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Vipera Mobile Network Operator

Vision Whitepaper

This document describes the vision for the ongoing development of the Vipera mobile network, and, from an end user point of view, how the Vipera network operates.

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1 Mobile Trends

Shipments of mobile devices are booming again. Especially noticeable is the considerable increase in sales of smart handheld devices (SHD). Industry estimates show that by 2006 SHD will outsell regular phones, and that these devices will include a camera and other multimedia equipment suitable for the typical consumer. SHD encompass SmartPhones as well as handhold's (PDAs and PocketPCs) with wireless networking capabilities. In this article the short form *device* is used to refer to an SHD, if not stated otherwise.

At the same time there is a proliferation in wireless networks underway. Bearers such as GPRS, EDGE, WCDMA/UMTS and WLAN transport IP packets from device to device, from device to server, and from server to device. Although these bearers provide for ubiquitous IP connectivity, bandwidth for mobile networks is still fairly limited and the per-megabyte fees charged for these networks are rather high. Users are concerned about the data traffic produced by their mobile applications. Efficient encoding of information and data compression become important, as is security for business usage.

While all this technology is fascinating we best not forget the most important element in mobile applications; the mobile *end user* herself. What is the end user after? Initial data application successes include text/picture messaging, ring tones, games, music and news alerts. Less interest has been shown in the much touted web surfing facilities of mobile micro-browsers. This has lead us to focus on interactive mobile applications providing entertainment for consumers and increasing the productivity of business users on the move.

2 Mobile Problems

2.1 SMS Monopoly Game?

The mobile world is far less exciting than some TV spots like to suggest. Let's have a look first at text messaging (SMS), the simplest, and most widely used mobile data service. Just in the UK alone more than 20 billion SMS messages were sent in 2003[1]. SMS accounts for a considerable percentage of mobile operator revenue, implying they continue to impose a rather high price for this basic service. A 160 character SMS can still cost the end user more than € 0.10 per message. This certainly means good business for the operators.

This might lead you to the idea of operating your own SMS control centre (SMSC) to offer an alternative, low cost SMS service to subscribers. However, the mobile operator can, and probably will, prevent mobile phones connected to its network going through your SMSC.

Another problem is that one single company owns a very big chunk of the market for SMSC software. Now if a mobile operator, which just happens to be a major user of a particular SMSC package, tells the SMSC software developer that they would not like to see you operating an SMSC in competition to the operator, you might have trouble obtaining the SMSC software. Anyway this was just a little mind game offering an explanation for those high fees, hypothesizing that SMS is not an open market.

As we shall later see, Vipera offers a solution to this dilemma: An SMSC-like infrastructure operated on top of any wireless Internet connection. Vipera text messages are not limited in size and can also easily be forwarded to other services such as e-mail accounts.

2.2 OK, but what about MMS?

The problems with MMS are very similar to those of SMS. In addition, MMS messages are much more expensive than SMS and are subject to roaming issues between providers.

2.3 WAP is ... ?

Next lets talk about micro browsers and WAP. Have you ever stopped thinking about how a typical PC and a mobile phone are used? For hours on a end a PC user will sit at his machine, typing and staring at the screen working with office software, accounting, editing documents and browsing the Internet on the lookout for content. The important conclusion is: you sit in front of it and you stare at it several hours a day.

[1] Source: Mobile Data Association (MDA).

Eventually its time to go home. For some people its at 5pm, for others 2am, that varies. However, no matter what your work habits are, you thankfully stop staring at the screen and off you go.

Mobile phones are used quite differently. First of all you carry them with you all day long, no matter where you are, at work or at home. Some people leave their mobile turned on the whole night when they go to bed. However, its quite unusual to stare at your mobile phone display for hours. In spite of the hype, TV and video delivered to your mobile phone won't change that either; let's not be blinded by technology.

So, following the logic, its probably unreasonable to expect to see people excessively surfing the web on their mobile phone, quite apart from the damage this could do to your eyes constantly looking at a small screen. On the other hand, the billions of text messages sent worldwide each month proves that people want interesting content to be delivered automatically to their phone. Note this is diametrically opposed to actually fetching content yourself using a browser. The important conclusion is: you carry it with you most of the time but without staring at it, you just want that little piece of equipment to beep when something interesting happens. The user does not go to find the content, but interesting content shall find the user.

Still we don't want to give the impression that micro browsers, WML and XHTML are useless. There are application areas where it makes perfectly sense to use a browser on a SmartPhone. Also to be considered is that the WAP user experience has gotten better due to the availability of high resolution color screens, faster networks and WAP2. We just don't believe it's ever going to be a killer application.

