe with such efficiency like making just one call to exchange diverse input and output parameters. The cross-platform and integrated security specification concepts guarantee maximum interoperability and security at all levels both locally and geographically distributed.

Performances and Security

Basically OPC UA supports two types of protocol that are totally transparent to the user and API: the opc.tcp://Server binary protocol and the Web Service http://Server protocol. The binary protocol offers excellent performances and requires the minimum of resources which is a major factor for embedded devices and field controllers. It also offers the best interoperability (the binary is
explicitly specified) and uses a single TCP port specified to facilitate communications through firewalls. The Web Service (SOAP) protocol is best supported in the more complex systems (e.g. NET or JAVA) and is firewall-friendly. It uses the http/https port standard and guarantees maximum security when using SSL, TLS and AES as well.

**The IEC 62541 standard**

The OPC UA technology is a standard communication specification, defined by the International Electrotechnical Commission (IEC) with the **IEC 62541 standard**. This proposes greater propagation and adoption of the specification by those who want to make their information available to third parties according to a secure, reliable and modern standard.

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**What about direct drivers?**

As mentioned above the platform is based on a technological infrastructure that uses the OPC UA standard Information Model. It does not leave out the **native I/O Drivers, the direct communication protocols** towards the most popular devices on the market (e.g. Modbus, Siemens, Rockwell, Mitsubishi, Omron, Profibus, Profinet, BACNet, KNX and others). In addition, users are provided with a **SDK for developing I/O drivers** with custom protocols, allowing them to integrate the platform with their own drivers.

This means that users can communicate by means of using the OPC UA standard or direct I/O drivers indifferently and simultaneously according to their project needs.

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**Eelco von der Wal,**
Managing Director of PLCopen:

"Communication is not about data. Communication is about information and access to that in an easy and secure way. This is what the cooperation PLCopen and OPC Foundation is all about. OPC UA technology creates the possibility for a transparent communication independent of the network, which is the foundation for a new communication age in industrial control."
Exceptional next generation graphics based on WPF and XAML

Windows Presentation Foundation (WPF) is the next generation of Microsoft Windows graphics that uses a **vector graphics-rendering** engine. It is independent from the resolution so therefore takes full advantage of the modern graphics and Direct X hardware components. In addition to this core feature, **WPF** offers a complete set of application development features that include the Extensible Application Markup Language (**XAML**), controls, data association, layout, 2D and 3D graphics, animation, styles, models, documents, multimedia elements, text and typography. **WPF** is included in the Microsoft .NET Framework to enable the compilation of those applications that incorporate other elements from the .NET Framework class library.
Windows Presentation Foundation (WPF) is a user interface framework that creates detailed and interactive client applications. The WPF development platform supports a wide range of application developer features including an application model, resources, controls, graphics, layout, data association, documents and security. As WPF is a subset of the .NET Framework you may be familiar with this kind of programming experience if you have already developed applications using ASP.NET or Windows Form. The Extensible Application Markup Language (XAML) is used in the world of WPF to provide a declarative model for graphical object and application programming.

**A next generation Graphical Interface**

Device interaction is experiencing radical changes in the industrial world driven by modern user interface technology, gestuality and electronic consumer control devices that we use in our everyday lives (smartphones and multi-touch tablets). This change generates certain operator expectations of interface system functionality within the industrial ambient. It is for this reason that the Automation Platform.NExT™ platform graphics uses the most modern and innovative technology to open up a new user interface world that has never been thought possible before. **The Movicon.NExT™ Graphics Editor** is completely integrated in the platform to enable users to design and use high-level graphics libraries, without having to use external tools (e.g. Blend) or XAML know-how. The user only needs to insert drawings, objects or symbols, configure their dynamic properties and associate them with tags from the Data Server. New symbols can be created by using the Power Templates and assigning styles or importing designs from other XAML-based graphics editors.
Movicon.NExT™

The platform’s **Client** side is designated to representing data (HMI, Human Machine Interface) using screens for visualization, analysis and user interaction. The platform’s Client side is defined by Movicon.NExT™ to continue the viewer and supervisor tradition of Movicon which continues to remain the core business of Progea. Movicon.NExT™ shares the platform’s Address Space from which it acquires all the dynamic information (tags) managed by the Server. Apart from this the basic Movicon.NExT™ architecture has nothing to do with the previous Movicon technology. It is based on the new Windows graphics rendering engine in the .NET environment defined.

