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Exploitation and Dissemination

Task 10.3

Establishment of European Competence Group

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Executive Summary

This deliverable is the third and last document for reporting about European Competence Group (ECG) activities. On the one hand, it contains details about the last two ECG meetings in Nürnberg (SPS/IPC/Drives Fair in November 2008) and Hannover (Hanover Fair in April 2009), and on the other hand gives an overview about all held major ECG events. Finally, some main conclusions will be drawn.

In general, the ECG is intended to be a consortium of potential end-users from factory and process automation, device and machine suppliers/vendors, system integrators, and companies which possibly could provide or use VAN technology in the future. At ECG meetings, the VAN consortium presents current results of work and shows tangible output to get feedback and to evaluate, if especially end-user requirements are met by VAN and to bring the research results into more practical applications.

Please note that only ECG related activities are reported here. The general dissemination activities, including publications, organisation of tracks/sessions on conferences etc. are taken into account in the respective deliverables in Task 10.1 and 10.2.

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1 Preface

European Competence Group (ECG) activities have been started officially in the beginning of the second period. Before that time, preparation activities took place, and first valuable contacts to interested parties could be established during Hanover Fair and SPS/IPC/Drives Fair in 2006, although no official ECG meetings have been organised there. Both fairs, in addition with other activities such as conferences, formal and informal VAN presentations could be seen as preparation and supporting activities for the later established ECG meetings.

After the preparation of first results and tangible output of VAN, the first ECG meeting has been organised to take place during Hanover Fair in April 2007. After the success of several related activities and especially this first ECG meeting, further ECG meetings have been planned and conducted during major events in the automation field, regularly at SPS/IPC/Drives Fair in November and Hanover Fair in April. Correspondingly, in the last reporting period of VAN, ECG meetings have been held at SPS/IPC/Drives Fair in November 2008 and Hanover Fair in April 2009. Two of the above mentioned ECG meetings have been organised as a joint dissemination event with the EC STREP PABADIS'PROMISE. Preparation, content and feedback of the last two ECG meetings will be reported in more detail in chapter 3 and chapter 4 of this document.

Most of ECG activities have been performed during peak periods – lasting from one or two months before an ECG meeting until the meeting itself – although the duration of the respective task was longer. Between ECG meetings, minor work, such as distribution of marketing materials, establishment of new contacts, have been performed.

The organisation of this kind of R&D marketing meetings during the main automation fairs were most promising, as interested people and all experts in the relevant area are on-site and the event can benefit from official marketing activities by the fair organisation. Further on, valuable contacts could be made during related activities such as conferences, formal and informal presentations, which could be seen as preparation and supporting actions for official ECG meetings.

The number of participants of most meetings (from the start of the project until end of 2008) were adequately high; nevertheless it has to be admitted that probably because of the starting economic and finance crisis in the end of 2008, the number of attendances of the last meeting in April 2009 has decreased strongly.

2 Objectives of European Competence Group

The objective of VAN European Competence Group (ECG) is to provide a platform for dissemination of the project knowledge and concepts, as well as to extend the project results beyond the project consortium and time frame. The competence group represents the requirements and concepts for industrial automation and communication with respect to real-time, security, safety and integration with a European focus. End-users, suppliers and system integrators will be aware of new techniques and new products resulting from VAN project by means of regular ECG activities and articles in relevant magazines and other publications. ECG activities are free of charge for interested companies, and meetings – in principle to discuss these companies' own requirements and constraints – have been planned to be held regularly during major events of automation industry such as Hanover Fair or SPS/IPC/Drives in Nürnberg.

After the first ECG meeting in April 2007 – on which mainly concepts and specification parts have been presented – the project has made a strong progress and moved towards realistic implementation parts in period 2 and 3. Furthermore, during that time potential synergies with the EC STREP PABADIS'PROMISE (P2) have been analysed and worked out. Respective results and outcomes could be presented at ECG meetings in November 2007 and April/November 2008, the last two ones as a joint meeting with P2. Now, in the last phase of VAN and shortly before the end of the project, all implementation work in the single work packages are finalised and the main focus is on the final implementation of the Industrial Experimental Setups (IESs) for Factory Automation (FA) and Process Automation (PA). All relevant single implementations and prototypes of the technical work packages are integrated in these industrial plants. Hence, since the beginning of 2009 the concepts and the vision of VAN can be presented by a strong support by demonstration scenarios in real technological plants. On the one hand, this is indeed very beneficially for the understanding of VAN and a great proof of concept, and on the other hand very convincing for the participants as well. That means that at the last ECG meeting in April 2009 detailed specification parts of the VAN concept as well as plant implementations could be presented.

