A Structured Approach to Assessing Heterogenous Workload Deployment to the IBM zEnterprise System

- Learn how to assess IT infrastructure pain points
- See how to assess the business value of the zEnterprise System
- Understand how to make platform placement decisions

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A Structured Approach to Assessing Heterogenous Workload Deployment to the IBM zEnterprise System

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This edition applies to all models of IBM zEnterprise System.

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Preface

Examining a possible deployment or migration of an application or workload to the IBM® zEnterprise™ System requires a structured approach. This process entails the following key decisions:

- What will the additional business value be, if any, after the application or workload is deployed on the zEnterprise System?
- What will the topology, or *infrastructure architecture*, be of the application or workload on the zEnterprise System?

This IBM Redpaper™ publication describes an approach to help determine the possible business value of deploying a workload or application on the zEnterprise System. It provides a framework to use, and brief information about, the *zEnterprise Business Value Assessment tool* and the Fit for Purpose method that IBM uses to help Clients make these decisions.

This paper is intended for customer technical managers and architects, and IBM and IBM Business Partner technical sales and architects. Before reading this paper, you must have knowledge about the zEnterprise Business Value Assessment method.

The goal of the approach in this paper is to ensure that the assessment of business value for a customer's business application results in an optimally architected zEnterprise deployment design and a solid business-grounded case for change. The purpose of this paper is to provide guidance for technical managers and IT architects to perform assessments of their own business applications.

The team who wrote this paper

This paper was produced by a team of specialists from around the world working at the IBM International Technical Support Organization (ITSO), Poughkeepsie Center.

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1

Introduction

The ways in which organizations use technology to achieve business goals are changing rapidly. Yesterday, companies had to install expensive value added networks (VANs) to trade with their business partners. Today, with the Internet, global business partners can trade and exchange data in business-to-business (B2B) configurations. Yesterday, market reach was limited geographically to a company's retail outlets. Today, with the Internet, companies can offer products and services through business-to-consumer (B2C) channels that reach customers around the world.

Internally, organizations use intranets to streamline business processes and facilitate team collaboration. Hardly a day passes without yet another new mobile application (app.) that can be downloaded to smartphones and used to perform feats, from wireless fleet tracking to social networking. Yesterday, the fastest growing user type was people; today, it is devices.

To compete successfully, companies embraced change by building adaptable business applications and infrastructures with flexible architectures. Yesterday, flexible infrastructures meant highly complex and widely heterogeneous server environments with increasing server counts and demanding service levels. System administrators specialized by platform architecture to cope with the vast differences in platform functions and systems management tools. Routine administrative tasks that were simple in small multiplatform environments suddenly became unmanageable. As a result, business agility atrophied and total cost of ownership (TCO) increased dramatically. Yesterday's "flexible" infrastructure is inefficient and does not scale. If this infrastructure remains unchanged, business growth will ultimately stall.

Today, the IBM zEnterprise System offers companies a smarter flexible infrastructure. This infrastructure scales in performance for increasingly heterogeneous business application architectures. It also scales financially for rising demands in service quality, security, and resiliency. For the first time, companies can take advantage of the following advantages:

- Deploy an integrated hardware platform that consists of a mainframe and distributed architectures from a single console.
- Collocate the distributed components of an important business application with its System z components.

- Manage end-to-end diverse business workloads by using dynamic, automated, and policy-based resource provisioning and optimization.
- Drive profitable growth by using the enhanced economics of a zEnterprise infrastructure.

The potential for enhanced business value by redeploying current business applications on the zEnterprise System is significant. However, technical managers and IT architects are often challenged by how to best conduct a business value assessment for the zEnterprise System. This IBM Redpaper publication answers that challenge by providing an approach to determine the business value.

This chapter includes the following sections:

- Common terms and concepts
- Business application topologies

1.1 Common terms and concepts

This Redpaper publication uses the concepts and terms that are described in the following sections to describe the business value assessment method.