**Top quality Vector Graphics**

The WPF graphics is not comparable to the vector graphics of previous generations. The new rendering engine offers a variety of features such as effects, transparency, reflections, gradations, animations and colors that until now were thought impossible in an automation system. These new features offer users ways of designing their own real-time user interfaces with greater scope and usability.

**Screen resolution independency**

The Movicon.NExT™ WPF vector graphics are not only of the highest quality but guarantee independency from screen resolutions. This means that the graphics will adapt to the various screen resolutions without losing any of their high definition quality. You will find that using the zoom with the multi-touch functions to enlarge detail one of the many pleasurable experiences gained using such graphics. The BMP, PNG and JPG graphics formats are also supported along with multimedia formats for video, film clips and texts.

**Object style Application**

Separate object function and style is intrinsic to the WPF/XAML technology. This characteristic allows Movicon™ objects to be inserted and configured on screen to obtain different styles at any moment without causing any variation to their logic.
Support to 2D and 3D Graphics

**3D technology** support is one of the core new features presented by the WPF/XAML technology. The Movicon objects are not just bi-dimensional graphical elements with advanced graphics. By using the XAML technology Movicon can now host and handle 3D graphics models. Each inserted graphics model becomes a Movicon object and made dynamic according to the specific 3D animations associable to the Tag Address Space. Graphics models can also be imported in different formats, such as .3DS, to XAML. The 3D model elements or groups can be colored, positioned and rotated in space among the many other things that can be done with them.

Next generation object libraries (toolbox)

Progea has dedicated a great deal of their efforts in **redesigning the complete range of graphics libraries included with their product** to provide users with a next generation toolbox full of high impact graphics. Hundreds of objects in the form of buttons, switches, gauges, displays and much more are available with a simple click. **The libraries can be expanded by using the Style feature.**

Completely redesigned Symbol Library (Templates)

The Symbol Library has also been completely redesigned to fully use the powerful graphical features now available with the new graphics engine. Thousands of symbols are ready to use for composing the user’s own screens graphically using the standard techniques. The symbols are **centralized in a repository** but can be screen localized as well as centralized using the **cloud** technology. The graphical symbols are based on XAML and encrypted for default with invisible XAML code for security reasons. Alternatively they can be unlocked on the license to enable customization and modification. Users can
create their own symbols to then group them into new symbol categories by using the Movicon vector editor or by importing other XAML drawings created by external editors.

**Powerful and intuitive configuration**

The platform and user interface is programmed using an integrated environment designed for simplicity and intuitiveness. All the above described advanced technologies are transparent to the user. Project programming and editing is object-oriented therefore the user simply drags the desired objects onto the screen with the necessary tags and configures their properties as desired using the predisposed settings window. It couldn’t be any simpler.

**Dynamic integration with geographical maps (GEO SCADA)**

Geographical maps have become a greater necessity in supervision and control systems of distributed automation, so have been incorporated as a native feature within the new Movicon technology. The Microsoft Bing geo-localization services are used for default and therefore require internet connection. This feature can be used to display graphical objects dynamically by being geo referenced on a map visualized with full screen operativity using the zoom while maintaining full operation of the localized objects (such as operational commands, dynamic animations). Many other interactivity map functions have been provided along with dynamic and historical data to satisfy every Geo-SCADA application need.

...And the Alarm Management?

We will not go into great detail of the powerful Movicon.NExT™ Alarm Management features that have functions that are performed by the Server to collect and historically log data, or by the Client to visualize and analyze data, or by the Event Notification Model. Automation Platform.NExT™ ensures the use of the most sophisticated Alarm Management, which functions better than ever.
Efficient data recording: Database, SQL, Cloud Computing.

The term “database” refers to the database management system (DBMS), the managerial software in general constituted by the client-server software model with server service. The server provides the DBMS managerial services to record data and processes client requests for information which is provided in the appropriate display structure format. In the most modern databases, such as the relational model, data is divided into data tables according to argument. These arguments are then subdivided into categories (fields) using the operations previously described. This mode of subdivision and functionality has been purposely designed to make databases perform more efficiently than the conventional data archives created by operating systems as a filing system within computer systems handling complex data.

