

PAPER

WHITE

# Developments in Mainframe Access Solutions

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Controlling costs and  
mastering new uses  
(Mobility, BYOD, Cloud...)

## Summary

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# Basics

**Client/server mainframe access solutions (3270 emulators) have been available for more than 25 years. Introduced when personal computers hit the market, they were able to replace proprietary terminals (3270 screens), which were extremely expensive.**

With the emergence of open systems and TCP/IP Internet networks, these solutions were standardized around the Telnet protocol. Even today, many companies continue to use client/server mainframe access solutions because they remain loyal to their long-time suppliers, who sometimes take advantage of them.

Now, however, **there are also mainframe access solutions on the market that offer an original approach based on a “Pure Web” concept.** These Pure Web solutions are becoming increasingly popular with companies **because their total cost of ownership (TCO) is much less than with client/server solutions.**

And the evolution of uses induced by Cloud Computing, Mobility or BYOD should amplify this trend.

Why? In order to meet these new needs, CIOs will have to provide simple and secure terminal-independent solutions, all the while complying to keep control of their information system.

As Client/server applications require the installation of client software on workstations, thus they are hopelessly dependent on the type and evolution capabilities of the equipment used. This does not happen with Pure Web applications, which only require a simple internet browser on the client to run.

This could be seen as an opportunity for companies still using client/server mainframe access solutions to evaluate Pure Web solutions... and to discover that the potential savings are real and deserve their attention.

*Early on, mainframe server manufacturers offered only extremely expensive proprietary physical terminals for accessing applications.*

## Introduction

With the arrival of personal computers running MS-DOS, terminal emulators were developed, allowing physical terminals to be replaced by software emulators running on personal computers. Such solutions, which have existed for more than 25 years, are some of the first applications ever developed for personal computers.

Before Unix servers and network access were standardized through the TCP/IP protocol, each manufacturer provided its own emulator, complete with wiring, a network protocol, a network card, and an emulation protocol. These proprietary solutions were also quite expensive because they required manufacturer-specific network cards in addition to terminal emulation software.

With the emergence of open systems (Unix, TCP/IP, and the Internet), Telnet became the standard emulation protocol, and network access became standardized around the TCP/IP protocol. For IBM mainframes, this was TN3270.

Companies that provide emulators have seen their research and development costs fall, with more network cards to develop and simpler, standardized emulation software that no longer changes. These solutions change alongside the operating systems for servers and workstations that are needed for their deployment.

But has the cost of emulators fallen? NO. Purchase and maintenance costs remain high. This can no longer be justified today, and companies can now find alternative solutions on the market, solutions that are based on a modern architecture that reduces ownership and operating costs.

# Emulators for Accessing IBM Mainframe Applications (3270 Emulators)

## Types of 3270 Emulators

There are two main types of solutions:

- ① A client/server solution (sometimes referred to as an ultra thin client)
- ② A Pure Web solution

Client/server solutions, which require an installation on the workstation and an intermediate server, interact with the host (mainframe) using the TN3270 protocol. These are typically emulators whose architecture has not changed.

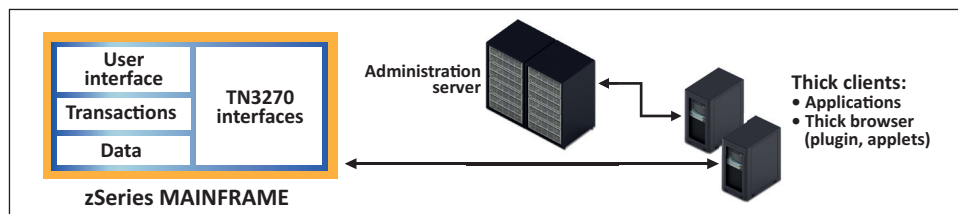


Figure 1: Client/server mainframe access solution

Pure Web solutions do not require any code on the client workstation. A web browser is all that is needed in order to interact with the server by http or https.

