

Shepherd Construction Limited and Intergence Systems

Process	Rapid Site Setup
Users	Construction Site Office Teams
Hardware	Standard Site Server/VSAT/3G
Software	Hyperforma
Location	Nationwide (UK)
Cost	£ 11,411 + VAT (approx)
Benefits	Rapid Data Connectivity



Business Problem

The rapid deployment of data and voice services to construction sites remains a key issue. Although there have been major advancements in available technologies that address this problem (as illustrated in the recently published COMIT Rapid Site Set-up guide), the demand for faster, more resilient and high performance solutions is growing rapidly.

Where once contractors could afford to wait for the delivery of core site ICT infrastructure and communications, this is no longer a commercially viable option.

The amount of data that is required to be transmitted to and from site has also grown significantly, together with the demand for a better user experience.

Business Solution

One of the new and emerging solutions is Hyperforma which is a 'service-enabling' virtual appliance (i.e. software solution only). It is hardware agnostic and supports a number of communication technologies (e.g. 3G, HSDPA, VSAT etc). This was trailed at a Shepherd Construction site in York.

Background

Shepherd Construction Limited is a UK based nationwide contractor who uses email, intranet and other systems to manage day-to-day operations on site. A reliable internet connection is of paramount importance from day one, so where fixed-line infrastructure is not available Shepherd Construction uses either 3G or Satellite communications.

Process

Typically it takes 7 to 8 weeks for BT to provide a basic telephone connection to site and an additional week for a high capacity data line to be installed. This also depends on "line plant" availability (i.e. physical cables from the local exchange to somewhere near the site with spare capacity). In the event this is not present additional charges are incurred and often significantly longer delays. This means critical electronic information cannot be exchanged between the site and other locations which hinder site operations and causes major frustration.

It is for this reason that Shepherd Construction use "3G where possible, Satellite everywhere else" since both these technologies can be installed on site within hours. However, they also bring their own problems. Both suffer from variable performance, are costly and can be difficult to integrate with fixed-line type services.

Solution

Hyperforma is a 'service-enabling virtual appliance' i.e. a software solution that provides a standard set of communication facilities via whatever underlying connectivity is available. It provides WAN acceleration, Internet gateway, firewall, VPN an Intrusion Prevention System and local network services such as file and print servers and a wireless local area network.

This can greatly simplify the configuration of services on site. In combination with 3G or Satellite it provides site staff with a means to access emails and other data services almost immediately once power has been established. It can also ameliorate some of the typical issues that arise with such technologies due to their characteristic latency and variable performance.

Costs

An indicative cost for Hyperforma is £11,411+VAT. The key areas of expenditure are:

- Engineering resource
- Software
- Preparation and Project management

In addition to this, support costs would have been £650 per day or £110 per hour in unit blocks of 20 hours as required. For the purposes of this demonstration project no support charges were made.

Business Benefits

Although difficult to clearly measure there were strongly perceived productivity improvements for site staff. Applications running via the Satellite and 3G links were more responsive and Email and file transfers from the data centre to the remote site were significantly faster. The most direct benefit was the delivery of data connectivity from “day one” (i.e. from date of site establishment with available power, services and accommodation). The system supported the effective operation and delivery of a variety of core software applications and systems for project-based teams

Champion

Steve Slater was the ICT Support Manager for Shepherd Construction Ltd (SCL). He was keen to make the management of remote IT systems more efficient; reducing the time his IT department spent solving connection issues and providing a more reliable service to the project management staff of SCL sites. Moreover it was important to establish faster connections from day one on site.

Implementation Team

The Hyperforma solution is a development of Intergence Systems who are based in Cambridge, UK. The network services used for this project are Orange 3G and VSAT Satellite connections.

Training

Very little training on the system is required, a significant advantage of Hyperforma, as once connection is established all maintenance work can be carried out remotely. A basic introduction to the system includes an explanation of how to power the unit up and when it may be necessary to reboot it. The aim is to provide an invisible component for the users in their connection to the Internet.

Technology Usage

There are some inherent issues in using Satellite and 3G communications over standard fixed line approaches. The key problems relate to limited bandwidth and high latency, both of which can cause significant performance problems for today's bandwidth-hungry applications.

Key issues for Shepherd were:

- Site deployment: the ability to rapidly deploy a site office in a remote location
- Application Performance: Running email, file transfers and their CRM application across satellite links without WAN Acceleration saw the applications performing very poorly with high end user response times.
- Cost: Use of Satellite or 3G connections are charged per Megabyte and large data transactions can prove very costly to the business.