2.4 First Generation Mobile Applications

There are many applications for mobile devices, mainly games, calendaring, to-do lists, productivity tools, etc. Most applications do not take full advantage of the connectivity and multimedia features of today's SHDs. Developing networked mobile applications means finding solutions to the following tasks:

1. First of all mobile applications need to establish a *network connection* to other mobile applications or to a server. This is not particularly difficult since the software development kits for mobile Java (J2ME), PalmOS, PocketPC and Symbian provide the required libraries.
2. Next, developers need to consider that connectivity to and from a mobile device is *intermittent* at best. It is a simple fact that network connections fail when network coverage is poor. Network reception fluctuates significantly in downtown areas when the user is on the move in spite of a high network coverage. Software needs to be written in a way that makes this fact of life completely transparent to the end user.
3. The greatest challenge consists in setting up a *mobile applications infrastructure* allowing the end user to download applications targeted to her device, to establish a connection to a network service, to safely and reliably exchange data with other applications and services, and so forth. This is the end user perspective. On the other hand, content providers (e.g., application developers) would like to bill end users on a data-volume or airtime basis. Moreover, services are required which allow end users to create online accounts where they can log in to download new applications, view what usage charges have accrued for their mobile applications, etc. As we shall later see, the focus of Vipera is on providing such a mobile applications infrastructure “on steroids”.
4. The mobile application platforms and portals available today have failed to deliver a fully integrated solution for content, billing and provisioning. Some solutions offer great provisioning capabilities but fall short in the other aspects. Other platforms offer interesting content but their billing system, if available at all, is very rudimentary.

2.5 Shocked by my Phone Bill

In spite of widespread availability in recent years of fast(er) networks, data transfer fees have stayed stubbornly high; e-mail and web access from a mobile device remains out of reach for mere mortals. In Europe, an SMS can cost € 0.10, an MMS (multimedia message) upwards of € 0.50. The cost per hundred kilobytes of raw data sent over GPRS can easily be € 1.50 or more. Due to the continued proliferation of broadband (WCDMA/UMTS, WLAN) we expect fees for raw data to become much more attractive in the medium term. However, we do expect prices for value added services such as SMS and picture messaging to remain comparatively high.

Vipera offers value added services such as text/picture messaging, news, mobile e-mail and games over all existing wireless bearers including GPRS, UMTS and WLAN. This at typically a fraction of the fees charged by mobile operators for SMS and MMS. For content providers, Vipera offers a highly flexible, compelling billing system coupled with the ability to offer content independent of the mobile operator.

2.6 Scammed by their Billing Model

If you are a content provider, and you have thought about offering an SMS service such as voting, sports news, whatever, you might have noticed that

1. It takes considerable development effort to connect your mobile service to the SMS infrastructure at the operator. There are many different “standards” and protocols in use (UCP, SMPP, XMS, etc.). You often end up implementing more than one standard in order to provide your service to more than one network. Or you end up paying high license fees for a third-party, proprietary mobile gateway product which implements the various SMS protocols.
2. Operator billing models are quite inflexible and usually not to your advantage. Sometimes 70% or more of revenue goes to the operator even though its your content being sent through their (simple) service. In addition you have to pay fixed monthly usage fees for your SMS “large account”.

2.7 Popularity of SMS Revisited

Let's finish this thought provoking section with a joke. It was told to me by a Finnish person I met at a conference years ago. “Do you know why SMS is so popular in Finland? Because the average Fin can express his whole life within 160 characters”. No offense intended!

3 Vipera to the Rescue

3.1 What is Vipera?

So what is Vipera after all this? First of all, the pronunciation is [vaɪ.pra]. In English, Vipera is pronounced [vaɪ.prə]. Like a combination of the words 'viper' and 'opera'. 'Vipera' stems from Latin and means *viper*; an agile snake characterized by hollow venom-conducting fangs in its upper jaw.

Vipera is a *mobile data network* operated by Vipera GmbH (Ltd.), a company founded early in 2003 with registered offices near Zurich, Switzerland. In contrast to most other mobile operators Vipera does not offer traditional voice services, our focus is only on value-added mobile data services. Services such as text/picture messaging, mobile news, games etc. on top of existing data bearers such as GPRS, WCDMA/UMTS and WLAN.

Vipera is a *virtual* network operator in that we do not roll out our own base stations and antennas. To take advantage of Vipera, users need only purchase a SIM card from one of their local operators such as Vodafone, Orange, Verizon etc. We call them *first generation* mobile operators, Vipera is a *second generation*, virtual operator.

These operators do no more than transport IP packets between Vipera applications running on mobile devices and the Vipera server-based software which comprises the “Vipera network”. Applications such as picture messaging, games, etc. are developed by Vipera and its partners. These applications are downloaded to the user's mobile device and use the Vipera network to send information from device to device, device to e-mail account, etc. The Vipera server-based software is invisible to the end user and runs in various data centers located around the world.