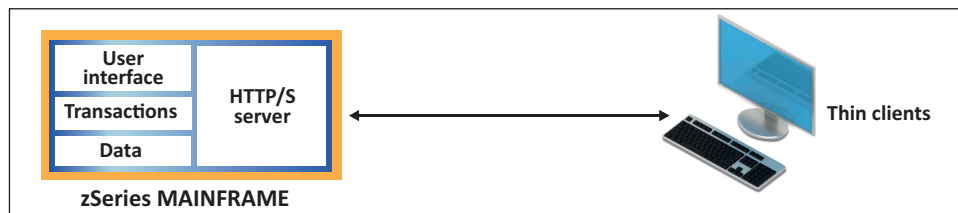


Figure 2: Pure web mainframe access solution

Some providers that use a Citrix (Metaframe, XenApp) or Microsoft (Terminal Server Emulation) deployment architecture present their solution as an ultra thin client, even though it is ultimately built using a client/server architecture.

They use a deployment architecture with an extended interface between an intermediate server and the workstation, but the client application is executed on the intermediate server, not on the workstation. The client application therefore still has an impact on the total cost of ownership (see next section).

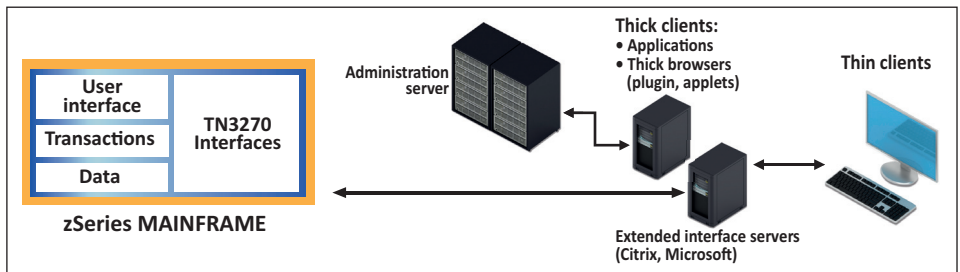


Figure 3: Client/server mainframe access solution with an extended server interface

Of course, Pure Web solutions can be used with this type of architecture.

## Total Cost of Ownership (TCO)

According to the model developed by the Gartner Group, there are three major cost categories that make up the TCO.

The table below shows how each category factors in:

Segment	Contribution to Total Cost of Ownership	Details
Hardware and software (servers, workstations, and network equipment)	20%	Management Purchases and rentals Upgrades
Operations	40%	Expenses for operations and maintenance staff Support center Training Future development
Off-budget costs (lost productivity)	40%	System outages and failures On-the-job training Future user-motivated development
	100%	

Figure 4: Each category's contribution to the total cost of ownership (TCO)

**In general, client/server solutions are more expensive in each of these three areas:**

- **Hardware and software:** Their price is based on a license for each workstation and high annual maintenance costs. In contrast, Pure Web solutions are usually priced on the basis of a fee that includes usage rights and maintenance. There are also costs for the intermediate servers, for administration, and possibly for the extended interface.

- **Operations:** The intermediate servers and the client application installation are additional deployment and operating costs.

- **Off-budget costs:** The client/server architecture introduces a higher risk of failure due to the intermediate server and the client application. Because the client application allows for additional development, users may try to use them without involving the IT department. If a problem occurs, they may go to a number of people, which further adds to the lost productivity.

Also remember that advancements in mobile devices mean that it is becoming more and more obsolete to support only one web browser.

## Type of Use

**Mainframe access solutions are used by different types of users who may be connected via an intranet, extranet, or the Internet for heterogeneous terminals, including tablets or Smartphones.**

Internet users may be:

- Remote employees: salespeople, repair technicians, telecommuters, etc.

- Partners: suppliers, distributors, brokers, etc.

Pure Web solutions are especially convenient for access from outside of the company. There is no workstation deployment, and only a secure Internet connection is required. The Pure Web connection has many advantages in terms of security, compared with the 3270 tunneling used by the TN3270 protocol (see the “Access Security” section).

Finally, the Pure Web solution provides the ability to have up-to-date changes through the HTML protocol, changes that are immediately available to the user community without requiring a migration.