The propagation of databases and the relating DBMS managerial systems in modern computing systems is enormous and capillary. The DBMS is an essential component for any computing system: you need only to think about the industrial activities and business data managements involved in running a business to understand why this is so (warehouses, master database, process data, quality control, certification, traceability just to name but a few).
There are also databases within the three-tier architecture of web applications that represent different data layers. The database management and development using DBMS has gradually become a branch of modern computing to all effect. It is an essential and indispensable tool in the industrial and automation sectors that necessitate an extraordinary and continuously increasing amount of information for production process data analysis.

**Automation Platform.NExT™ Historian technology**

The Automation Platform.NExT™ Data Server integrates the best technology available today to ensure recording and access to historical data for those who wish to manage their own projects. Progea has developed a technology called Virtual File System (VFS) to guarantee independence between the platform, project and collected and archived data so that such data can be stored in a Relational Database, on local file (XML) or Cloud indifferently. The architecture transparently uses the ADO.NET technology to allow the user to customize the physical access procedures of the various Data Provider modules.

The platform comes ready with Providers integrated as native components to enable transparent use of Ms SQL Server, Ms SQL Azure and XML data files. The Oracle and MySQL providers are currently being prepared and will shortly be integrated to guarantee users even greater platform independency from databases.

ADO.NET is a set of classes that expose data access services for .NET Framework programmers. ADO.NET provides a rich set of components for creating distributed, data-sharing applications. It is an integral part of the .NET Framework, providing access to relational, XML, and application data. ADO.NET supports a series of development features for a variety of needs, including the possibility to create front-end database clients and middle-tier business objects that can be used by applications, tools, languages and Internet browsers.

A .NET Framework data provider enables database connectivity, command execution and result retrieval. These results are processed directly inserted in a DataSet object for user disposal in combination with other data deriving from various origins, or processed remotely between the different tiers. The .NET Framework data providers have a simple structure and constitute the middle tier.
between data origin and code with the purpose to improve performances without compromising functionality.

**The importance of using Databases in automation**

It is practically inconceivable to imagine a modern automation system without the capacity to use a relational database to record data. Process data needed for effective analysis to detect critical points in order to improve productivity is continuously becoming more extensive. So much so that it can no longer be managed within normal binary file archives. Furthermore, the information flow integrated with factory managerial systems and IT infrastructures make standard relational databases an indispensable component to have. The big advantage of having a relational database derives from its capacity to extract immense volumes of data and information from different interrelating data tables. It is therefore vital that automation systems deploy relational databases in order to manage and report data, whether serial data based on time-series or analytical production data.

**Microsoft SQL Server**

SQL Server is the Microsoft technology for Relational Database software solutions. The **SQL Server Express (free)** is the version widely used and includes all the core SQL Server features but has restricted database scalability: it uses one CPU, 1GB of RAM and supports databases up to a maximum of 10 GB only (starting from the 2008 version and later). SQL Server is a leading product on the database market within the Windows environment with a share hold of 46% compared to Oracle’s 17% and IBM’s 9% with the remaining 27% held by others (*IDC 2013 data*).

**The possibilities offered by using the Cloud**

Cloud computing has recorded an impressive increase in the last few years. It is not only a new technology but also a revolutionary architecture that involves all the IT levels to offer new ways of managing and accessing production process data from any location point. In this context the Cloud technology is capable of improving existing technologies and services as well as enabling process innovation at a low cost. This transformation does not only concern mass production plants or big enterprises but whoever uses computing tools.

**Benefits**

The biggest benefit obtained by using the Cloud is that it enables you to access your resources from wherever and whenever by using a number of various devices.
• **Greater information security.** Each company must dedicate resources to ensure data integrity, server maintenance, redundancy and continuous availability. This task is guaranteed by the provider with Cloud Computing.

• **Reliability.** Data reliability and storage is essential. According to recent statistics the Cloud computing provider reliability index is superior to that of a normal manufacturing company (data line redundancy, group and electronics continuity, technical personnel, ready available spare parts and other). Microsoft Azure, for example, guarantees a minimum 99.5% reliability.

• **Flexibility and scalability.** A Cloud system can easily be scaled according to growth necessity without causing any modification to existing company hardware or infrastructure. It is quite normal to begin with managing data archives by using servers with 10 GB database storage to discover later on that terabytes of data are needed. The Cloud systems are designed to offer unlimited scalability.

