



## Telecommunications and Media

Convergent services  
Combining agility with robustness

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Architect of an Open World™



## Convergence

### The new battleground in telecoms

In this fast changing, highly competitive, and highly pressurized market, telecoms operators and Internet services providers are taking steps at several levels to reduce both their capital and operating expenditure (CAPEX-OPEX), improve the agility of their systems, build customer loyalty and attract new business and personal customers. The impact of concurrent changes in technology, regulations and the needs of customers – both individuals and businesses – is leading telecoms companies to rapidly revise their business strategies and develop ever more sophisticated, high added-value services.

The 'Total IP' revolution means that 'Quadruple Play' – combined access to voice, data, fixed and mobile telephony and a host of innovative services – is becoming a reality, thanks to convergent infrastructures and business systems. IP technologies also open the way to more affordable tariffs, with differential pricing depending on the location where the

service is used (at home, via a WiFi terminal...).

Thanks to these new resources, operators can now implement convergent services designed to improve customer satisfaction, average revenue per user (ARPU) and attract new users, while at the same time keeping costs under control.

### Business-oriented services

- Virtual private networks (VPN)
- Virtual leased lines (VLL)
- IP Centrex – private voice network (mobile and fixed)
- Collaborative business applications
- Integrated address book
- Presence
- Messaging
- Remote office (Teleworking)
- Video and audio conferencing
- Web conferencing
- Geolocation services
- Multimedia customer services
- Push-to-Talk...

So professional workers on the move can access their entire business environment when they are out of the office, at home and now, even when they are in the air! For the enterprise, this undoubtedly paves the way to significant improvements in productivity.

As for private users, the benefits they enjoy include comprehensive telephony services that combine mobile networks and IP, messaging, fixed and mobile address books, TV at home or via a mobile telephone, video on demand (VoD) and much more.

For the players in this sector, from now on, it will be a question of building solutions that combine:

- Lower infrastructure costs, by cutting down on the number of data center sites, adopting a virtualization strategy for servers and storage; even by migrating to more flexible IMS<sup>1</sup> architectures that make it easier to monitor, administer and optimize their systems
- More agile and reliable Information Systems (IS). If information systems and

### Individual subscriber services

- Broadband Internet Access
- Video on Demand (VoD)
- TV over IP (IPTV)
- Integrated address book
- Presence
- Messaging
- SMS & MMS
- Instant Messaging
- Content sharing
- Geolocation services...

OSS/BSS systems are scalable, then operators can respond more efficiently to the market when launching new services, survive the phenomenal growth rates typically experienced in emerging markets, and adapt billing systems to customer requirements

- Stronger customer loyalty, by gathering more detailed knowledge of individual requirements. This depends on everything from effective Customer Relationship Management (CRM) and Business Intelligence (BI) solutions, and well-designed portals that improve the Business to Consumer (B-to-C) interface, right through to convergent billing services, for example.

As a prime contractor in this sector, Bull has successfully integrated convergence and developed associated applications (convergent services, Service delivery Platforms, mediation, billing, provisioning, Service Quality Management, CRM, self-care...) and supports operators with services from consulting, through to systems integration and operation.

<sup>1</sup> IMS: IP Multimedia Subsystem), the telecoms standard aimed at convergence to Total P for telecoms networks and services. Specified by the 3GPP, 3G normalization group, IMS is based on technologies of the Internet world.

# New generation convergent services

Among the latest convergent services, having access to a messaging system and an address book for individual and business users on the move is a key concern for consumers and enterprises alike. Operators are offering both kinds of user convergent services including unified voice messaging, fixed-mobile portals, and video phone services. Below are two examples of unified messaging services implemented by Bull, one for a mobile operator who wanted to develop its VoIP services, and the other for an integrated operator.

## Unified messaging system

This mobile operator offers its business customers a range of services including:

- Unified voice messaging, accessible from a mobile or fixed telephone
- Access to an electronic messaging system from a PC or mobile phone
- A single address book for a shared fixed-mobile connection.
- For individual subscribers, the offering applies to 'Multiple Play' convergent services integrating high-speed ADSL access, VoIP, as well as convergent messaging (text and voice) and a unified address book.

Bull has provided end-to-end integration services for this project: from the telecommunications infrastructure itself, to integration with information systems, and in particular 'self-care' and billing. It is also delivering upgrades, systems operation, maintenance and support services.

