The Big Communications Picture

It’s real-time, it’s 100% open
It’s more than multimedia
It’s HiPath and it’s here

February 2004
This white paper provides an overview of the company’s HiPath portfolio, the focus being on HiPath OpenScape, which is a suite of presence-aware, real-time communications software. HiPath OpenScape is a groundbreaking addition to the HiPath solutions portfolio and an important development in its own right. Additional Siemens white papers are available that focus on the portfolio, the HiPath MobileOffice solution and the company’s award-winning migration strategy.
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An evolutionary revolution

Great ideas don’t always work out the first time around. They may fail for a variety of reasons but come back a few years later and turn into a resounding success. Using the intelligence and display resources of desktop PCs to enable better desktop telephony sounded like a great idea at the time — the early ’90s. However, computers and phones occupied disparate environments; they could be linked, but it was a complex exercise, so in most cases the cost of integration outweighed the benefits. This is why unified messaging never made it to the desktop.

By the mid ‘90s the Internet was being used to transport telephony signals but the quality was poor. Nevertheless it demonstrated the ability of IP networks to transport both voice and data traffic, which removed that earlier constraint. And when corporate infrastructures were adequately provisioned, call quality improved and Voice over IP (VoIP) became a business technology.

The convergence of voice and data lowered communication and network management costs, but the business case was not compelling. Convergence did facilitate the development of earlier computer telephony applications such as unified messaging, but business requirements has moved on and after the turn of the century they had become more demanding. Applications that enhanced personal productivity had become a priority; the market wanted communications and information to be unified in order to facilitate workgroup collaboration. All this and more was needed at a time when the economy was heading south, so big investments were out and the need to leverage legacy investments was very much in.

The challenge was formidable but so was the opportunity and it was one to which Siemens rose. We started with an award-winning migration strategy, one that protected corporate investments in PBXs, phones and telephony cabling. A comprehensive portfolio of communications applications was developed and they were backed by the full telephony feature set of an advanced PBX. And then we went on to create HiPath OpenScape — a groundbreaking suite of presence-aware applications that boost individual and workgroup productivity and reduce stress at the workplace.

You need to see presence-aware telephony in action to realize that a velvet revolution has taken place. No hype; no fanfares; just a smarter, not harder way of working. Everything is enabled via the intuitive browser interface. There’s no learning curve, so the benefits are realized immediately.
A real-life, real-time example

IP-centric communications has the proven ability to lower costs, increase profitability, and deliver superior services to customers and prospects, but a degree of skepticism is justified, particularly when one looks back at recent high-tech history. Similar claims have been made in the past; many technology developments failed to deliver while others only addressed part of the problem. With the benefit of hindsight it is easy to see what went wrong. The industry became infatuated with technology and along the way it lost sight of the fact that technology was only a means to an end.

Let us therefore consider one of those ends: telephone tag. Party A calls Party B and gets voicemail; B calls back and gets A's voicemail. This is something we've come to accept, despite the fact that it wastes time and money; in addition it contributes to stress at the workplace. And failure to communicate adds to another problem: information overload. More messages are left in different media types on different systems and networks.

IP phones are 'Lite' data devices that live on the LAN and HiPath OpenScape is able to detect the status (on- or off-hook) of these phones, which it uses to indicate the telephony equivalent of IM presence. The flag is blue when parties are free to take a call and red when they are busy. Thus, telephone tag is eliminated; you don’t call somebody whose flag is red. This may sound like a relatively simple and basic application, but it represents the first link in an added-value communications and collaboration chain.

Note: the operators of PBXs can see if an extension is free or busy, as can the users of key systems. In both cases a lamp indicates the status. Presence-aware software is therefore a high-tech extension of this baseline function.

The HiPath environment allows one-on-one and conference calls to be set up immediately if the relevant parties are free, i.e. if their presence flags are green. If some parties are busy they will be informed that a conference is taking place and can join when available. When conference calls are scheduled the application contacts all team members using the appropriate media and device at the designated time.

When calls are urgent and not returned other communications services are employed, e.g. SMS. This is a waste of time for both parties.

Fractured Communications Landscape

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As illustrated, every user has a personal portal that is customized to match individual requirements, i.e. establish personal contacts and workgroups. Icons show both IM and telephony status, i.e. a blue or red icon. Individual calls are set up by clicking on the relevant icon, but the power and convenience of this “Click & Done” paradigm really takes off when users need to make conference calls and bring in documents in order to collaborate. One click on the workgroup icon will set up the call and display all documents that were used in the last session. Thus, there is no need to schedule in advance and no time is wasted setting up conference calls. This means that group productivity gets a big boost, issues are addressed immediately, and stress is minimized.