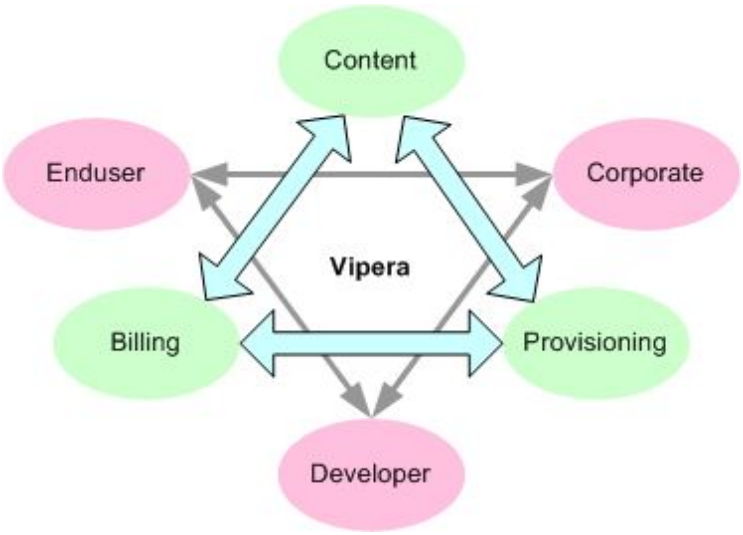


Illustration 1: Vipera trilogy.

Vipera targets three different customer groups:

1. Mobile *end users* seeking entertainment or better productivity through custom-made mobile applications.
2. *Content providers* and *software developers*, seeking revenue from their own content or applications hosted on the Vipera network.
3. Large *corporations* seeking to use Vipera to provide a customized service such as sales force automation etc.

The three main features of the Vipera network are *content*, *provisioning* and *billing*. For that Vipera provides a fully integrated platform solution based on Internet standards.

3.2 Content

Content hosted on the Vipera network takes the form of mobile applications (mainly Java MIDlets) that are downloaded and installed on handheld devices. Other services consist of WML or XHTML pages hosted and billed via the Vipera network. The uniqueness of Vipera lies in the fact that developers of networked mobile applications need not be concerned with the issues of developing and running a communications infrastructure for MIDlets to reliably talk to each other and to server based applications, nor for billing the end user for these services.

3.3 Provisioning

Provisioning allows end users to find new Vipera applications, to download them directly to their mobile device, and to easily configure and personalize those applications.

3.4 Billing

One of the strongest features of Vipera is its flexible *billing system*. First time users need to create their Vipera account via the portal at www.vipera.com. The Vipera billing system uses the notion of “points”; this is like a virtual currency within our network. Every user receives a certain amount of free points every month. Additional points can be purchased at any time and through a subscription plan.

Every time the Vipera service is used, for example to send a picture message from a mobile phone to an e-mail address, we withdraw points from your Vipera account. Once all the points have been used up, you got the option of either purchasing more points by credit card, or of waiting until the end of the month, that's when the next allotment of free points is granted to your account.

Vipera agrees on a billing model with third party content providers. The Vipera network measures transmitted data volume, transmitted data units, unit sizes, air time, etc. and can charge end user accounts based on a billing model defined by the content provider. At the end of each month, Vipera

transfers revenue to the content provider's bank account or credit card. Vipera relies on the PayPal™ service for all payment transactions.

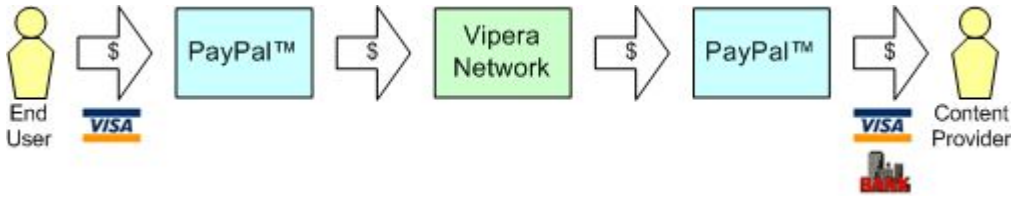


Illustration 2: Revenue flow.

3.5 Unique Selling Propositions

Thus the USPs of Vipera are

1. An exciting end user experience thanks to interactive, networked content delivered through custom made applications on mobile devices.
2. Lower service fees for the end user. For example, picture messages will cost the end user just a few cents in total, including data fees charged by the first generation data network operator used beneath the Vipera network. This is a fraction of the MMS fees being charged today.
3. Flexible billing system fully integrated with PayPal™. This is transparent to the end user, the account status can be checked online at any time.
4. Standards compliance: The Vipera software and protocols are based upon open Internet standards such as HTTP, TCP/IP, SSL, and SOAP WebServices. Part of the Vipera Software is available under an Open Source model.
5. Independence. Developers and content providers are given full choice over content types, interaction models (information push, request/response, peer-to-peer) and billing models. Eventually cost benefits can be accrued.