1.1.1 Business application

The term *business application* can refer to any software that supports or enables business functions or processes, from line-of-business (LOB) systems to specialized tools. However, in this paper, the term refers to the larger end of the application spectrum. As such, a “business application” typically has a layered software structure that consists of a presentation or web layer, a business layer, and a data layer. Each layer often consists of both commercial or independent software vendor (ISV) and custom- or in-house-developed software components. Communication between layers is explicit and loosely coupled to support a strong separation of concerns that, in turn, facilitates flexibility, scalability, and maintainability.

1.1.2 Workload

A *workload* is a logical classification of work on a computer system. It is an expression of the amount and type of resource consumption associated with a business-relevant entity, such as a department. In this paper, the business-relevant entity is a business application or portion of a business application that provides a particular function or service, such as web services or a data serving function.

1.1.3 Fit for Purpose

One of the key decisions to make during the design of the infrastructure for business application is to determine which platform to use for the various components of our business application. In the 1960s and 1970s, this decision was easy to make because an enterprise has only one predominant platform, which was the mainframe. During the 1980s, however, new distributed computing architectures emerged that expanded the platform options. Initially, these expanded options met highly specialized computing needs. For example, the supercomputer platform targeted numerically-intense business applications, such as those for oil exploration, weather modeling, and other mathematically-intense business problems.

In the 1990s, the Intel server architecture, primarily running the Microsoft Windows operating system, emerged as another platform option. The emergence of these various operating

systems, computing architectures, and server platforms significantly made it challenging for IT architects and designers seeking to select the right platform for their business applications.

Fit for Purpose refers to the IBM method for positioning and selecting the platform for a business application based on matching or "best fitting" the workload characteristics of the application to the execution and processing capabilities of the different platforms. Additionally, both business factors, such as enterprise-wide standards and financial considerations, are part of a Fit for Purpose analysis. For example, from an overall operational TCO standpoint, it might be more cost-effective to use a single platform for all business applications of a particular type or for a given business unit, even if it is suboptimal from a purely technical processing perspective.

1.1.4 Pain point scenario

The term *pain point* refers to a current factor with a negative influence on service levels or an inhibitor to future growth. From an IT environment perspective, the occurrence of a pain point often coincides with other pain points. The term *pain point scenario* describes the commonly occurring patterns of pain points in today's IT data centers and infrastructures.

1.2 Business application topologies

This paper highlights four business application topologies. Most business applications can be fit easily in any of these four topologies.

1.2.1 Transaction processing topology

Successful commercial enterprises depend on the reliable processing of transactions to ensure that customer orders are met on time, and that partners and suppliers are paid and can make payments. Transaction processing business applications, therefore, are a vital part of effective business operations.

Transaction processing systems consist of computer hardware and software hosting a transaction-oriented application that performs the various transactions needed to conduct business. Typical examples include applications that manage sales order entry, airline reservations, payroll, employee records, manufacturing, and shipping.

A transaction binds a set of related tasks that succeed or fail as a unit. Transactions in a transaction processing application must possess the basic properties of atomicity, consistency, isolation, and durability (ACID). These properties reinforce the critical role of the transactions as all-or-none propositions.

Transactions come in two broad classes: batch and real-time. *Batch processing* is a resource-saving transaction type that stores data for processing at predefined times. Batch processing is useful for enterprises that need to process large amounts of data by using limited resources. *Real-time processing* executes transactions immediately.

Typically, business applications in this category have the following characteristics:

- Rapid processing. Fast and consistent performance with rapid response and turnaround time is critical.
- Reliability. Breakdowns disrupt operations or can stop the business. The failure rate for a transaction processing application must be low. When a failure occurs, quick and accurate recovery is imperative, and well-designed backup and recovery procedures are essential.

- Standardization. Transactions are highly standardized, with each transaction processed the same way each time, to maximize efficiency.
- Controlled and secure access. Transaction processing applications support core business functions, and access must be restricted to only authorized users.