One useful, additional feature is the ability to give instructions using voice commands, e.g. “status of John Murphy” and if free “call John Murphy”. This facility also applies to workgroups and it would normally be used by mobile employees.

This real-life example clearly illustrates the validity of that early ‘90s vision, i.e. the benefits that come from applying desktop computing resources to desktop telephony. For example, icons display presence in customized browser windows; communications becomes a simple ‘click-to-call’ process; workgroups are easy to establish and collaboration sessions easy to initiate. Individual and group productivity is enhanced via this smarter way of working, but there’s more — much more.

Presence and managed availability represent a true paradigm shift. Presence minimizes telephone tag, so users spend more time communicating and less leaving and responding to messages. Managed availability (see the “My Status” window in the above illustration) is used to define levels of privacy; personal profiles define which calls will be accepted and when. In turn this leads to much better business and personal life-styles, the boundaries of which are becoming increasingly blurred.

This is the way that most everybody will be working in a few years, so why wait? And there’s more to come; so far we’ve only touched on the first two pieces of the “Big Picture”.

The intuitive browser interface is used and it can be customized to match individual requirements. Phoning becomes an intuitive ‘click-to-call’ process.
The business case for IP communications is compelling and there is only one significant issue: realizing the productivity and other benefits while protecting legacy investments in regular telephony systems, phones and cabling. There are exceptions, e.g. greenfield sites, but in most cases a graceful migration strategy is required. The alternative approach is a forklift upgrade, which is disruptive and expensive. Moreover, the benefits of IP communications are rarely required throughout the whole organization and in some cases implementation is impractical. For example, extending LANs to warehouses that have regular telephony wiring.

Converged systems enable interworking with legacy PBXs. This allows IP Communications to be introduced and evaluated at departmental level or in one or more remote locations.

HiPath real-time IP systems live on the LAN and use this physical medium to transport voice traffic. They can be IP systems that only handle IP traffic, or they can be ‘converged’ systems that combine both circuit and packet switching, i.e. one half functions as a regular PBX and the other as an IP PBX. Thus, regular phones connect to the circuit-switched interface, as illustrated, while the IP phones connect to the packet-switched interface via LAN switches. Note that this does not introduce any interoperability issues; there is seamless ‘mix and match’ between the different client devices.

When the time comes to replace the PBX, regular phones continue to be used by employees who do not require the additional functionality.

Converged systems (HiPath 3000 and HiPath 4000) connect to the public telephone network directly or they can interface to a legacy PBX. The legacy phones can remain
in place or they can be connected to the new platform, as can the new IP phones. More IP phones can be added in line with increased usage of the new applications and when the time comes to replace the legacy system the converged system can take over its phones and cabling. Over time the converged system may only employ a few regular phones, e.g. the ones needed in warehouses and similar remote locations. Converged systems therefore enable a smooth, cost-effective migration strategy.

There are circumstances in which the forklift upgrade approach can be justified, e.g. an organization has PBXs that have come to the end of their life cycles and/or a number of new locations need to be added to the corporate network. In this case IP systems are employed.

Real-time communications software

Before moving on to the third and fourth pieces of the big picture, we should consider the implications of hardware commoditization. Regular PBXs are proprietary platforms; computer servers are open systems; converged platforms represent a pragmatic mixture. However, it is clear that the future of both voice and video will be a combination of real-time communications software running on enterprise-class computer servers. To put it bluntly, hardware has already become a commodity and the only way to innovate is via software.

This is a trend that Siemens not only recognizes, but one that the company is driving. However, this does not mean limiting the functionality of real-time IP telephony, although that route does represent an easy option. Instead, we ported all the rich telephony features of an advanced PBX into software. These features, which were developed over decades, include end-user functionality such as caller list, call back, recall, do-not-disturb, override, hunt group, group call, etc., etc. One can question the actual usage since a typical user may only use a dozen or so features, but different individuals use different features, as do the many different user groups, and vertical industries have specialized requirements. And unless everything is ported some users will have to compromise, i.e. change the way they work when the new IP phones are deployed.

This real-time communications software, known as HiPath ComScendo, includes all mainstream public networking standards. This is mandatory re the need to interoperate with the PSTN and the PBXs of other vendors. HiPath ComScendo also features intelligent call processing, contingency routing, redundancy, network failover, systems monitoring and alerting, etc., etc.

The company's real-time IP systems comprise IP servers and gateways. The robust, feature-rich HiPath ComScendo software runs on these items of commodity hardware. HiPath ComScendo is therefore the real-time communications equivalent of an
Siemens supports Linux as well as Microsoft Windows operating systems.