• **Pay-as-you-go model.** The Cloud has an attractive billing method which allows you to pay on demand meaning when and for how long you use it. For example, the initial startup and system infrastructure configuration costs are lower than traditional computing ones and enables you to focus energy more on your business demands.

**Disadvantages**

• **Dependency.** Once you have chosen a Cloud provider it is not easy to change it (this does not mean it’s impossible). Therefore you should evaluate which is the best Cloud service and provider to use according to your company needs before anything else.

• **Data possession.** When using the Cloud you will need to get use to the idea that your data is being managed by a third party. Providers do guarantee data security and privacy but it is nevertheless in their possession. If the data to be archived is extremely sensitive you will need to carefully consider the risks involved and the best way to do it. This may also need you to consider implementing local backup security methods just to be on the safe side.

**What is SQL Azure?**

SQL Azure is part of the Windows Azure platform: it is a suite of servers that offer hosted process solutions, Web services and data infrastructure. The **SQL Azure component offers the functionalities of a relational database** and comes complete like the SQL Server but with a difference. Unlike the SQL Server it also features the **Cloud computing** service which is hosted by the Microsoft datacenter. The SQL Azure is generally an ideal choice whenever needing to use database services. The essential features of SQL Azure are practically interchangeable with the conventional SQL solutions despite certain limits in terms of the residing Windows Azure platform database size. Each approach offers different benefits and costs in terms of infrastructure. Therefore, it is simply a matter of choosing the solution that best suits your business needs. Ultimately you can always divide the workload between both platforms in an integrated way.
The difference between Time-Series Data and Relational Data

After having outlined the importance of relational databases in the world of automation both for its own sake and its ability to integrate with the world of IT, it is worth mentioning the differences that exist in managing serial data, listed by date, in respect to relational data aggregation. This includes, for example, performance analysis or analytical reports based on the criteria established by the operator, which is not necessarily bound to a certain time range.

The true effectiveness of managing data is achieved at the very start when deciding which data recording method to use. A decision which Platform.NExT offers you the choice to use both solutions in your projects: the Historian or the Data Logger.

**Historian:** The Historian objects have been designed to attain the highest efficiency in managing Timer Series Data which is time-based data recording (with millisecond precision). This is typically used for recording the behavior of process variables for a set duration of time with the purpose to produce an analysis in the form of charts or trends.

**Data Loggers:** the Data Logger objects have been designed for use when it is not needed to record data according to a specific time range and when the data aggregation and analysis modalities differ to those of a standard chart or trend. Production Reports are a typical example where this type of data recording is applied. This is mainly because the data needed for analyzing is usually aggregated according to varying criteria which cannot be retrieved from one single set of data only.

Automation Platform.NExT™ is an extremely versatile platform that has the capacity to collect and record process data in the most efficient way possible. It can easily adapt to client needs and it is based on standard and open technologies that are very simple and transparent to the user.
So far we have seen how relational database management is a requirement of modern automation systems. The vast amounts of data that are available daily in every production process, if organized well, constitute the basis for implementing analysis activities to determine Plan Intelligence (or Business Intelligence). This means applying all the tools needed for analyzing, measuring, comparing and also predicting productivity performances. In this way weak points can be detected and removed accordingly with the aim to increase company competitiveness.

The term Plant Intelligence refers to a wide ranging field of company activities, information systems and computer technologies that have been designed to support and in some cases to automate measuring, control processes and analyze production system results and company performances (reporting and various types of graphical display systems, dynamic dashboards, historical analysis systems, alarm systems of various types, alarm systems to alert abnormal events or exceptions, plus more). They aid business decision making processes in situations where uncertainty prevails (systems used for previewing, predicting, simulating or creating alternative scenarios). Together they all play a crucial part in the normal procedure of “measuring, analyzing, decision making and taking the necessary action”. A large number of these tasks are generally performed by modern supervision systems at the factory level. A simple HMI is limited to what it can do when managing interaction between man and machine. SCADA, on the other hand, provides the more sophisticated functionalities for complex analyzing and control. Automation Platform.NExT™ integrates all the tools needed to perform these tasks in the most simple and efficient way possible whether locally, at factory level, by remote control, over the
web and ultimately at an enterprise-wide level.