Bull's solution features products supplied by its partners including StreamWIDE's Audiostream for messaging, Dilithium for the video gateway, and Thomson Cirpack Class 5's Softswitch for the transit. The scalable hardware platform is a Bull NovaScale® Blade Center server with NFS NetApp storage.

## Unified address book

In this instance, the challenge for this integrated operator was to offer all its subscribers with a single, unified address book that gave them one-click Internet exchanges (Instant Messaging, email...) and access to a common Internet, fixed and mobile phone address book. The second objective was to reduce costs by using a common platform for the different messaging, fixed-mobile telephony and mobile services.

Bull's solution is integrated into the existing infrastructure, and interfaces with the different services the operator already delivers. Bull chose Voxmobili's PIM (Personal Information Management) solution, which offers functions for interactive business cards, single-click verification procedures, and SyncML synchronization. The project is deployed on Bull NovaScale clusters running under Linux® and Oracle.

# OSS/BSS information systems: the changing face

## To speed up the deployment

**Putting the customer at the heart of the information system guarantees that it is relevant and will perform effectively**

In order to speed up the deployment of these new-generation convergent offerings, a thorough understanding of all the different processes and operations support and business support systems (OSS/BSS) is essential. For example, billing needs to be aligned to the customer's specific requirements and marketing programs, the information system (IS) may have to be open to external partners including mobile virtual network operators (MVNOs), content providers and other Internet portals.

Most operators' information systems have been built under pressure, in response to their growth. Therefore they incorporate numerous specific developments, and the resulting architecture generally lacks consistency and agility. When it comes to integrating new and often complex applications, this often leads to performance problems.

So the aim should be to build a customer-focused information system that can take into account:

- Complex business-to-business (B-to-B) customers, with their own hierarchies, geographic locations, payment authorities...
- Private customers – whether simple or complex – individuals, family groups...

## Orange.pl, developed by AMG.net, voted the best business portal in Poland

At the end of February 2008, the Swedish consultancy group Hallvarsson & Halvarsson published a report evaluating 16 business websites in Poland.

Three of the five best portals in Poland were developed by AMG.net, a Bull company. The top award went to the corporate web site of the Telekomunikacja Polska group (orange.pl together with tp.pl), with BRE bank's site in second place, and the state-owned petroleum and gas mining company Polskie Gazownictwo Naftowe i Gazownictwo in fifth place.

## Brazilian telco Embratel develops strategic applications with Bull

Embratel heads the country's largest telecommunications network (fibre optics, underwater cables and satellites) and pursues sustained growth through the implementation of state-of-the-art technologies.

Bull has been partnering Embratel for the last ten years in all application-related aspects of its network operator's business: integration, software support, and the evolution of its communication infrastructure and business processes.

**NovaForge™, a pioneering tool to accelerate developments, to reduce costs and develop flexible solutions**

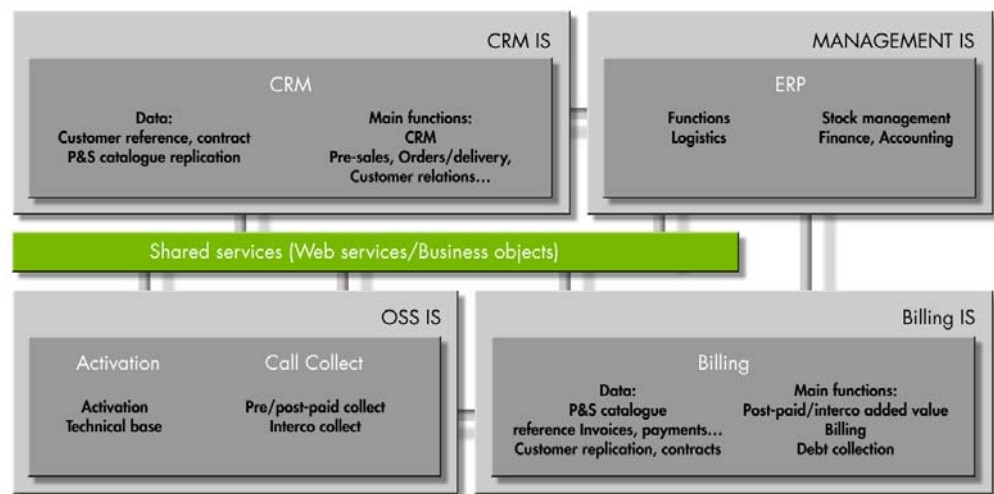
Thanks to its long R&D tradition and experience on the ground on major projects, Bull is one of the pioneers of the 'software factory' concept. Choosing the best tools notably from the world of Open Source— where the need for widespread collaboration first appeared – then adding in its own modules, Bull created its own software factory, NovaForge. Widely used in Bull's own Service Centers, this highly industrialized software development tool reduces the overall development workload, optimizes costs and timescales, improves the quality of deliverables and provides a powerful overall project management system.