Open systems is a term that is widely used to describe hard- and software systems that employ open standards, e.g. IP. The systems may themselves be semi-open or proprietary, but use of common standards allows them to work with each other. Unfortunately the term is also abused and one has to look below the surface in order to determine the degree of interoperability.

PCs are semi-open hardware systems, but what counts is the open applications environment. Siemens believes that IP communications should adopt this model, thereby allowing companies to employ applications that come from the development community as well as those of the IP PBX vendor, i.e. there should be no lock-in or other constraints.

At the time of writing, Q1 2004, Siemens is the only company that has adopted this model. In common with other vendors we started with a set of applications that are dedicated to the company’s HiPath platforms. That is the only way to kick-start the market. However, the new HiPath OpenScape suite of presence-aware applications can be used as a stand-alone product on competitive and complementary communications infrastructures, e.g. the IP PBXs of other vendors as well as the data platforms and information databases of IBM, Microsoft, SAP and other leading IT corporations.

In addition, Siemens has created a unique application architecture and an open application environment: one that goes much further than that of published APIs (application programming interfaces). For example, there are libraries for both .NET and Java. This is another indication of our commitment to open systems. It also shows that the company recognizes the increasing commoditization of hardware. IP PBXs will continue to play an important role in corporate communications for many years, but
there is a trend towards the deployment of all software on corporate servers. This is the inevitable result of voice-data convergence and the unification of communications and information.

Bridging people, systems and technologies

So far we have indicated that 1gIP reduces communication and network management costs. The applications that 2gIP enables boost personal and group productivity; in addition they make companies more competitive; these apps also facilitate the integration of enterprise applications and the concept of the real-time enterprise. Important benefits that we shall examine in later sections, but first we should examine a really big challenge: creating unified user experiences and unified communications domains. This represents the fourth and last piece of the big picture. (Unified domains are covered in the section titled “LifeWorks: an even bigger picture”).

Enterprises currently have three principal domains: real-time communications (telephony); information (databases); and IT (network and other services). There is a need to merge these domains into a unified framework and this development is well advanced on the information front. Enterprise Application Integration (EAI) is taking place and enabling transactions to flow from one system to another. However, there is an equally clear need for telephony to transition in the same way. The Gartner Group has coined the term Integration Broker to describe a new generation of middleware that can help bridge the current disparate flows of data and real-time communications. Siemens employs a slightly different term — Communication Broker.

Siemens’ middleware has the same focus, but in addition to addressing the infrastructure of the back office it also focuses on the needs of individuals and workgroups. This indicates that the Communication Broker bridges people, systems and technologies.
This is the innovative software development that underpins the groundbreaking functionality of HiPath OpenScape.

The end users’ perspective is that of a unified communications and information environment and it can be customized to match individual needs. Portals allow users to: communicate via any real-time communications client; use all mainstream media types; employ a comprehensive range of communications and collaboration applications; and obtain information from back office systems.

**Video enters the picture**

Telephony is a very rich medium; the human voice is the best way to convey subtle messages, to express feelings and emotions; it is also the optimum way to reach consensus on difficult issues. However, in recent years email has become the primary medium for business communications because it is cheap and effective — ideal for working over time zones and in carrying attachments. But there are no shades of meaning in emails and misunderstandings can arise. Thus, we need to use a combination of real time ‘human’ media and electronic enhancements.

IP Telephony is taking voice back to its communications future. This real-time media type can now be used to complement instant messaging (IM) and email. For example, communications may start by clicking on an IM icon and escalate to telephony by clicking on the adjacent icon. The next step is obvious: add the visual element when you want to replicate a meeting and/or enhance collaboration. The following graphic visualizes this relationship. Email is ideal for routine work and when decisions can be taken without a discussion. When text-based communications are not up to the task and personal involvement is needed phones are currently employed. However, in 2004 video will come to corporate desktops. This medium will be employed as the next best thing to a face-to-face meeting and we can anticipate increased use of this medium and in a few years video-enhanced communications will be taken for granted.

*Electronic media are ideal for routine tasks. Telephony and video enter the picture when there is a need for personal involvement.*

**The Big Communications Picture**
Implementing Video over IP is a logical next step for many companies. It leverages the same LAN/WAN infrastructure, thereby improving the ROI, and for desktop meetings the systems upgrade cost is minimal. The information and communications network must be engineered to handle the additional traffic and this is something that should be evaluated at an early stage, ideally before the move to IP telephony. This will help ensure a smooth transition at a later date.