4 Ann's Use Case

To round off our understanding of the Vipera network, lets examine a fictive use case. Ann is a journalist working for a computer magazine. She's thinking of trying out Vipera to send picture messages taken at a computer exhibition, from her mobile phone to the e-mail account of one of her editorial colleagues.

- Ann has heard of Vipera and thinks it might be cheaper and faster than the MMS picture messaging service provided by her mobile operator. And, Vipera picture messaging works with any network operator whereas there are still interoperability and roaming issues with MMS.
- From her PC, Ann uses a web browser to open the Vipera portal page at www.vipera.com. She likes what she sees on the site and decides to sign up for a Vipera end user account, and it's free!
- Ann clicks onto the “new account” link, accepts the “Terms of Use” and fills in the registration form.
- Shortly after submitting the form, Ann receives an automatic e-mail from the Vipera portal welcoming her to the service and providing her with her unique Vipera user name `ann`, her Vipera address `041-76230-002348007`, and her password `auklgtzu`. She will need the Vipera user name to log on to the Vipera portal via a Web browser. The Vipera address is like a phone number. It's used by Ann's colleagues to send text/picture messages as well as other data to her mobile device. The password is used to prevent other people from using her Vipera account.
- Now its time for Ann to download the Vipera picture messaging application called “Shoot&Send”. Ann starts the microbrowser on her mobile phone and enters the service address `wap.vipera.com`. A list of mobile applications appears. Ann selects “Shoot&Send” and starts to download the application.
- Once the download completes, Ann starts the Shoot&Send application. Since this is the first time it is being used, the application prompts Ann for her Vipera address and password. Ann enters `041-76230-002348007` and `auklgtzu`.
- Next, Ann uses Shoot&Send to take a picture with her phone camera. The Shoot&Send application asks her where she would like to send the picture. Ann enters Bob's e-mail address and sends the picture on its way. A few seconds later the picture arrives in Bob's e-mail account.

- Bob uses MS Outlook on a PC to view the picture. He likes it and immediately replies with “Well done, Ann!”. The Vipera network processes Bob's response e-mail, extracts the text, and sends it directly to the Shoot&Send application on Ann's device. The application flashes a little “inbox” icon to let Ann know that a message has arrived for her. Ann uses the Shoot&Send “receive” menu to view the text. It works! And this without any complicated configuring on Ann's part. All the “magic” is done by the Vipera network, no intervention from either Ann or Bob.
- Ann sends a dozen further picture messages and then logs into the Vipera portal to check her account. For this she enters her user name `ann` and password `auklgtzu` in the portal login form. She sees she's used up about a third of this month's free points.
- After a couple of days of using Vipera for her professional work, Ann receives an automatic e-mail from the Vipera portal informing her that she is running out of her monthly allocation of free points. Ann realizes that the free Vipera points are not enough for what she still wants to do and decides to sign up for a Vipera monthly subscription plan, granting her the necessary extra points she needs. Any time she wants Ann can top-up the account conveniently by credit card, using the PayPal™ service she already knows.

That's it. Ann is ready to take advantage of Vipera!

5 Vipera Applications

Vipera can support a whole host of applications and content types (text, picture, binary, documents, ...) the initial offering includes those listed below. Further applications will be provided by Vipera, other companies and individual developers.

1. Shoot&Send – A picture messaging application with features similar to MMS. Take a snapshot with your mobile's camera and send it to other Shoot&Send users or any Internet e-mail account. E-mail replies can be read from within Shoot&Send.
2. TextMessenger – A text messaging application similar to SMS. Send text messages to other TextMessenger users or Internet e-mail accounts. E-mails to mailgw@vipera.com with a Vipera address in the subject line will be forwarded to the corresponding Vipera TextMessenger account.
3. MobileNews – An RSS[2] news reader. Log into the Vipera portal and configure a set of RSS URLs. The Vipera network periodically scans these news feeds and pushes news items to your MobileNews application. News headlines are sent to your mobile device and full news text is delivered to your e-mail account on demand.
4. MobileFun – View images transmitted via NetNews (Usenet) binary groups.

6 How it Works

6.1 The Components

From a technical point of view, Vipera consists of three software components:

- A *Vipera access library,* which has to be installed on the mobile device. Typically the access library is packaged and downloaded with the Vipera mobile application (MIDlet). This is completely transparent to the end user and does not require special installation or configuration. The Vipera access library is provided for the J2ME platform[3] under an Open Source license. This allows handset manufacturers to extend the access library and to include it in their products at no cost.
- The *global Vipera network software* is what gets the Vipera network going (see Illustration 3). This is the invisible heart of our system needed to handle access control, billing, data transmission, data conversion etc. This software is installed at various data centers around the world, managed and operated by Vipera GmbH. Mobile devices connect to the Vipera network through the access library, using the TCP/IP protocol.