Bull has built up a wealth of experience in building new information systems and migrating existing ones for major telecoms operators throughout the world. Based on an enhanced Telecom Operations Map (e-TOM), Bull offers a global and consistent approach to each operator's information system, using solutions drawn from a group of select, qualified partners, as well as its own integration layer. Based on Open Source developments and industry-standard products such as webMethods and Microsoft Biztalk, this interface handles the flow of messages between the different components of the IS, and can be used to manage integration within the existing environment (IN/prepaid platform, etc.).

In the solutions that Bull implements, CRM is capable of handling all customers including pre- and post-paid subscribers, as well as fixed-mobile-Internet users. The system manages the whole customer life cycle, from marketing campaigns and prospect identification, to the signature and life-span of the contract. In addition it offers Extranet access for fleet and partner management (PeopleSoft, Oracle Fusion, Siebel, ATG...).

Bull recommends basing billing on a standard product such as Highdeal, LHS BSCS. The core of the system is a powerful driver for adding value, providing a ready-to-use platform on which to build other tailored offerings, specially-targeted packages, innovative services, discounts and promotions, in addition to enabling new promotional offerings to be launched quickly.

ERP solutions complement the system when it comes to accounting and logistics functions. Where Bull really adds value is in the fully optimized customization and integration of all these components. The Operations Support System (OSS) consists of provisioning, activation and call-collect solutions (from Comptel, Kabira, Bull's own solution, etc.), which ensures service reliability: an essential differentiator in a very well catered-for market place. OSS components need to support next-generation platforms (such as NGN, and IMS), as well as a number of different service platforms. They also have to be capable of taking on board new hardware components, adapting rapidly to network upgrades and providing interfaces for new kinds of services.



OSS/BSS Information System

Two  
examplesEstablishing the information  
systems for IP operator Wana

Wana, a new Moroccan operator in the Internet access and mobile telephony markets, started out with the aim of providing innovative offerings to individual subscribers and business customer, to rapidly win significant market share in the face of stiff competition from existing players. The company successfully signed up a million consumers in just eight months! Bull designed Wana's entire IT architecture, delivered specific developments, and integrated all the components, including solutions from partners including Highdeal, Comptel, Oracle PeopleSoft and StreamWIDE. The shared services platform is based on Open Source developments using JOnAS, AIX® and Oracle. It is especially flexible, scalable and simple to maintain, and additional workflows can be integrated with ease.

Effective systems for OnAir's  
in-flight services

OnAir – a joint venture between IT solutions provider SITA and Airbus – chose Bull to develop the business management system for its in-flight mobile phone and Internet services.

OnAir allows airline passengers to access their personal or professional environment while in the air. The passenger can use their portable terminal: PC, mobile phone, 'smartphone' or PDA (Personal Digital Assistant), as easily as any other device that is available to them during the flight. Using OnAir's services means that airline companies can offer passengers a range of innovative, customized services, from mobile telephony to Internet access.

Bull has implemented a comprehensive billing, customer care and CRM solution that will evolve to keep pace with the growth of OnAir's business. The call-collect system is based on market-leading tools and specific developments. The Highdeal Transactive software suite was selected for billing and customer care, and the Microsoft SQL Server platform was chosen as the reporting system. The next stages of this project will provide OnAir with additional CRM, reconciliation and advanced reporting functions.





## Infrastructures convergence

### Networks

Network convergence is built around a unique, shared and IP-based platform and delivers voice, data and video services. It can be based on Next-Generation Network (NGN) components such as Class 4 and Class 5 soft-switches, with associated Next-Generation services such as pre-paid service plans, voice and video messaging, and IVVR (Interactive Voice and Video Response) all interconnected to the NGN network via Session Initiation Protocol (SIP).

This solution is especially practical for

operators launching new business activities.

IP Multimedia Subsystem (IMS) architecture enables operators to reap the full benefits of a convergent infrastructure because of the rapid integration possibilities for new, high added-value services which can revolutionize the way the operator manages its business.

IMS effectively defines an architecture that permits sharing, not just of the network, but also of the back-office and the whole service-production environment.