As mentioned above, information collected and aggregated on the database can be analyzed using diverse powerful tools which are provided on the Movicon.NExT™ platform’s client side and likewise on the Web Client side (as explained below). The data is analyzed at different levels of detail and system hierarchy for each business function: production manager, company management, logistics, marketing, sales, administration, personnel or other. Each business intelligence system has a specific goal which derives from the company’s business vision and strategic management objectives.

**Trends, Charts and Data Analysis**

The data recorded by the Server, especially those based on recording time (but not only) can easily be represented in chart and trend format using different tools according to the objective of the analysis.

The **Trends** display trend curves based on temporal data and can be simply linked to dynamic real-time data (sample tags) and data created by the server. The data displays of the next generation are in line with the most modern visualization trends around. They can be customized with desired curve types, colors, size and formats. They also come equipped with a powerful zoom function, label management and many other features.

The **Charts** are objects that can be handled in screens for displaying data recordsets as desired. What’s more the data needed to enable histograms trend curves and pie chart displays do not have to come from a database as they are quite often linked to dynamic values and data sets which are directly available in tags (typically with data arrays).

The **Data Analysis** objects are powerful and sophisticated tools capable of performing graphical analysis on historical data stored in the relating database created by the server. These objects perform a number of analysis functions with easy time range selection. They can perform detailed analysis on sampled curves, as well as different and overlapped time ranges. They also come equipped with a zoom, dynamic measurements and labels plus other useful features.
Report Designer

Movicon.NExT™ has powerful and unmatched Reports management provided as a Reports Manager module. This module offers Automation Platform.NExT™ users a powerful and flexible tool for creating, performing and distributing data reports. It has been designed to allow users the possibility to perform any type of data analysis they require no matter how sophisticated. In addition to performing analysis and reports on data recorded by the platform, such as those from archives managed by the Historian module, they can also be performed on any other data source. This is done by connecting to the existing relational DBs and offers users greater flexibility. The Report Manager offers a visual object-oriented interface that enables users to create Reports by following a few simple procedures using wizards and templates. The Report Designer, which is based on the .Net technology, can be used by users to create powerful reports intuitively simply by using the tools provided in the toolbox. Once the data source has been established (e.g. database table), the report can then be created by simply using fields, tables, statistics and 2D and 3D graphics. All the analysis tools are also supported and include multi-level filters, grouping and sort by, calculation and formulae functions, Master Reports and Sub-Reports. The user can then display, print or export reports using one of the supported formats such as PDF, HTML, RTF, XPS, or in Excel XLS and XLSX formats as well. A navigation tool has been provided to help users manage the more complex Reports which are exposed in a hierarchical document map in a tree structure format.

Web accessible Reports

The Web Server module supports the Report Manager module’s functions to enable users to publish Reports over the Web. Therefore once reports have been deployed and published using the Web Server module they can then be accessed and viewed over the web using the Automation Platform.NExT™ HTML5 technology.

DB Connectors for HMI Interface-Database solutions

The Movicon.NExT™ user interface has a set of graphical “DB Connector” objects designed for connecting objects as ComboBoxes, Lists and Grids directly to data sources in various databases. Not only is this simple to do but it provides the user with more flexibility to establish a more powerful way to manage data between the user interface and those data sources that are collocated in external databases as well.
Automation Platform.NExT™ is a software architecture designed for building the base of modern automation systems

Automation Platform.NExT™ is an open and scalable platform based on .NET and the most modern software technology. Designed with the modular concept of plug-in technology in mind, it is extremely open and scalable industrial software architecture. This platform integrates functional modules that are capable of efficiently managing all business needs. Automation professionals will have a platform on which they can work on for industrial Supervision, HMI, Control, Historian, MES and Analysis by using the open and modular Automation Platform.NExT™ solution. It is an object-oriented software platform that is simple to use in a unique modern programming environment.

With the one unique environment (Editor), users can configure their application projects using a tree structure full of resources, Tag list, Alarm and Historians lists, Screen list that can be configured using the elements from the symbol and object libraries and their relating properties. At first glance users may not realize the extent of the true added value the Automation Platform.NExT™ technology offers. Yet every company operating in automation is naturally concerned about their technological investments, time available for human resources and having the right know-how: in this context companies need to gain more knowledge of the technological architecture and infrastructure possibilities of their applications.
Automation Platform.NExT is a platform based on a .NET framework developed by Progea with a system infrastructure shell offering a modern and modular Interface Development environment (IDE).