3 Constitution of European Competence Group

The European Competence Group (ECG) is constituted by representatives of possible suppliers and possible end-users of VAN technology. It is recommendable to have representatives of both classes as ECG members because of their different points of view on VAN, their different requirements, and their consequences for different aspects of the project work.

For the organisation of the fourth and fifth ECG meeting, the elaborated ECG contact lists have been used, in detail:

As mentioned previously, the fourth ECG meeting (in November 2008) has been organised as a joint dissemination event with the EC STREP PABADIS'PROMISE. As it could be seen with the previous ECG meeting, again it seemed very promising that the synergies of both research projects with the headline "Order based Automation via Public Networks" and the combination of both Industrial Groups, namely European Competence Group – ECG@VAN – and the Associated Reference Group – ARG@P2, would attract more interested parties than single meetings. Altogether, more than 800 e-mail invitations have been sent around to a wide range of international companies and institutions. The contents of these invitations comprises the following: (a) reason for the invitation, (b) objectives of VAN, (c) project partners, (d) reasons for the ECG meeting, (e) time and premises of ECG meeting, and (f) contact person in Siemens. For reasons of privacy and lucidity, it is not practical to list all contacted persons and companies here in detail. In general, the existing relations and contacts of VAN partners inside several organisations and communities have been playing an important role while preparing the ECG meetings. Among others, contacts were used from interested parties of Industrial Ethernet activities in general and PROFINET technology mainly. Moreover, the numerous e-mail rosters of P2 partners also brought a wide range of valuable contacts.

The last ECG meeting was devoted to the presentation of the "almost final" achievements of the VAN concept. Specific emphasis has been on the demonstration of practical scenarios (Industrial Experimental Setups) with two major topics, namely the VAN based addressing scheme and the common engineering concept.

Publicity for the events was made via e-mail distribution as mentioned above, and by the fair organiser as such by means of their leaflets which are distributed to all visitors at the entrance of the fair, examples can be seen in the following figures.



SPS/IPC/DRIVES/
Elektrische
Automatisierung
 Systeme und Komponenten
 Fachmesse & Kongress
25.-27. Nov. 2008
Nürnberg

VAN / PABADIS'PROMISE – Invitation

What?

Order based Automation via Public Networks

An overview about application of public networks and advanced control structures in industrial automation – Results of European IST Research Projects.

When?

25.11.2008, 10:00-12:00

Where?

Messezentrum / Exhibition Centre
 CongressCenter Nürnberg (CCN) Ost
 Room Prag
 Karl-Schönleben-Straße
 90471 Nürnberg

Traveling to Nürnberg: www.nuernbergmesse.de, www.congressing.de

Contact?

Dr. Arndt Lüder, Univ. of Magdeburg (arndt.lueder@ovgu.de)
 Christian Schwab, Siemens AG (christian.schwab@siemens.com)



SPS/IPC/Drives 2008, 25.11.2008

VAN (IST-016969) / P2 (IST-016649)

Figure 3.1: Invitation Cover SPS/IPC/Drives on 25.11.2008 (Excerpt)

21. APRIL 2009
TAGESPROGRAMM
TODAY'S PROGRAM



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TAGUNGEN · FIRMENVORTRÄGE

FORUMS · SPECIAL DISPLAYS ·
CONFERENCES · CORPORATE LECTURES

GET NEW TECHNOLOGY FIRST
20.-24. April 2009
www.hannovermesse.com



Figure 3.2: Leaflet Hanover Fair of 21.04.2009 (Cover)

Nutzung von Weitverkehrsnetzen für die Industrielle Kommunikation
Application of Wide Area Networks for Industrial Communication
Convention Center (CC), Saal 104
Dienstag/ Tuesday, 21.04.2009, 14:00–15:30 Uhr/hrs

Von der lokalen Industrie-Kommunikation zu Virtuellen Automatisierungsnetzen

Basierend auf dem Ethernet-Standard IEC 61158 Type 10 (PROFINET) wird im Rahmen des EU-Forschungsprojektes VAN (Virtual Automation Networks: www.van-eu.eu) ein verteiltes Automatisierungssystem entwickelt, das neben lokalen Kommunikationsnetzen auch öffentliche Weitverkehrsnetze – drahtgebunden und drahtlos – in die Automatisierungslandschaft einbezieht und dabei Aspekte wie Echtzeitverhalten, Security und Safety berücksichtigt sowie ein einheitliches Engineering zur Verfügung stellt.