## Bull: playing a pivotal role in IP network innovation

Bull is a contributor to the European ENERGY R&D project, run under the ITEA2 program. The aim of this project is to implement innovative IP network management automation solutions. Bull and its subsidiary Evidian are providing an intelligent service quality monitoring solution and, more precisely, dynamic and automated activation of observation points as a function of network events.

The solution enables industrial networks to be interconnected via redundant public networks and enables a significant reduction in the bandwidth needed for monitoring operations, so leaving more resources available for user connections.

The first step in implementing a network convergence strategy is to define a convergence migration strategy, including which services are to be migrated or developed initially, and for which user groups. The new network architecture also has to be integrated within the existing infrastructure. Success then depends on the operator's ability to implement the new services simply and quickly.

Capitalizing on France's leading position in the area of convergent networks, Bull works with some of the most demanding operators in this fast changing market, and has delivered network infrastructure solutions to Altice, the group France Telecom /Orange and SFR among others.

## IP network infrastructure for a French mobile operator

For a French mobile operator, Bull designed and deployed a convergent fixed-mobile network infrastructure in a very tight timescale, and helps run and maintain this via its subsidiary Agarik. This architecture allows the operator to offer and develop innovative and competitive services to private subscribers and enterprises alike.

Bull's solution integrates the StreamWIDE, Dilithium and Thomson Cirpack software solutions, and MySQL Cluster database. It uses Open Source components including Apache Reverse proxy, SMTP Postfix gateway and PHP script language. The hardware architecture includes Thomson Cirpack Blade and Bull NovaScale servers, and finally Cisco switches, firewalls and DHCP.

Bull has three key strengths in this area:

- The capacity to deliver tailored solutions that take full account of all the customer's business constraints, at every point in the value chain: organization, qualification and implementation
- Expertise in IP and IMS infrastructures, and across the entire scope of telecoms operators' information systems
- Responsiveness, flexibility and adherence to timescales while also taking account of the customer's requirements as they evolve.

# Hardware infrastructure

**These days,  
consolidation is an  
essential way of  
bringing down  
operating costs,  
and optimizing the  
productivity,  
flexibility and  
resilience of  
information  
systems**

This consolidation strategy benefits from the constant improvements being made to technologies, from semi-conductors to virtualization applications that ensure systems are increasingly powerful. Once it has been standardized and is easy to administer, the IT infrastructure facilitates alignment with the organization's business priorities.

Bull has supplied one integrated telecoms operator with hardware platforms that are well suited to providing the availability, extendibility and reliability the group needs to manage critical databases based on Oracle, as well as its centralized applications. In addition, Bull Escala® servers are used to support customer relations management applications, for a CRM project covering all operations in France.

In Poland and the UK, Escala servers have enabled operators to consolidate their critical applications managing Oracle databases. Finally, they support the France Telecom group's call-collect application – a vital revenue-generating system for all operators – both in France and in its subsidiaries in emerging countries.

## Telecom Malagasy

Bull has also enabled the first fixed-mobile-Internet convergent operator in Madagascar Telecom Malagasy to significantly reduce its operating costs by simplifying its IS and virtualizing its NovaScale servers.

## Seznam

The leading Internet services portal in the Czech Republic, Seznam, has based its portal designed to handle promotional applications on a redundant Bull infrastructure composed entirely of blade servers, which is both flexible and easy to administer.

## Chunghwa Telecom

In Taiwan, the leading operator Chunghwa Telecom has chosen Bull to modernize the infrastructure supporting its Internet, mobile and Media-on-Demand services, as well as its R&D center.

## Service quality

Impeccable service quality is a major differentiator for telecoms operators. Typically, integrated operators use SQM (Service Quality Management) and SLM (Service Level Management) tools to optimize the efficiency of their various operational teams, as well as to manage the increasing complexity of their business environments. Having developed numerous network and systems monitoring projects, on the basis of Bull Evidian solutions or those of partners

including BMC and HP Openview, today Bull offers global service quality management solutions, notably in partnership with Telcordia and Oblicore. In addition, Bull is a certified trainer and developer of training courses for Telcordia internationally. Finally, Bull's projects include integrating systems that are even used in the homes of private individuals, with solutions built using Motorola, Prosys or others for managing the configuration of Customer Premises Equipment (CPE).