Through the use of Hyperforma, Intergence added additional value to the Shepherd engagement via:

- WAN Acceleration
- The provision of SSL and IPsec VPN site-to-site and remote access
- Email pre-population
- HTTP proxy and content filtering where required
- Layer 3 Routing
- Strong firewall capabilities including an Intrusion Detection System / Intrusion Prevention System (IDS / IPS)
- Active Directory backend synchronisation.

The solution provides all the above features in a single physical device and is ready to be deployed with only minor configuration required relating to the appropriate network configuration. Management of the device is performed remotely via Intergence Support without the need for dedicated onsite support personnel.

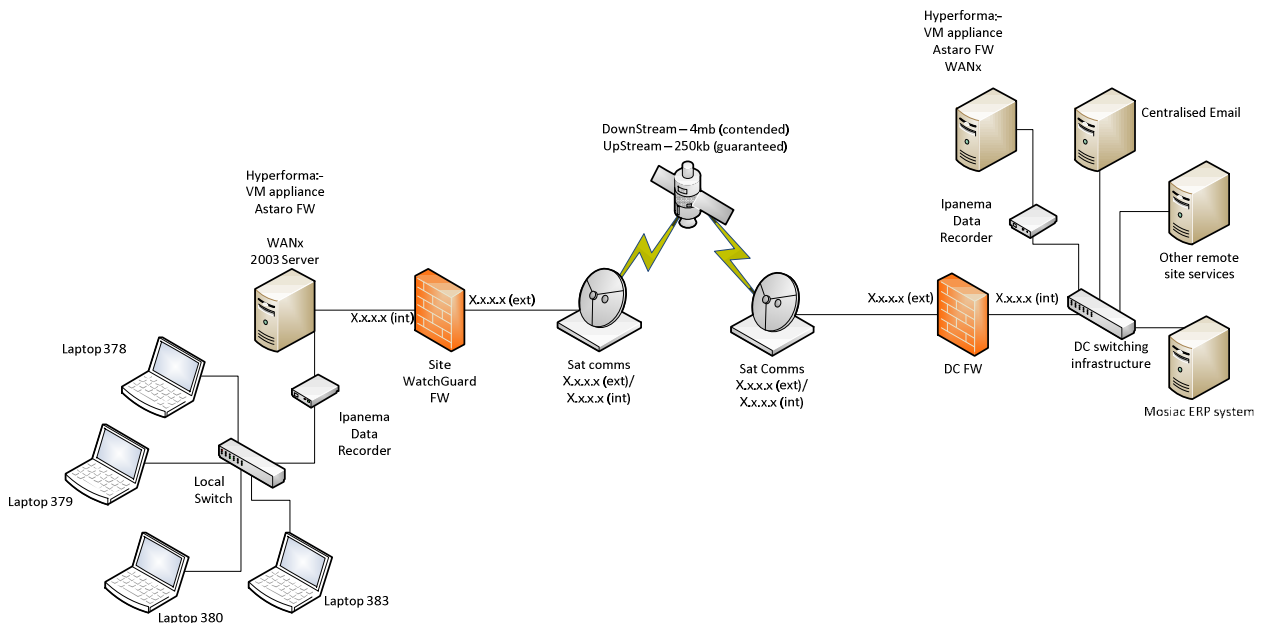
The 2U single chassis design minimises space, noise, power and cooling requirements and if necessary can be deployed in a ruggedized form for environments which are subject to dust, heat, vibration or other environmental factors which would affect a standard server.

Note:

Latency is effectively the time lag between a request for data being made and the data starting to be delivered. It is determined primarily by the physical length of the link.

Bandwidth is effectively the amount of data that can be delivered within a given period of time (once transmission has started) and is primarily determined by the type of link.