Figure 1-1 shows a common deployment topology for a transaction processing business application. A unique characteristic of transaction processing applications is the IBM CICS® or IBM IMS™ component on z/OS that contains most of the business logic. Core information for transactions also resides on z/OS in files or, more typically, in a relational database system, such as IBM DB2®.

The user interface and security components of transaction processing applications are often deployed on distributed platforms, such as UNIX or x86. These components are used to modernize (web enable) the user interface, reformat information generated by the z/OS backend, add static content to a transaction, and perform routing and security functions.

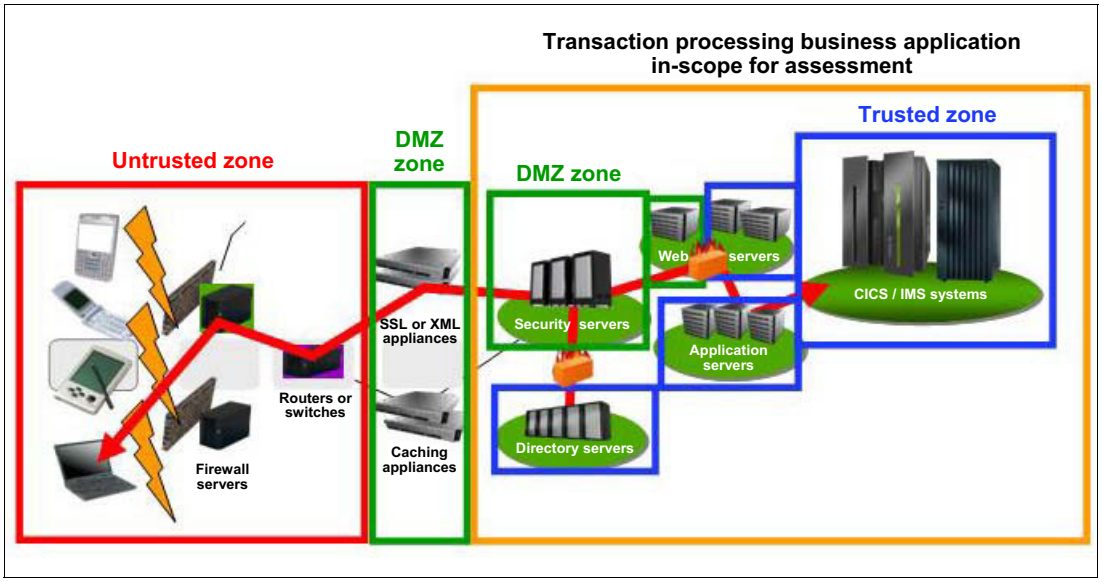

Figure 1-1 Transaction processing business application topology of today

1.2.2 Data serving and analytics topology

The data serving and analytics topology provides various information management components. The goal of this topology is to satisfy the needs of applications and users in retrieving information from data.

Opposed to the other three topologies, the primary focus of this topology is on the middleware that is required to perform operations on data. These operations can include storing and retrieving data, operations that are popular in data warehousing (such as *cubing* and *Extract, Transform and Load (ETL)*), and business intelligence and analytics operations.

This topology does not include the application programs and middleware to run these programs, even though you might have these components to effectively use the data serving and analytics topology. You will need application programs to build and maintain a large part of the operational data, and you will have other application programs using the data stored. However, more data is retrieved from business intelligence packages, such as IBM Cognos® and DataQuant, for decision making purposes. Also, it is likely that, a business environment will have just one data serving and analytics workload, although multiple or many workloads will fit the other three topologies.

The data serving and analytics topology has the following key characteristics:

- Scalability

  In this topology, scalability might be required in different ways and provided by various techniques. It depends on whether you are talking about operational data, business intelligence queries, or data warehousing processes (processes to populate and refresh the data warehouse).