## Security and systems administration

In addition to infrastructure supervision, Bull and its subsidiary Evidian are recognized as European leaders in identity and access management, with *IAM Suite*. This comprehensive and modular solution includes Single Sign-On (SSO), synchronization of identity databases, and role-based access rights management. Evidian has established its reputation in Europe among major operators who have chosen *IAM Suite* for its comprehensive functional and the large number of staff it can manage. So, for example, Deutsche Telecom has equipped nearly 100,000 staff with Evidian's Single-Sign-on (SSO) solution and Telecom Italia has deployed it

for some 50,000 users. In Germany, Evidian's SSO solution paid for itself in the space of just one year at T-Mobile's help desk: hot-line staff no longer waste time typing in passwords, so they can devote more time to helping customers.

More recently, Evidian has won contracts on other continents. Embratel, the Brazilian leader in the mobile phone market, has been using Evidian's offering since 2006, and this has enabled them to satisfy the traceability and control requirements set out in the Sarbanes-Oxley regulations. Similarly, in 2008, Sonatel in Senegal chose *IAM Suite* for its 2,500 users.



## Hosting and outsourcing services

Bull's range of offerings is completed by critical hosting services delivered by its subsidiary Agarik. The company designs, delivers, hosts, and manages Web infrastructures for numerous operators in France. For example, SFR chose Agarik in 2005 for its video-on-mobiles project, and then more recently, broadband services for the general public.

Agarik's key strengths in this area include:

- Expertise in Web architecture design, with Agarik acting as consultant and building specific architectures for operators while taking individual network requirements into account
- As an ARCEP-registered operator, Agarik holds an L33-1 license [Flexibility when it comes to infrastructures and budget control. As an Open Source specialist, Agarik also redefines technical, network and security specifications for customer platforms, for improved cost control

- A complete range of operational services:
  - 24x7 system monitoring (hardware, network, system, applications)
  - Support, administration and maintenance in 24/7 operational status
  - Security management and back-up policies
- 24x7 services. For large-scale projects, Agarik acts as a 'single point of access', letting the operator benefit from its round-the-clock technical support resources.

Agarik guarantees the fastest intervention and recovery times in France, subject to the terms of the Service Level Agreement concerned.

<sup>1</sup> ARCEP is the French electronic and postal communications watchdog (*Autorité de Régulation de Communications Electroniques et des Postes*), formerly the ART (*Autorité de Régulation des Télécommunications*).

# An innovative industrial systems integrator

To serve telecoms operators and ISPs

Bull, as 'Architect of an Open World'<sup>TM</sup>, delivers a complete range of solutions enabling operators and Internet service providers to make the most of their information systems to develop their business.

Its solutions feature an integrated combination of carefully chosen partner products and specific developments adapted to the customer's individual context, whether they are a fixed, mobile and integrated operator, or operating in emerging markets. Bull acts as prime contractor and delivers large-scale projects, drawing on its international network of resources. These projects benefit from the full range of Bull's expertise in engineering, systems integration and infrastructure development, including:

- Bull's centers of expertise in VAS (Value-Added Services), SDP (Service delivery Platform), OSS/BSS and networks
- Teams specializing in the latest IP 'Triple and Quadruple Play' technologies.