Satellite Test Environment



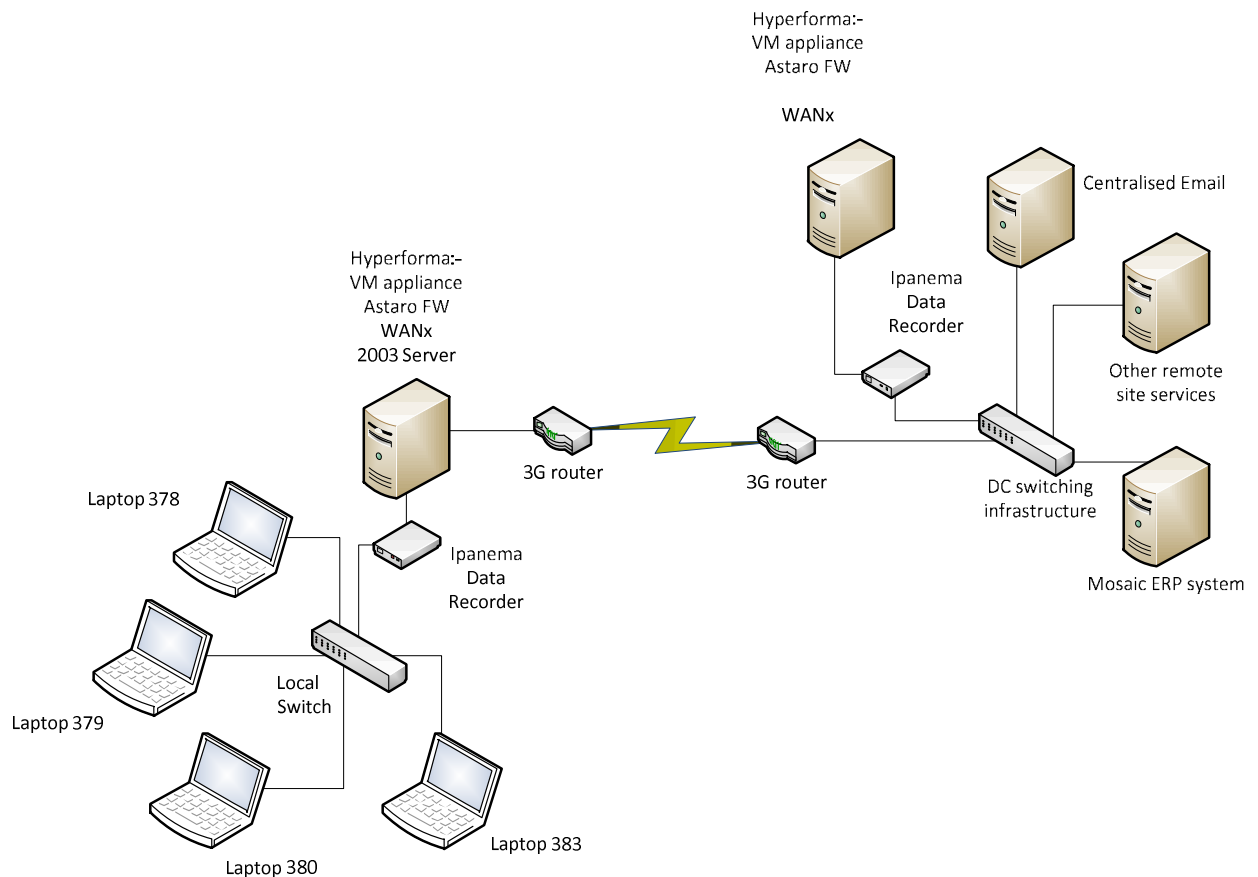
Original Business Process – VSAT Satellite

ADSL lead times are at least 2 weeks but on a remote site it is more likely to take 3 months for British Telecom to install and enable telephony services. During this period a mobile solution is often required to provide network connectivity. Traditionally Satellite communications are used where 3G is not available, most often in remote locations with poor mobile coverage. Satellite does bring with it a number of disadvantages, as previously discussed, most notably a high latency and low bandwidth in comparison with ADSL services and is often a 'stop gap' solution whilst the site waits for an ADSL connection.

New Business Process - VSAT Satellite

The new business process leverages the benefits of Hyperforma to make use of Satellite links more feasible with improved application performance across the WAN. Mobile workers can be more productive with less waiting for files to download or applications to respond.

The benefits can be so great that they negate the need to install ADSL completely which brings with it additional cost savings.

3G SSL Test Environment**Original Business Process – Orange 3G**

As previously mentioned long lead times for ADSL installations on site often means that a mobile solution is required as an interim measure. Shepherd's approach is to use "3G where possible, satellite everywhere else". 3G coverage in the UK has improved and is continuing to improve, but there are still significant areas of poor reception. 3G suffers from higher latency than ADSL, but to a lesser extent than Satellite. In areas of good mobile coverage 3G bandwidth is typically greater than Satellite.

New Business Process – Orange 3G

As with Satellite, the new business process using Hyperforma saw significant benefits in the use of WAN Acceleration to improve application performance. Due to the lower latency and higher bandwidth, even greater performance was leveraged via the 3G link with files downloading up to 28 times faster than without WAN Acceleration enabled. In addition to the performance benefits there were also cost savings thanks to the data reduction capabilities, which saw less data having to be transmitted across the WAN link.