From local Industrial Communication to Virtual Automation Networks

Based on Ethernet standard IEC 61158 Type 10 (PROFINET) and in the context of the European funded research project VAN (Virtual Automation Networks: www.van-eu.eu), a distributed automation system will be developed, which incorporates local communication networks as well as public wide-area networks, wired and wireless. The concept considers also aspects such as real-time behavior, security and safety, and provides a common engineering concept for these Virtual Automation Networks.

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Veranstalter/ Organizer	VAN IST-Projekt-Konsortium, c/o Siemens AG
Sprache/ Language	Deutsch, English
Teilnahme/ Participation	Teilnahme kostenfrei. Anmeldung erbeten per E-Mail an: Christian Schwab, christian.schwab@siemens.com <i>Participation free of charge. Registration requested by e-mail to: Christian Schwab, christian.schwab@siemens.com</i>

Virtual Automation Networks – Europäisches Forschungsprojekt
Virtual Automation Networks – European Research Project

14:00–14:15 English	Zukunft der Industriellen Kommunikation <i>Future of Industrial Communication</i> C. Schwab, Siemens AG
14:15–14:40 English	Technische Architektur und industrielle Prototypen <i>Overall Technical Architecture and Prototyping in Industry</i> R. Greiner-Jacob, Siemens AG
14:40–15:05 English	Namensbasierte Adressierung und Routing <i>Name based Addressing and Routing</i> R. Messerschmidt, ifak e.V.
15:05–15:30 English	Gemeinsames Engineering Virtueller Automatisierungsnetze <i>Common Engineering for Virtual Automation Networks</i> M. Hoffmann, Universität Magdeburg

Figure 3.3: Leaflet Hanover Fair of 21.04.2009 (VAN Excerpt)

4 Meetings of ECG in Reporting Period

This chapter gives an overview about both main ECG meetings in the reporting period in November 2008 (SPS/IPC/Drives Fair) and April 2009 (Hanover Fair).

In general, all ECG meetings are organised as an interactive workshop with a mixture of presentations and short discussion rounds with coffee support. Although numerous VAN materials were available, the meetings have kept in a compact time frame with several focus topics.

4.1 ECG Meeting at SPS/IPC/Drives 2008

Due to the good experiences and the good feedback of the participants, also the fourth ECG meeting has been organised and conducted as a joint dissemination event with the EC STREP PABADIS'PROMISE (P2), whereas this event took place at SPS/IPC/Drives Fair on 25.11.2008. During that event it was mainly intended to give the guests a good overview about research activities in the context of novel automation architectures and technologies which will increase the flexibility, efficiency and robustness of automation and communication systems.

In general, and in the context of both projects, a distributed automation system is/was under development, which incorporates local communication networks as well as public wide-area networks, both based on IT standards, integrating agent based technologies, and considering aspects such as real-time behaviour, security and safety. The development of the communication infrastructure in a VAN system is based on Ethernet standard IEC 61158 Type 10, and for the control architecture in a P2 system the standard IEC 61499.

Concepts and reached achievements of both projects have been presented during that meeting, whereas the presentations themselves were subdivided into two parts, Session 1 with the focus on PABADIS'PROMISE, and the second session with the focus on VAN.

With the paradigm "The Order is the Application", in P2 a new control architecture based on distributed intelligence, a new manufacturing ontology, an embedded real-time agent platform for control, a new generation of RFID's, a new generation of field control devices, and building blocks for a new generation of Enterprise Resource Planning systems have been developed. The P2 session started straight forward with rationales and benefits of P2 which was followed by the technical architecture. The new approach of manufacturing system design process and a "lessons learned" discussion completed this session.