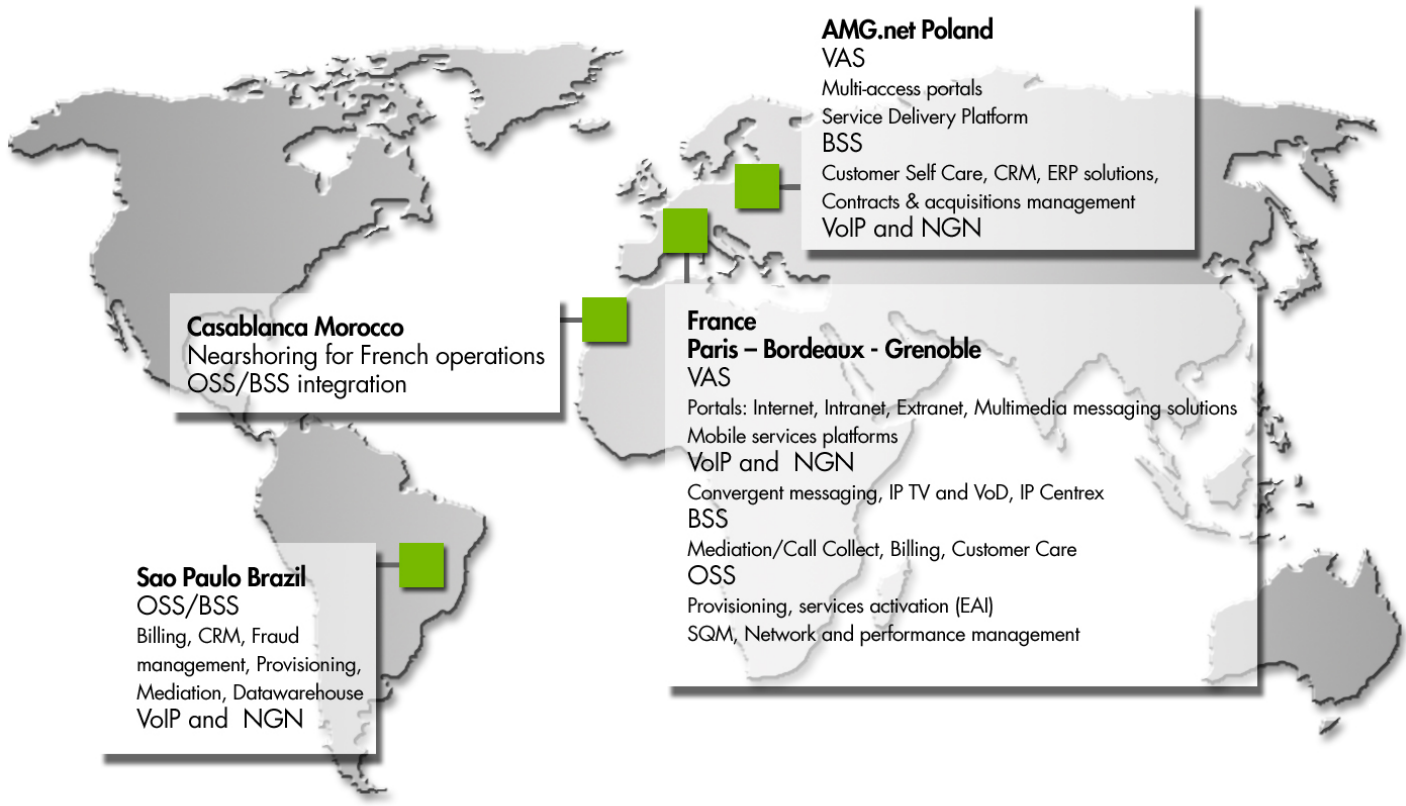
<p><b>VAS/SDP</b>  <b>Value-added services</b>                      (above and beyond voice telephony services)                      Portals, messaging solutions, Personal Information Management, address books and multi-media management                      Triple/Quadruple Play and IP TV  <b>Services platforms</b>                      Open Source/NovaForge infrastructures</p>	
<p><b>OSS/BSS</b>  <b>Basic OSS/BSS systems</b>                      Billing, active mediation and rating  <b>Next-Generation Networking (NGN) services</b>                      Provisioning, Service Quality Management, Service Assurance  <b>Risk management</b>                      Revenue Assurance, integration, fraud management, CRM, customer care</p>	
<p><b>IP network infrastructures (NGN)</b></p>	<p><b>Servers, storage, network</b></p> 

# A worldwide Telecommunications and Media business unit

Bull has created a worldwide Telecommunications and Media business unit, dedicated to supporting customers in this fast-changing sector. Capitalizing on the experience acquired through major projects undertaken by Bull's centers of expertise in France (in the Paris, Grenoble, and Bordeaux regions), Poland, Brazil, Morocco and Mauritius, Bull can offer computing expertise and an industrial culture when it comes to implementing innovative, flexible and powerful 'carrier-grade' solutions worldwide.

Bull's key assets include:

- In-depth knowledge of the telecoms operator's business
- A global approach and mix of skills in complex telecoms systems integration. Bull can be involved from start to finish, right along the value chain, drawing on its development capabilities and on selected partner products, and with a commitment to results
- A systems architect that puts innovation and Open Source at the heart of its approach
- Its expertise as a hardware manufacturer with total mastery of IT infrastructures and their development
- An international presence, combined with local support for customers, so vital in emerging markets.





# MASTER THE UNEXPECTED



## Initiative 6: Favor exchanges

Innovation is the key driver in the telecommunications market. Each day new technologies create new behaviors. Because everything is changing, all the time, Bull provides flexible and robust solutions that are immediately operational to meet the specific needs of each individual, each business.  
With Bull, master the unexpected.

Discover our 7 initiatives, visit our website [www.bull.com/7i](http://www.bull.com/7i)



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