**Wireless as the norm**

Our communication and information needs have grown in size and complexity in recent years. Over half the average workforce is mobile and this figure is set to rise to two-thirds by 2006 according to an IDC report. Couple this statistic with the need to access, manage and exchange information and it is clear that replication of the wireline office is a pressing issue.

Previous attempts to create the mobile office were not successful. Wireless voice and wireline data occupied disparate domains and integration was complex and therefore costly. But the new 2.5G networks and Wi-Fi hot spots employ the same communications protocol (IP) as wireline networks and this has enabled the wireless

**ACCESS VIA ANY DEVICE**

Communications portals enable anytime, anywhere access to corporate data, personal information and collaborative tools.
paradigm to be realized. The increase in mobility, driven initially by the spectacular success of cellular telephony, has resulted in the rapid growth of wireless LANs, i.e. extensions to the wireline infrastructure. These and other developments indicate that wireless will become the normal way of communicating and working, i.e. mobile devices and air interfaces will be increasingly used to access the resources of wireline corporate infrastructures.

Users interface with the Siemens MobileOffice solution via a Communications Portal. Access to messages and information, both personal and corporate, is enabled via the portal’s browser, which can be customized by users in order to match their individual requirements. For example, a salesperson would typically go directly to the product and customer information that he/she handles. Customization therefore meets the critical need to find the right information at the right time and in the case of mobile workers that need can become mission-critical. For example, orders are easier to win by sales forces that have real-time access to information stored in back office CRM and ERP systems.

Mobile employees who only travel with a cellular phone will normally use the portal in order to listen to emails and dictate responses, as described in an earlier section. Ideally this would be a 2.5G phone since the device would then be on-line all the time and messages would be received immediately. However, the solution will send an SMS to users of 2G devices in order to inform them that new email has been received.

Device mediation is used to provide the appropriate communications features to the user’s device, i.e. the system recognizes the resources such as screen size. Media translation includes text to speech to speech to text.

**SIPing into the future**

SIP is an end-to-end rendezvous protocol that is used to establish and terminate communications sessions over IP networks. This client-server protocol establishes communications links over different IP networks and between disparate SIP-compliant devices. The protocol is not concerned with details such as the device at the other end or the network(s) that the communications traffic traverses. This explains why it becomes possible to dissolve the difference between today’s networks, both wireline and wireless. For example, a session might start with an IP phone on an enterprise network, traverse the Internet as well as one or more cellular networks and end up on a mobile phone. It might also stay on the Internet before being handed off to a Wi-Fi hot spot, where it terminates on a ‘softphone’ or PDA.

SIP is the only protocol needed to support voice, chat, instant messaging, presence, multimedia messaging and video. In addition, SIP has been selected as the call control standard for 3G wireless networks. This indicates that this versatile protocol will be increasingly used to provide unified domains.
At first sight this may seem to be a dream-on scenario; we are talking about a groundbreaking concept, but so was cellular telephony with its anywhere, anytime communications paradigm. The concept of unified domains and the unified user experiences that Siemens has pioneered is set to make equally significant changes to work patterns and practices, one example being the easy and economic creation of peer-to-peer networks and so-called ecosystems.

The power of presence is just starting to make its mark while SIP is the technology that will take us into 21st century communications. Usage will be intuitive since nothing much changes from the end users’ perspective, which is the one that really matters. SIP, like cellular telephony, will become an invisible technology — something we take for granted.

That is the big picture. It’s a visionary concept that we share with IBM, Microsoft, SAP and other leading IT vendors. It’s also a concept that the market is embracing. Siemens is playing a pivotal role in the development and deployment of this new medium, e.g. HiPath OpenScape is a SIP-based communications suite. The server for enterprise networks is Microsoft LCS; HiPath 8000 is employed for carrier-class implementation in the data centers of large enterprises.

These and other developments indicate that the company has brought its unrivalled telephony expertise and experience to the real-time world of unified communications and information. In a nutshell, Siemens is putting the C into next-generation ICT, which is detailed in the next section.

**LifeWorks: an even bigger picture**

So far we have mainly considered the internal requirements of organizations, i.e. the way that HiPath 2gIP applications are being used to improve communications between individual employees and workgroups. As we have seen, this leads to increased productivity and profitability, but there is an even bigger picture — a visionary concept called LifeWorks.