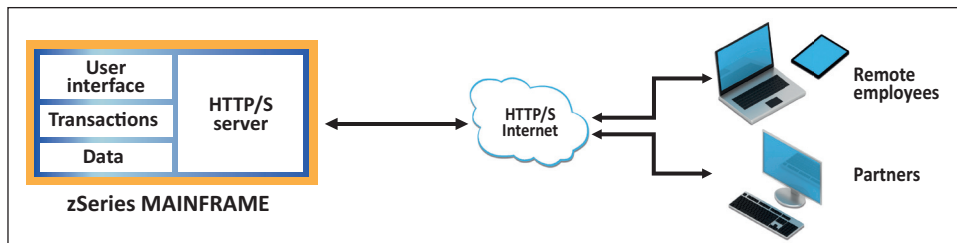


Figure 5: Pure Web solution, access from outside the company

A client/server solution requires VPN access in order to establish a secure connection to the company's network, along with a client application installed on the workstation. This is expensive, and it is difficult to deploy and operate.

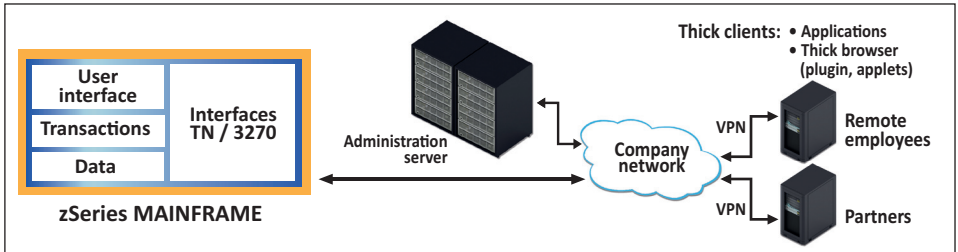


Figure 6: Client/server solution, access from outside the company

## Access Security

Unlike a client/server solution that uses 3270 IP/TN tunneling, a **Pure Web solution does not maintain an IP session**, which reduces hacking attempts considerably.

Through the HTML protocol, a **Pure Web solution also has a range of options (filters, scripts, configured URLs, etc.) to restrict user access rights**.

Also, IP tunneling could mistakenly bring a user to CICS, IMS, and TSO environments where they can access unauthorized transactions, something that is impossible in a Pure Web architecture.

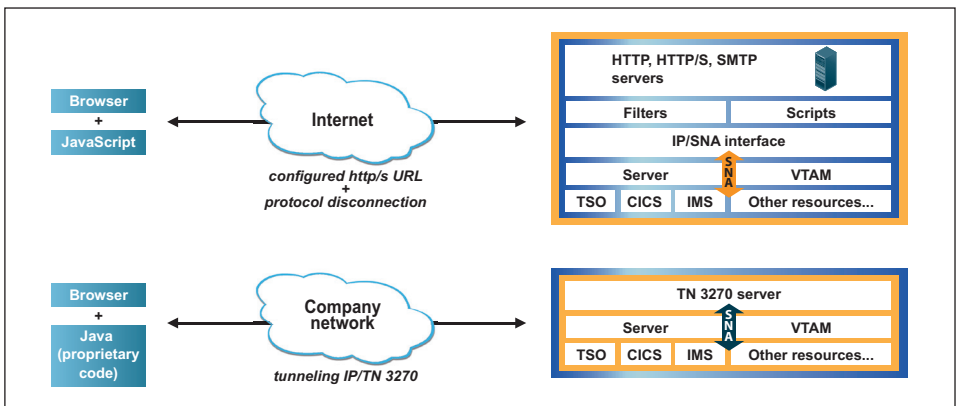


Figure 7: Comparison between the access security of a client/server solution and a Pure Web solution



# Uses & technology evolutions

*Employees, customers, partners and other stakeholders of the company now connect from any device (including smartphones and tablets) to access their business applications in Cloud Computing mode, in transit, at home or from any other place.*

## Impacts

The mobility and BYOD phenomena are forcing IT departments to adapt and provide a secure and easy solution to open access to mainframe applications, while maintaining control of their information system. Traditional emulation 3270 are no longer appropriate.

Even if the emulator has proven very able, it involves additional costs and administration time loss. This can be avoided by turning to Pure Web access solutions, which are independent of the terminal used.

## Opportunities to Migrate to Pure Web Solutions

### Mainframe applications become "naturally" mobile

Pure Web solution enables instant display of mainframe applications in a new web interface, regardless of the device used (PC, smartphone, tablet, iPad ...). Access to mainframe applications is simply granted from any web browser, without hardware or software restraint, the browser becoming a universal terminal. Users' benefits from this experience are the same, regardless of the means of connection or the location. This is the principle of the Open 3A - Architecture Anywhere, Anytime.