Considering all aspects of P2, it became very obvious that a reliable communication infrastructure for local and for wide-area communication is one of the main preconditions for the concept. Thus, the VAN project came into the game.

As the previous times, and to catch the participants from a technical point of view, in the first VAN presentation an overview of the state-of-the-art of industrial communication and a view in the future resulting in the presentation of the VAN project has been given. This has been followed by a deeper view into the VAN architecture with the respective VAN extensions and a presentation of VAN application scenarios. In the last presentation, implementation aspects with a specific focus on name based routing have been given and discussed.

The following table shows the agenda as it was shown during the meeting – all presentations were written and held in English language.

Table 4.1: Agenda of ECG Meeting #4

#	Joint ECG / ARG Meeting, 25.11.2008 @ SPS/IPC/Drives Fair Agenda	Presentation by
Session 1: PABADIS' PROMISE Control System Architecture		
1	Reached results – A distributed control architecture and more	Lueder / Univ. of Magdeburg
2	Lessons learned – A new view on manufacturing system design	Wagner / Siemens CT
Session 2: Virtual Automation Networks (VANs) in Industry		
3	Future of Industrial Communication	Schwab / Siemens I IA
4	Technical Architecture and Prototyping in Factory and Process Automation	Greiner-Jacob / Siemens I IA
5	Implementation Aspects	Messerschmidt / ifak

4.2 ECG Meeting at Hanover Fair 2009

In the last VAN ECG meeting at Hanover Fair on 21.04.2009 “almost final” results of the VAN project could be presented. At this stage, shortly before the end of the project, the expected outcomes and achievements can be foreseen more precisely. In particular, implementation work in the single work packages are finalised and the main focus of work is on the final implementation of the IESs for FA and PA. That means on the one hand that several achieved highlights of VAN could be presented in theory, and on the other hand that several real implementation scenarios could be shown and discussed. As already mentioned, the presentation of both parts is most convincing for the audience and very beneficially for the understanding.

After the view in the future of automation and communication three focus topics have been chosen for this workshop. The content of the first topic was the Overall Technical Architecture and Prototyping in Industry. This has been followed by a deeper view into technical details, and in particular the concept of name based addressing and routing scheme in VAN has been presented. Looking at the heterogeneous network concept in VAN and the variety of communication technologies it becomes obviously that a common engineering concept is needed, this was the content of the last presentation.

The following table shows the agenda as it was shown during the meeting – all presentations were written and held in English language.

Table 4.2: Agenda of ECG Meeting #5

#	ECG Meeting, 21.04.2009 @ Hanover Fair 2009 Agenda	Presentation by
1	Future of Industrial Communication – Virtual Automation Networks (VANs) in Industry	Schwab / Siemens I IA
2	Overall Technical Architecture and Prototyping in Industry	Greiner-Jacob / Siemens I IA
3	Name based Addressing and Routing	Messerschmidt / ifak
4	Common Engineering for Virtual Automation Networks	Hoffmann / Univ. of Magdeburg

4.3 Feedback

The joint meeting with P2 attracts nearly 30 interested experts whereas during the last ECG meeting, the number of attendances has decreased strongly. Probably, this was caused by the starting economic and finance crisis in the end of 2008. However, the discussions during all meetings / workshops have been on a high level and with high quality.

Most of the participants approved the main objectives and the concepts of VAN and P2. Following the main opinions of them, both projects are strongly in line with major trends in automation and set trends in that area with highly sophisticated and clever concepts with real applications scenarios themselves.

For VAN, it was underlined that the number of applications with wide area networks for industrial automation will definitely increase in the future. Here, not only a “simple” data transfer will be needed but a deterministic communication scheme with defined and monitorable Quality of Services will be necessary for specific application fields. Very convincing in that sense and a good basis for the discussions were the presentations of implementation scenarios in real technological plants.

In the following, a selection of discussion points which have been raised during the meetings are itemised:

- Concept of real-time applications in heterogeneous networks, performance classes, mapping of local QoS scheme to VAN
- Service level agreements and provider switching in case of failure connection
- Name based routing and the usage of standard automation protocols
- The difference of the usage of web services and VPN technology in the context of automation, establishment of the runtime tunnel
- Safety extension and application in VAN through OpenVPN technology
- Application scenarios and real use-cases, in particular the IES FA and IES PA

5 Summary of ECG Meetings in all Periods

During the whole runtime of the project five main meetings / workshops of the VAN European Competence Group have been organised and conducted; these workshops, including the presentation titles are itemised in the following table.