LifeWorks has several facets, but from an enterprise perspective it represents a logical, network-based extension of the presence and availability paradigm. In recent years many companies have focused their resources on core competences and mainstream activities such as manufacturing have been outsourced. Ecosystems, which represent complex webs of inter-company transactions between customers, suppliers and other authorized third parties, are the natural extension of this trend. Thus, once the benefits of enhanced communication and collaboration have been realized internally, the next step is to extend them to authorized parties in the ecosystem, which is where a subscriber-solution hosted by carriers and other service providers enters the equation.
Once the benefits of enhanced communication and collaboration have been realized inside the enterprise, the logical next step is to extend them to authorized parties in the ecosystem.

LifeWorks is therefore a carrier-class implementation of HiPath 2gIP applications, the most important of which for this market sector is HiPath OpenScape. Authorized ecosystem partners that employ presence and managed availability as a service have the same presence and availability functionality as the relevant employees of the 'owner' of the ecosystem. This means that the unified domain and unified user experience applies to all authorized parties across both public and private networks: it is not limited to an individual corporate infrastructure.

Extending the communications and collaboration paradigm in this way results in more efficient business processes, e.g. issues can be resolved in real time. However, a less obvious benefit is the significant reduction in transaction costs. Outsourcing the manufacture of products drives prices down but ecosystems require many more transactions than in-house production. This means that the percentage cost of transactions is high; a figure of 50% is typical. Thus, reductions in this area will have a much bigger impact on prices than those in manufacture and distribution, where only relatively minor improvements can normally be realized.

LifeWorks also involves a baseline telephony service, i.e. the ability to set up and take down calls made from and to IP phones. Thus, an IP Centrex service eliminates the need to install IP PBXs. Centrex services are widely used in North America, less so in Europe for various reasons, e.g. geographic constraints. However, IP removes this constraint.

Other facets of this concept include hosting a carrier-class HiPath 8000 solution in one or more data centers of a very large enterprise. This would allow the enterprise to deploy its own ecosystem. A typical scenario would involve starting with a mix of HiPath systems at various locations and then adding the SIP overlay network service at a later stage.

Carriers and service providers can provide a range of network-based HiPath and third-party applications to all business users: from home professionals through to small- and medium-sized business and on to large enterprises. And there are early indications that presence and managed availability services will also be deployed to consumers. One such indication is the success of ‘push-to-talk’ mobile telephony.
This brief explanation indicates that the core concept of LifeWorks is the integration of home, business and carrier networks as well as wired and wireless networks. By integrating communications among home offices, small offices, branch offices, regional offices and headquarters, LifeWorks creates a unified domain across both carrier and enterprise market segments and erases the artificial boundaries imposed by today’s technologies. The result is a unified user experience regardless of location or device.

LifeWorks is also a lifestyle concept, as the name suggests. Technology is employed to provide a homogeneous communication landscape and enable a secure, seamless, yet personally managed consistent end-user experience. This means no matter where and when communication takes place, whether in personal, or in professional circumstances, it happens both conveniently and efficiently.

Summary

Siemens has raised the real-time communications bar to a record-breaking height. The company’s wide-ranging portfolio comprises:

1) An award-winning migration strategy
2) Versatile HiPath systems and a modular architecture
3) HiPath ComScende: feature-rich real-time communications software
4) All mainstream IP communications applications
5) HiPath OpenScape: groundbreaking presence and managed availability; killer app
6) Interoperability with competitive platforms and mainstream data systems (e.g. IBM, Microsoft and SAP)
7) An open development environment
8) A mobile office solution
9) IP video
10) LifeWorks: unified communications domains and end user experiences

Ten facts that support two statements:
(1) Siemens is the leader in real-time communications.
(2) Siemens puts the real-time C into ICT.
Conclusions

The voice-data convergence debate is over. VoIP is an established, robust technology having the requisite quality of service for business communications. Currently (Q1 2004) about 11% of all phone calls use VoIP at some stage in the connection. This technology reduces communications costs and simplifies network management, but the really big business benefits come from real-time communications applications. Convergence has facilitated the development and implementation of CTI-type applications such as unified messaging, unified communications and contact centers; now Siemens is driving second-generation applications such as HiPath OpenScape. This is a groundbreaking development: one that combines the power of presence and managed availability with SIP’s ability to traverse different IP networks. Moreover, this new communications paradigm does more than save time and boost productivity; in addition it minimizes stress and enables a much better personal and business lifestyle.

However, HiPath OpenScape should really be seen as the tip of an iceberg. Siemens has also pioneered the award-winning\(^1\) LifeWorks concept of unified domains and unified user experiences and brought feature-rich telephony to an open systems development environment.

The benefits that result from paradigm shift will take time to evolve but it is merely a matter of time. The Big Picture described in this white paper is a future that has already started.

\(^1\) The “European Innovation Award” from The Wall Street Journal Europe.
The information provided in White Paper contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.