Both the Server and Client applications are supported in this framework architecture. Even though they are united within the configuration environment, they still work independently to perform their differing and distinct tasks efficiently and robustly:

- The **Server** as an application service performs all tasks that involve communication, data collection, alarm and historian management.
- The **Client** manages all that is necessary for the user interface and can therefore be managed locally alongside the server or distributed in other remote workstations.

Data persistency has been designed to be independent from the platform. Therefore project files and historical data collected in runtime are managed by a mechanism that Progea defines as a Virtual File System (VFS) that allows users to choose where to allocate files: in a database, cloud or XML files.

The Progea Framework is designed to be modular and is therefore also based on the Plug In technology. The product’s functional modules are independent and can be customized or expanded. For example, users might need to develop a new vertical module and insert it into the framework as a **collaborative platform module**. This is a favorable option that can guarantee investment protection with more innovation and flexibility and one which Progea provides a SDK and template to allow users to create new custom modules to add to the platform.

**Power-driven by the integrated VB.NET language to guarantee success for any customization need**

Movicon.NExT™ integrates a powerful VB.NET engine capable of executing code that is perfectly compatible with VB.NET standard (Visual Basic for .NET™) and uses a truly powerful and vast set of APIs. Properties, events and methods can be used not only for customizing system functions but also for accessing the entire .NET world of your system. Scripts can therefore be executed as normal.
routines or encapsulated in objects, such as graphical objects, alarm objects, templates and data loggers, in response to events.

The Movicon.NExT™ VB.NET language ensures multithreading, whereby different scripts can be executed simultaneously to therefore offer unmatched solutions compared to those systems using standard languages. In addition, the powerful debugger offers the option to use step-by-step, breakpoint and other execution types.

Security: An essential feature

The Movicon.NExT™ applications guarantee the maximum level of security and reliability. The Users and Password management is complete and robust. It has been explicitly designed to ensure that project design engineering is done in conformance with the strict security regulations as part of an integral and simple system procedure. Movicon.NExT™ provides the possibility to define user profiles with the option for mixed configurations among project users, users defined by administrators in runtime, Windows dominion users and users from connected Child projects. Access privileges can also be associated to all the command and action functions as well as to each individual project tag. The Movicon.NExT™ Users management is expandable and open to allow user sharing with different architectures in the form of Memberships.

Membership Providers

The security model used by ASP.NET, known as Membership Provider Model allows greater flexibility in choosing which features to expose in your applications. The Membership Provider Model is a four-tiered model. The Server controls occupy the top tiers and the Membership APIs occupy the third tier with two types of classes: the Membership class with the task to add and delete users and the MembershipUser class with the task to manage user information such as password or forgotten password requests. The
Membership APIs use Membership Providers, which occupy the second tier, to save or store information in a data warehouse or repository. The role of the Membership Provider is to provide a bridge between the Membership APIs and the data repositories, or databases, to relieve the developer from the tiresome task of writing low-level code. The data repository or database systems are found on the first tier where user information is stored and available for a considerable length of time.

**Authentication by logging on** is the stage that the user is recognized and given or denied access based on their credentials. The different types of authentication supported by ASP.NET are reducible to the same end result even though they start from different points, to adapt to the different modes with which one can decide to use for protecting their application. The **authorization** process,

**Text String Management**

The texts management is one of the most notable and powerful platform features. Even though at first hand this may seem obvious and trivial it is nevertheless time consuming for developers to use. In order to make the developer’s work easier the platform therefore supports the text **string management** in a resource and repository as an integral part of the system that is open and modular at the same time. The **texts are managed dynamically for whatever language change implemented** (Unicode) and their structure is compatible with Excel sheets. Text translation can be managed automatically by the platform (online translator) or new text columns (languages) can be directly added in XML files without modifying the project.

**Rich and powerful integrated features**

Automation Platform.NExT, as any professional industrial platform, integrates a great variety of **ready-to-use features** to simplify the programmer’s life and greatly reduce developing times. One of these features includes the integral **Recipe management** based on the atomic data model to ensure maximum functionality. The **Commands** on Event manager and the **Scheduler** are another two interesting features to note. Both of these have modular functionality that is managed by the Server with functions that are performed in asynchronization with the project.
The rapid growth of mobile system use (Tablets and Smartphones) has revolutionized the conventional automation concept in the last few years. It is now quite normal for personnel to manage control systems without having to actually be on the factory premises. Therefore system architectures cannot survive in today’s world without truly web-based factory system access solutions.