[2] RSS (which can stand for RDF Site Summary, Rich Site Summary, or Really Simple Syndication) is a format for syndicating news and the content of news-like sites, including major news sites like Wired or News.com, and personal weblogs.

[3] Access libraries for other platforms, notably Symbian, PalmOS and PocketPC .NET are in development and will follow.

- The *Vipera portal* at www.vipera.com is also operated by Vipera GmbH. The portal offers user registration, accounting functions as well as the downloading of Vipera content and applications. Moreover, third parties can host their Vipera applications themselves on the portal under a Wireless ASP (Application Service Provider) model.

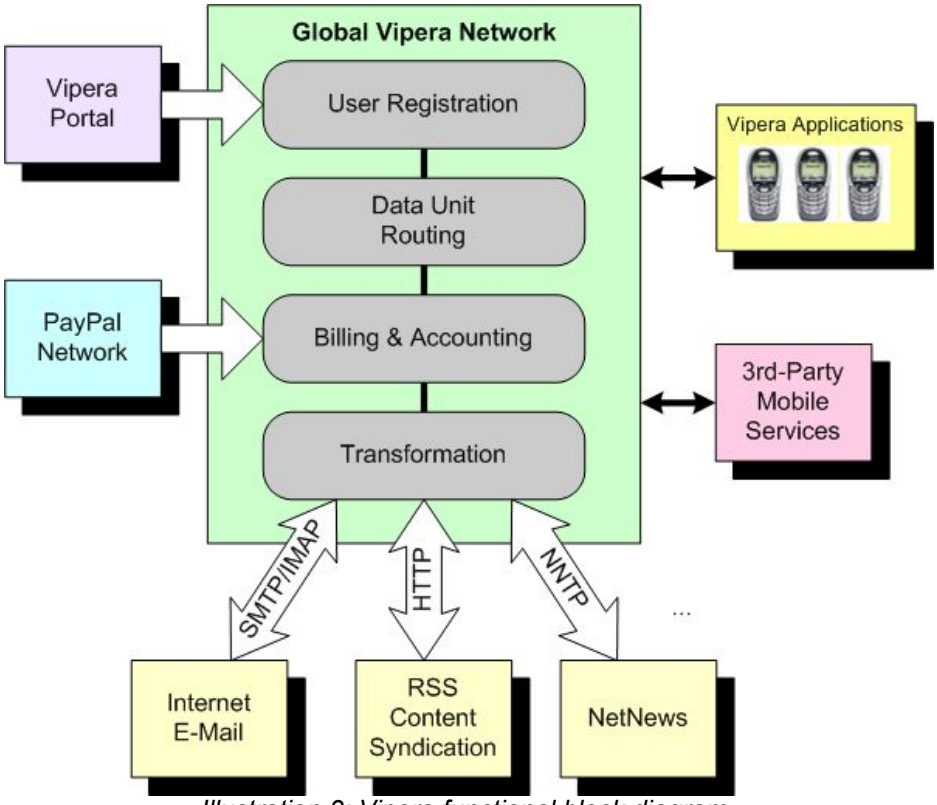
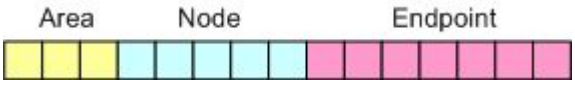


Illustration 3: Vipera functional block diagram.

6.2 The Procedure

As shown by the Use Case in Section 4, end users must register with the Vipera portal before they can use any Vipera application on their mobile device. Doing this means they have a Vipera address in the form `aaa-bbbbb-ccccccc` assigned to the user. `aaa` denotes the so-called *area*, `bbbbb` the *node*, and `ccccccc` the *endpoint* within that area and node. These three components together make up the globally unique Vipera ID. For example, `041-76230-002348007`.



Vipera addresses look like phone numbers but there's no direct relation between a Vipera address and the phone number assigned to the device by the mobile operator. The Vipera address is configured within every Vipera application used by the user. This means an application “knows” its Vipera address.

Vipera addresses denote not only mobile users, but also services. For example, the Vipera network hosts services such as an e-mail gateway, an echo service and so forth. An application can communicate with these services by addressing “data units” with the Vipera address of the service.