Table 5.1: Overview of ECG meetings

Date	Event / Location	Focus Topics
18.04.2007	Hanover Fair	<ul style="list-style-type: none"> • Virtual Automation Networks (VAN) – Overview of Industrial Communication’s Future • Future is Near – Technical Building Blocks and Architecture of VAN • Integration of Wireless Communication into Virtual Automation Networks • Public Nets and Internet go Automation • Uniform Engineering of heterogeneous Networks and Distributed Automation System
28.11.2007	SPS/IPC/Drives Fair, Nürnberg	<ul style="list-style-type: none"> • Future of Industrial Communication – Virtual Automation Networks (VANs) in Industry • VAN – Technical Architecture and Prototyping • Details – Web Service related Implementation • WANs – Public Networks in Industrial Automation • Features – How safe are Public Networks?
24.04.2008	Hanover Fair	<p>Joint Meeting IP VAN & STREP PABADIS’PROMISE</p> <p>Session 1: The PABADIS’PROMISE Control System Architecture:</p> <ul style="list-style-type: none"> • Rationales and Benefits • Technical Architecture – Most Flexible Industrial Control Systems • Designing Decentralized Manufacturing Systems <p>Session 2: Virtual Automation Networks (VANs) in Industry:</p> <ul style="list-style-type: none"> • Future of Industrial Communication • Technical Architecture and Prototyping in Factory and Process Automation • Implementation Aspects

Date	Event / Location	Focus Topics
25.11.2008	SPS/IPC/Drives Fair, Nürnberg	<p>Joint Meeting IP VAN & STREP PABADIS'PROMISE</p> <p>Session 1: The PABADIS'PROMISE Control System Architecture:</p> <ul style="list-style-type: none"> • Reached results – A distributed control architecture and more • Lessons learned – A new view on manufacturing system design processes <p>Session 2: Virtual Automation Networks (VAN) in Industry:</p> <ul style="list-style-type: none"> • Future of Industrial Communication • Technical Architecture and Prototyping in Factory and Process Automation • Implementation Aspects
21.04.2009	Hanover Fair	<ul style="list-style-type: none"> • Future of Industrial Communication • Overall Technical Architecture and Prototyping in Industry • Name based Addressing and Routing • Common Engineering for Virtual Automation Networks

6 Main Conclusions / Lessons Learned

The ECG workshops always started with the presentation of the state-of-the-art and existing solutions for industrial communication. This was followed by a view into the future which in case of the VAN project aimed at the presentation of selected technical “highlights” of the overall concept. To make the story complete, an overview of real applications scenarios and use-cases, and in particular presentations of the IES for FA and PA were given.

Additionally, the marketing concept as such, to rent a room during one of the main automation fairs, invite people via a dedicated database, and, moreover, to use the general fair publicity to attract further participants was a good basis for the success of the events.

It seems to be relatively easy to attract several experts also to research topics during exhibitions and fairs. And in the end of VAN, more and more real implementation scenarios could be presented, and this obviously seems to be even more promising for the attendance of potential users.

All events have shown the interest of external experts and the relevance of the project: on the one hand by the stable number of visitors (except for the last event, due to the known reasons), and on the other hand by the quality of discussions during and after the events. The quality of the workshop could be ensured by the concept of presenting “research activities underlined with realistic use-cases and application scenarios” and by the merged forces of both projects, VAN and P2, too.

For VAN, most of the guests stated that the problems and methodologies which are investigated in the project are of high relevance in real applications. The course of the activities reflected industrial needs and requirements, especially in the context of a possible application of wide-area networks for industrial communication and telecontrol aspects.

The guests agreed that the realisation scenarios and in particular the Industrial Experimental Setups for FA and PA are promising and convincing for the application of the VAN concept. Most of the statements which hint to open problems did not query the VAN concept in general, but rather concretisation and completion issues.

Summarising, and after five ECG conferences, it could be shown that the concept of the meetings works very well. The VAN concept and vision – and in the course of the years also real VAN applications scenarios – could be presented to (and discussed with) a wide range of international experts; trends, technical approaches, requirements, and use-cases have been considered and extended.