Implementation Costs

The following costs are indicative of a typical Hyperforma deployment

Description	Notes	Cost
Software costs	Dependant on the number of concurrent user sessions	From £2,000
Annual Software Maintenance	Dependant on the number of users supported	From £400
Engineering Resource	(Implementation, Customer Application Testing, Documentation, Training)	£7,500
Preparation and Project Management		£1,500
Support	On-going support	£650 per day or £100 per hour

Costs

Following implementation of the project the only other costs to be incurred are the annual maintenance costs and on-going support from Intergence. As Hyperforma is built to maximise uptime, on-going costs are minimal.

Implementation Timescale

As the project was a trial, the implementation time was a week. If the service-enabler was installed as an investment for an organisation, the time scale would be about 1 – 2 days.

Lessons Learnt

People

Consideration must be given to how the user will feel with the solution and concentrate on ensuring that they are happy with it. For example, the performance of an Internet connection is the main indicator for the Hyperforma users. It is also important to set expectations of the users.

Technology

- The technology is well suited to the email cache model used on our construction sites reducing the data traffic that needs to traverse the network.
- Unfortunately there was no direct improvement in the real time ERP system performance. However, reducing the amount of data passing over the network meant that it was more useable.

Process

- Reliance on a third party to install adds an extra step to the process. This will more likely delay connectivity to site.
- The technology puts an extra layer of complexity on the site server. If this fails it may take more time to recover.

What Next?

- The technology works well. However, the extra costs for installation make this difficult to justify.
- Further discussions with Intergence to establish if the installation / cost model can be modified to suit our requirements.

Details for further investigation

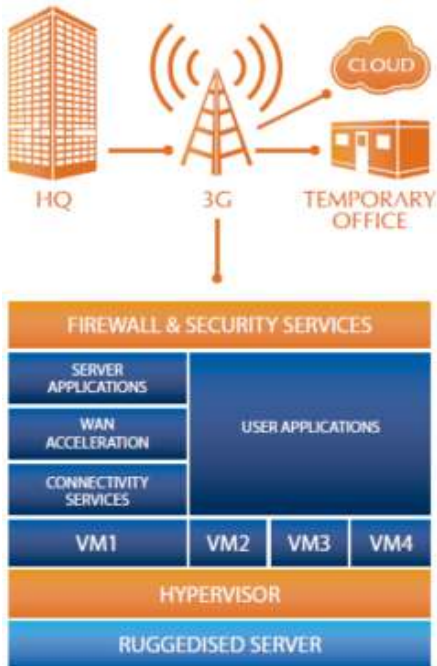
User

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Hardware and software provider

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Technology Overview



Hyperforma

Hyperforma has been designed to provide instance, remote IT infrastructure in a secure, fault tolerant single unit with a very small footprint. Hyperforma can be delivered to a site with a range of software-based capabilities, fully installed and tested, such as firewalls, email, VOIP, office applications, PBX and more, integrated to provide a virtual set of services on hardware that is designed to deliver 99.999% availability.

Hyperforma is designed for organisations that have to operate in temporary or mobile accommodation where demanding environmental conditions such as the desert or maritime can impede IT operations.

Communications Infrastructure

Hyperforma has multiple WAN connectivity options that include 3G, Wi-Fi and Satellite, all of which can be managed remotely.

COMIT PROJECTS Ltd

COMIT, Construction Opportunities for Mobile IT, grew from a two-year research and development project partly funded by the Department of Trade and Industry which completed in 2005. It then became a thriving membership-funded community and in 2011 COMIT Projects Ltd was created to provide a more commercial footing.

Mission Statement

To become the Centre of Excellence for the exploration, development and implementation of mobile computing and communication technologies within the Construction Industry Sector by creating an environment for our members that encourages collaboration, promotes knowledge exchange, supports innovation, industry best practice and continual improvement.

COMIT's mission is to promote the use of mobile technology within the UK construction industry by spreading best practice, promoting new developments and facilitating understanding between technology providers and construction companies. To this end COMIT will support, instigate and promote case studies and demonstration projects, engage with like-minded organisations and actively communicate the benefits of mobile technology to current and future construction members through publications, meetings, conferences and links with educational institutions.

COMIT Case Studies

This report provides an overview of the use of mobile communication technologies on a construction project. It is one of a series of case studies that have been conducted as part of the COMIT project to show real examples of implemented applications.

The case studies illustrate several mobile technologies and how the companies have improved work processes. An overview is given of vital information such as who championed the changes, how much they cost and what business improvements were gained. To gain a full insight, both the staff using the technologies and their managers were interviewed.

How do I find out more?

In addition to the contact details provided in this case study you can use the **Information hub** available on the COMIT website (www.comitproject.org.uk). The relevant details can be found by selecting:

Process	Rapid Site Setup
User	Construction site office teams
Software	Hyperforma
Hardware	Standard Site Server/VSAT/3G
Infrastructure	Data transfer

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