Using a design similar to the public phone system, the global Vipera network consists of many “switches” to which Vipera applications connect. These switches, a pure software implementation, are called *Vipera servers*. When a Vipera application is started on a mobile device, the application connects to the nearest Vipera server called the “home server” of that particular user. To determine the home server, the Vipera access library (which is linked with the application) contacts the Internet Domain Name Service (DNS) and asks for the Internet host responsible for `aaa-bbbbb` (or `041-76230` in our specific example).

Applications connected to different Vipera servers can of course communicate with each other. This is accomplished via a *global routing* protocol implemented between servers.

When Ann in Section 4 sent a picture message to Bob, the following happened:

- Her Shoot&Send application connected to Ann's home server. This is the server responsible for area/node `041-76230`.
- Shoot&Send created a data-unit containing a picture taken with the camera, as well as Bob's e-mail address. The data unit was sent to the Vipera e-mail gateway at `000-99000-0000002`. (`000-99000` denotes a service directly connected to Ann's home server).
- The data unit arrived at the Vipera server. The server determined the intended address of the e-mail gateway and passed the unit along to the gateway. The e-mail gateway extracted Bob's e-mail address, created a multimedia e-mail with picture attachment, and sent it off to Bob's e-mail account.

When Bob sent an e-mail back, the following happened:

- The e-mail was addressed to mailgw@vipera.com. The subject contained Ann's Vipera address `041-76230-002348007`.
- The e-mail was received by a software module running inside the global Vipera network. The destination Vipera address was extracted from its subject line and the body of the e-mail was put into a data unit.
- Finally the data unit was delivered to Ann's Shoot&Send application.
- The “inbox” icon was displayed on Ann's Shoot&Send application, telling her that a message has arrived.

6.3 Addressing Revisited

The global Vipera network consists of multiple areas. An area typically maps to a country. A three digit number is assigned to each area by following the international phone numbering scheme. E.g., `001` for the United States, `041` for Switzerland, `049` for Germany, and so forth.

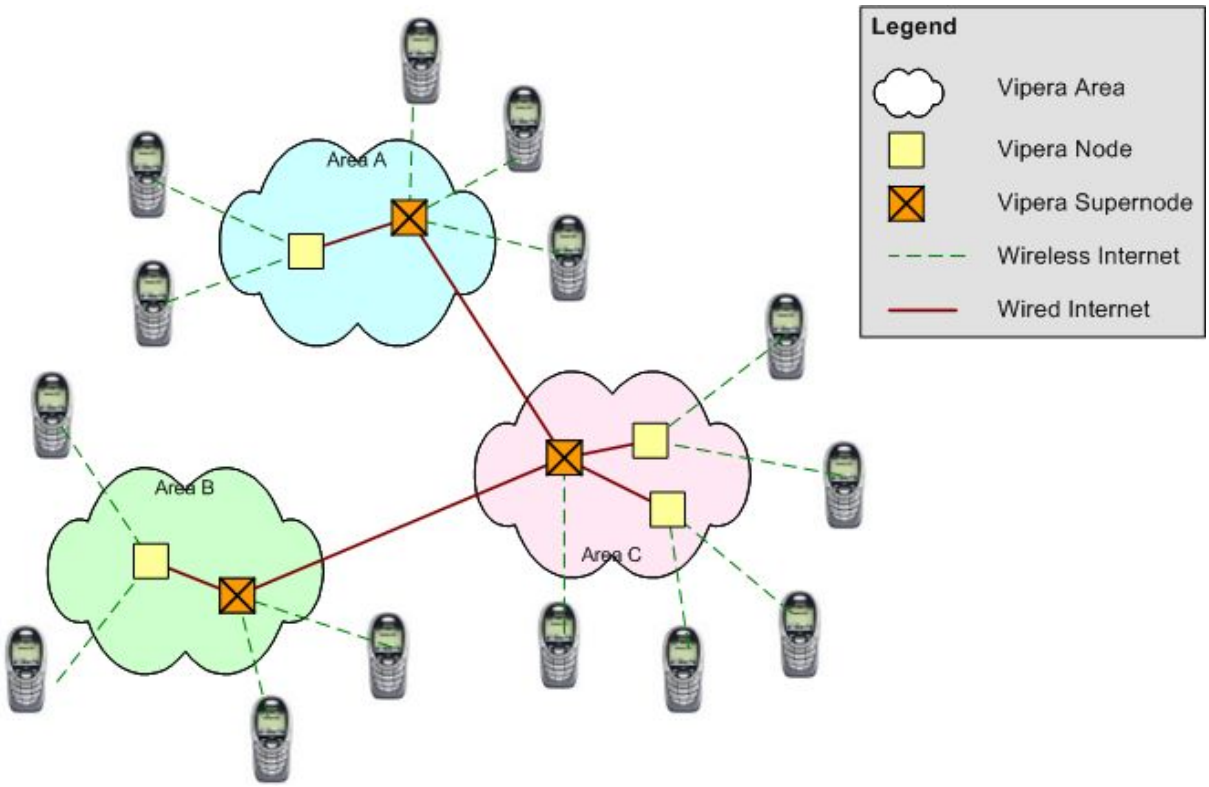


Illustration 4: Sample network topology.