With a Pure Web solution it is also possible to take into account users' needs and clients' restraints. The data display is adapted to the screen size, ergonomics and navigation system of each type of terminal. It is therefore easy to transform the classic presentation (often in "green screen" 3270 mode) in a display with accordion menus, more consistent with mobile devices' ergonomics and navigation systems.

### Undeniable implementation and cost advantages

Since it does not require deployment on desktops, implementing a Pure Web solution automatically induces an operating and maintenance costs reduction for IT departments:

- unlike client/server emulation, this solution is not impacted by changes in operating systems,
- there is therefore no migration or update to predict, nor additional costs, which makes it an economical and sustainable solution.

By choosing this type of solution, companies will benefit from a low TCO as well as reduce the impact of future developments..

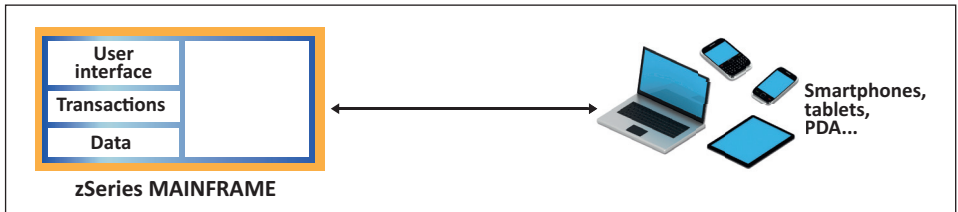


Figure 8: A Pure Web solution with universal access to applications from all types of terminals

# Saving with Pure Web Solutions

These cost comparisons are based on hardware and software savings. According to the Gartner Group, this reflects only 20% of the total cost of ownership. As a result, the savings shown below do not include the savings that Pure Web solutions bring to Operations and Off-Budget Costs, as described above.

For new licenses, a company must purchase an expensive license. An administration server must also be purchased and deployed. The table below itemizes these costs over a three-year period for 1,000 workstations.

	Client/Server	Pure Web
Administration Server	€20,000	0
License	€150,000	0
Annual fee X 3	€135,000 *	€120,000 **
Deployment	€10,000	€3,000
Cost over three years	€315,000	€123,000

\* Common price: annual maintenance of €45/workstation

\*\* Includes a user license and maintenance

*The Pure Web solution represents a savings of more than 60%*

Figure 9: Comparison of the costs for purchasing mainframe access solutions

When migrating 1,000 client/server workstations to a Pure Web solution, remember that the maintenance cost for a client/server solution is often greater than the user license for a Pure Web solution. The table below itemizes these costs over a three-year period for 1,000 workstations.

	Client/Server	Pure Web
Administration Server	€20,000	0
Annual fee X 3	€135,000 *	€120,000 **
Deployment	€10,000	€3,000
Cost over three years	€165,000	€123,000

\* Common price: annual maintenance of €45/workstation

\*\* Includes a user license and maintenance

*The Pure Web solution represents a savings of more than 25%*

Figure 10: Comparison of the costs for migrating a client/server solution to a Pure Web solution

# Conclusion

Mainframe emulators have been available for personal computers for more than 25 years. Yesterday's burden evolved into numerous solutions based on a client/server architecture, while **today's standard is to deploy purely web-based applications, with low costs of ownership and limited acquisition and maintenance costs.**

The cost to purchase and maintain a Pure Web mainframe access solution can represent a 60% savings compared to the cost of a client/server solution, not to mention the savings in Operations and Off-Budget Costs.

Finally, access security and the upgrade capability provided by the HTML protocol strongly advocate a Pure Web solution.

The implementation of a strategy consistent with the needs related to mobility, BYOD and Cloud Computing present a tremendous opportunity to migrate client/server solutions to Pure Web solutions.

Companies that choose this route enjoy the lower costs of ownership provided by Pure Web solutions, while limiting the impact of future migrations and anticipating technological advancements.

## ABOUT SYSPERTEC



For more than 20 years, SysperTec has provided interoperability solutions and automated data interchange within mixed IT environments for major IBM accounts. Used by hundreds of customers, these solutions improve the access, scalability, and integration of central applications and data, making those users citizens of the Web and other technologies.

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