  Operational data is at the heart of data processing. Any bottleneck or limitation in the data layer has an immediate affect on the response times of applications. However, most operational data is stored in one place. You cannot just scale it by duplicating data stores, unless you synchronize all these duplicate data stores on a continuous basis. Therefore, scalability must be accomplished in the routines and services that are run to perform operations on data and to optimize I/O channels and storage infrastructure. For example, you can duplicate database and files servers, but you cannot duplicate the data store.

  Scalability in business intelligence queries might be required, especially now that more businesses are using business intelligence queries as part of their core business process. A good example is the scalability required when a bank must suddenly run a large amount of complex queries to analyze a massive fraud attack.

  In data warehousing, scalability in extract, transform, and load (ETL) might be a strong requirement when unexpected massive volumes of data must be extracted, transformed, and loaded from multiple data stores around the globe to a data warehouse. The entire infrastructure involved in ETL must be able to scale, which in some cases, can also mean that multiple ETL processes must run in parallel.

- Availability

  Operational data, when used in important applications and core business processes, generally must be highly available. Alternatively, operational data must be at least as highly available as the applications that are using it. Data warehouses generally must be less available. However, a trend indicates that more data warehouses are used in critical business processes and, therefore, must also be highly available, which also applies to business intelligence tools.

- Volume

  Data worldwide is growing steadily, and in large corporations and governments, databases can be massive. More information is stored digitally, as text documents, images, video or sound. The continuous drive to reduce risk of any kind, and to comply with increasing regulatory rules, requires a business intelligence and underlying data warehouse implementation. ETL processes might need to process millions of data records per day. Complex business intelligence queries might also need to dig through millions of records to return a meaningful summary to the user. Even though the volumes are massive, these operations need to be performed within challenging response times.

- Reliability

  Data must be fully reliable, and related data must be synchronized at all times. The reliability and synchronization of data are a real challenge in a world where mergers and acquisitions are common and where companies typically use multiple data stores to store the same information, such as customer information. Therefore, this topology has an important role for *master data management*, which provides a single view and a single access point for retrieving master data.

- Security

  Security plays an important role in all topologies mentioned in this paper, and it is not any different for the data serving and analytics topology. Data can be sensitive, and proper security mechanisms must be in place to block unauthorized access to data. Databases

and files might have different access profiles. In this topology, all data is assumed to be maintained in the trusted zone.

Figure 1-2 shows a simplified infrastructure diagram of this topology.