A single Vipera server clearly does not have sufficient capacity to service an entire country. Hence each area is subdivided into “nodes”. A five-digit number is used to denote a particular node within an area.

This allows for a huge number of servers (and thus scalability!) within an area. Together the three digit area and five digit node number uniquely define a Vipera server.

When a Vipera application submits a data unit, the data unit is first delivered to the home server of the application. There the unit is stored in a database to handle the situation when the receiving node is not currently available.

The home server examines the area and node component of the destination address. If it does not correspond to the local home server, the unit is routed to the destination server by consulting a routing table. A data unit can pass through several servers when traveling from source to destination.

Illustration 4 depicts the general topology of a Vipera network. There are three areas, within each area a node is designated to route inter-area data units. This is called a *super node*. Other nodes within the area will route foreign data units to their designated super node within that area. A single node within an area can easily host a user base of ten thousand users, depending mainly on the specific node hardware configuration and usage pattern.

The Vipera global network is a federated architecture, using well know concepts from both the public phone system and Internet Domain Name Service. Both systems have proved to be very scalable and highly resilient to failures.

6.4 Technical Details

Illustration 5 presents a more detailed view of the communications protocols used throughout Vipera. A highly optimized, low-overhead protocol is used between the mobile devices and the Vipera network. A data encoding scheme similar to Binary XML is applied. Just a few tens of additional bytes are added to each outgoing data unit. These extra bytes are used to convey addressing information, quality of service parameters and the like.

The Vipera portal stores user account information in a relational database. When a new account is created or an existing one modified, the portal informs the affected Vipera servers via SOAP calls. Billing information is also conveyed from the Vipera servers to the portal database with SOAP.

Third party mobile services can be developed in Java or in a .NET programming language (C#, VisualBasic etc.). Mobile services are deployed on a servlet engine, a J2EE server or a .NET server. The mobile service connects to the Vipera network using SOAP over HTTP(S).

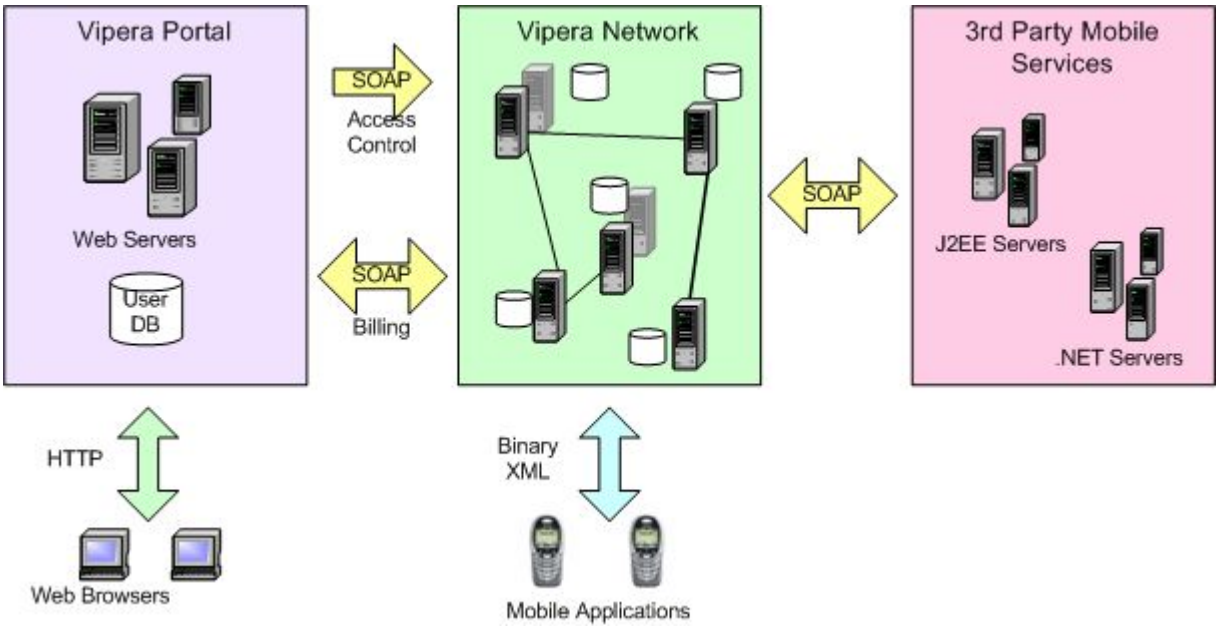


Illustration 5: Main protocols and data flows.