The true modern automation concept includes access to automation system data from wherever and whenever. **Users, Maintenance workers and Managers at all enterprise wide levels from factory floor to the head office must be able to access, manage and visualize production process data over the web in top security.**

The Platform.NExT™ Web Server module performs these tasks by using the most modern and innovative technologies in the world of web. **Local graphical HMI screen interfaces can be deployed on the Web using the Movicon.NExT™ wizards.** These screens can then be accessed locally or by using a browser or an App. For example, an automation system can be configured with a local server (with or without local HMI) and a remote graphical HMI interface that is connected to the Server in HMI Client or Web Client architecture with the necessary user access authentication procedures when required.
Communication occurs locally using the I/O Data Server or directly by using the OPC UA. The Web Server manages the local instances and publishes the data over the web. When command access is protected for security reasons, the Client Web stations will grant command activation as defined on the Server by means of using the same security procedures adopted.

All accesses and command activations are traced and recorded on the Server’s Logs. In addition, user logon to a Web Client station is totally independent from other stations where different users can log on with different privilege levels (Multi-users).

The new HTML5 technology

HTML5 is the standard that defines a set of technologies that substantially include all the most recent novelties relating to web development and creating web applications. The new HTML5 technologies surpass previous limits and help define new semantic functions, storage, API to access devices, websockets, webworkers and graphics solutions, multimedia and 2D and 3D drawings never thought possible before in cross-platform and standard technology. The emergence of this standard has enabled the Automation Platform.NExT ™ Web Server module technology to provide users with a web client architecture that is truly standard and cross platform. This means that it can be used on any portable PC, operating system, browser or mobile device. The advantage of having a cross-platform solution will allow access to your projects from wherever you are in complete top security and without compromising graphics rendering.

The HTML5 technology used to do this is based on WebSockets for intelligent and bidirectional http communication where client data is in part processed on the server side. Even though the performances are slightly inferior to the Mobile APP solution, platform interoperability is nevertheless possible with the open HTML5 standard definition.
**APPs for Mobile systems (at work)**

If it is true that the HTML5 is a cross-platform solution for accessing as a Web client to the factory system Server, it is also true that despite the fact that mobile systems are continuously improving their potentiality, they do not have the same power and calculation capacity of a PC. Even though HTML5 is the new frontier in Web technology, it requires the use of standard protocols and the processing capacity of the server to prepare data for the Client. In terms of performance this does not result particularly well for those using mobile devices. **By considering the use of a client by Tablet of Smartphone systems it is easy to understand how performances could improve by using a native APP installed on the device:** this would not only improve performances on the client side but it would also make data access easier for the operator to manage as well.

..And Silverlight?

Progea had great hopes for the Microsoft Silverlight technology. A technology based on a component that had to be installed on the Client side (Silverlight Engine, using a concept similar to Adobe Flash) and that enabled the WPF/XAML technology to be graphically processed on the Web Client side by processing it locally (therefore less HTML5 portability but greater performances). Unfortunately, it seems that Silverlight has recently been side tracked and left without any prospects for future development that look promising on the horizon. It is for this reason that support to Silverlight by Platform.NExT has been suspended pending verification of any new development of this technology by Microsoft.

**Augmented Reality (AR) the new frontier**

Finally a quick mention on what the Progea R&D team is developing alongside web technology. The R&D team is currently preparing an AR technology application for automation systems that you will find most interesting and a must have for your business. **The augmented reality (AR) technology extends and integrates real objects that exist in our surrounding environment** (captured and displayed using the tablet camera for example) together with information and virtual reality objects that are available from the data server (tags and real-time information). The AR is intended to function as a useful tool to help companies increase productivity, support decision-making, reduce maintenance time and provide visual comparisons and real-time analysis. An example to this technology can already be seen on the market with the arrival of Google Glass which is said to revolutionize the world in which we live in and have a strong impact on the industry reality as well.

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**Heinz Hoppenmaier**

R&D Manager:

“The new Platform.NExT technology ensures maximum productivity, offering not only “functions” but innovative, modern and future-proof technology.”