6.5 Vipera Terminology

Term	*Explanation*
Vipera Address	15 digit number (`aaa-bbbbb-ccccccc`) which uniquely identifies a Vipera user within the Vipera network
Node	A virtual “network switch” to which **Vipera applications** are connected. (Logical concept)
Server	Embodiment of a **Node** (physical concept). Typically a **Node** is implemented by one **Server**. However, for fault-tolerance and load sharing, two or more **Servers** can be used for one **Node**. This is transparent to the applications
Home Server (Node)	Denotes the **Server** (or **Node**) to which the application is directly connected
Super Node	A node within an area used to route traffic to other areas
Routing	When two users are connected to two different **Home Servers**, the servers will route **Data Units** among each other
Data Unit	Atomic pieces of data transmitted between **Vipera Applications**. A **Data Unit** can hold a text- or picture message, for example
Area	A network region hosting multiple **Nodes**. Uniquely identified by the first part (`aaa`) of a **Vipera Address**
User Name	Used to log into the Vipera portal
Vipera Application	Refers to a mobile application installed on a device

6.6 Where to Go from Here

The next step would be for you to sign up for your free Vipera end user account at www.vipera.com, download Vipera applications onto your Java enabled handheld (or emulator) and let us know what you think of it!

7 Frequently Asked Questions

1. **Do I need to sign up with a first generation mobile operator such as Vodafone, Verizon, etc.?**
   Yes, normally you do. Vipera is a virtual network operator. This means we do not roll out our own base stations etc. Vipera uses first generation mobile network operators for transporting IP packets from source to destination. However, the interesting value added services and associated billing is done by Vipera. There is an exception, though. If your device uses WLAN or Bluetooth, then you can use Vipera directly atop of that wireless bearer and you don't have any extra charges from the first generation operator. Your Vipera address is all that is required.
2. **Can I run my Vipera applications on multiple devices?**
   Yes you can, as long as you don't run multiple applications *simultaneously with the same Vipera address*.
3. **I don't have any Java device. Can I still use Vipera?**
   You can sign up for a Vipera account and install Vipera applications under a J2ME emulator. We recommend using the Nokia 3650 or 7600 MIDP SDK available from www.forum.nokia.com, as these two tools can simulate a phone camera. Alternatively you can install the Vipera TextMessenger MIDlet under the Sun Wireless Toolkit (Sun WTK).
4. **Which wireless carriers do you support?**
   Vipera basically supports any wireless carrier and bearer, provided the carrier has the ability to transport IP packets from a mobile device to a server connected to the Internet.

5. **Which device platforms do you support?**
   Basically any device capable of executing J2ME MIDP 1.0 or 2.0 compliant Java applications. Further, the Vipera Shoot&Send requires the J2ME Multimedia API (MMAPI) to access the digital camera on the mobile device. Native support for Symbian OS (C++), PalmOS (C/C++), and Pocket PC .NET (C#) will be available in the future. (But note that these platforms support J2ME-MIDP as well).

6. **What is the relationship between a Vipera address and existing mobile phone numbers?**
   None, your Vipera address is independent of any phone number. This allows Vipera applications to run on WLAN enabled devices that are not connected to any mobile phone operator (meaning, they don't even have a phone number). We do use a numbering scheme similar to the public phone system to ensure scalability.

7. **Do I use a Vipera address per device? per Application?**
   A Vipera address is *per end user*. Its not necessary to obtain multiple addresses when a person owns multiple devices. You can use the same address for all your Vipera applications. Internally the Vipera network uses “content identifiers”. So the network knows how to route information to the correct application.

8. **What does the Vipera service cost?**
   The business model is similar to popular freemail providers: If you don't use it too much, then its free. If you use it frequently, then you need to purchase extra points. You always have full control over your Vipera charges since Vipera points are prepaid.

9. **How scalable is the Vipera network?**
   Very. The Vipera network software uses federation and routing techniques. This allows the network to scale globally, by using approaches proven in the public telephone system and the Internet Domain Name System (DNS).

10. **I'm a developer. What do I need to write my own Vipera MIDlets?**
    You will need the J2ME Vipera access library. This is a simple, lightweight (10-20 KB) library that you link to your MIDlets. The library exposes a WMA compliant connector API.

11. **Do I have to host my Vipera MIDlets on the Vipera.com portal?**
    No, you can host your Vipera MIDlets on any server you want. Selected third party content providers can host their applications on the Vipera portal.

12. **What are the licensing models of the Vipera software?**
    The access library is Open Source under the terms and conditions of the Apache group. The Vipera network software is proprietary (closed source).

13. **Why is it called Vipera?**
    Well, that's our secret!