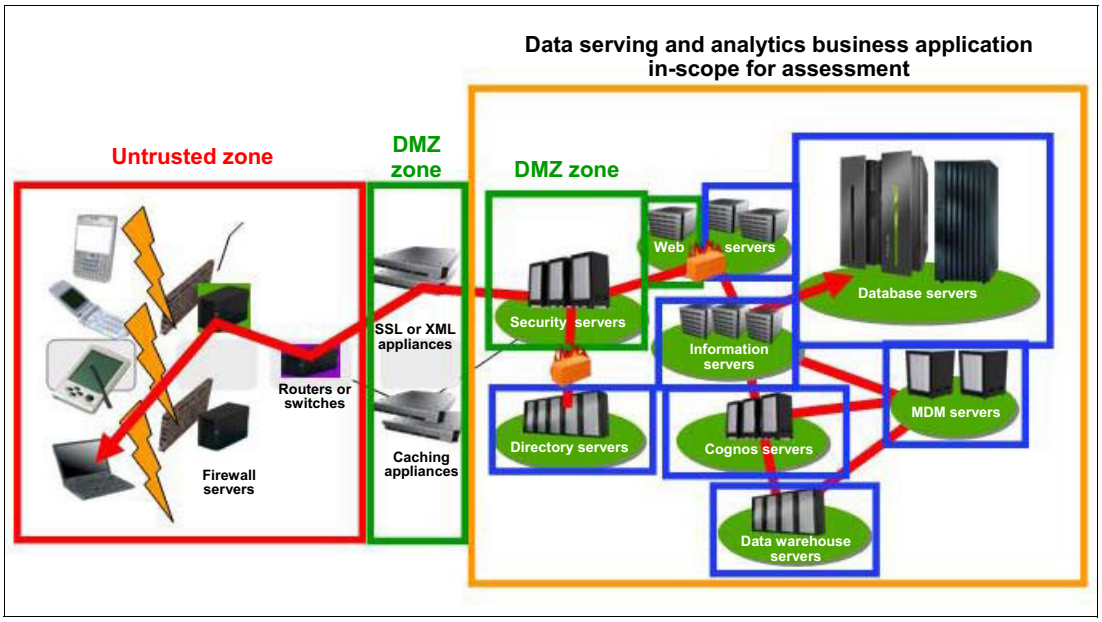

Figure 1-2 Data serving and analytics business application topology of today

1.2.3 Web and application serving topology

The web and application serving business application topology is distinguished by its application server component. An *application server* is software that interfaces with one or more databases to convey processed data to and from a user interface (UI) that is typically web based. The role of the application server is to perform the business logic in a multitier or n-tier application architecture. For example, a common web application design consists of the following tiers:

- A presentation tier that provides the functionality related to the UI
- An application tier that performs the business rules processing
- A data tier with the functionality related to data access

The application server tier is independent from the other tiers of the business application and can be deployed on physically separate computers. Communication between tiers of the business application occurs over the connecting network.

Application servers are written for specific tasks that are defined by business needs. Their job is to retrieve, process and present data to the UI; to process input data from the UI, whether queries or updates; and to perform validation, verification, and security checks as needed.

Service-oriented architecture (SOA) enables application functionality to be provided as a set of software services. It also facilitates the creation of business applications that use software services. Services are loosely coupled because they use standards-based interfaces that can be invoked, published, and discovered. SOA is suitable when message-based communication between application tiers is needed that exposes functionality in a platform-independent manner.

The architecture of a business application is almost never limited to a single architectural style. Rather, a combination of architectural styles is more common. For example, a business

application might have an SOA design that consists of services that are developed by using an n-tier architecture approach to comply with the security policies of an organization. An n-tier architecture enables effective separation of concerns for customer- or public-facing web applications. Sensitive application and data tiers can be in trusted security zones, but the presentation tier is deployed to the perimeter.

Web and application serving business applications often have the following characteristics:

- Scalability

  Scalability, which is the ability to handle an increasing load in a graceful manner, is essential. A business application can be scaled in one of the following ways:

  - Horizontally, by adding additional servers to a tier, which is also called *scale out*.
  - Vertically, by enlarging the capabilities of a single server, which is also called *scale up*. An example is adding processors.

- Throughput

  Scaling is straight forward as long as all involved resources can cope with the increased load. At some point, a resource reaches its maximum throughput, limiting the overall throughput of a system. This point is called the *saturation point*, and the limiting resource is called a *bottleneck resource*.

  In well-designed web and application serving business applications, a database component is usually the bottleneck resource. The reason is that application servers can be well-scaled horizontally, because they have interconnection only with the database and nearly no interconnection to each other. See 1.2.2, “Data serving and analytics topology” on page 4.

- Availability

  Highly available web and application servers is not optional. If the web servers go down, customers and users cannot access the application. Also, the reliance on network connections, including the Internet, exposes the vulnerability that any network outage also stops all access to the application.

Figure 1-3 on page 8 shows a popular deployment topology for web and application serving business applications. The IBM WebSphere Application Server for z/OS distinguishes the web and application serving topology from the other business application topologies. Additionally, a characteristic of many web and application serving business applications with a multitier SOA architecture is the specialized tiers for business process management and monitoring and for service registry and repository. Communication across tiers and components is typically done by using TCP/IP. However, other protocols might be used.

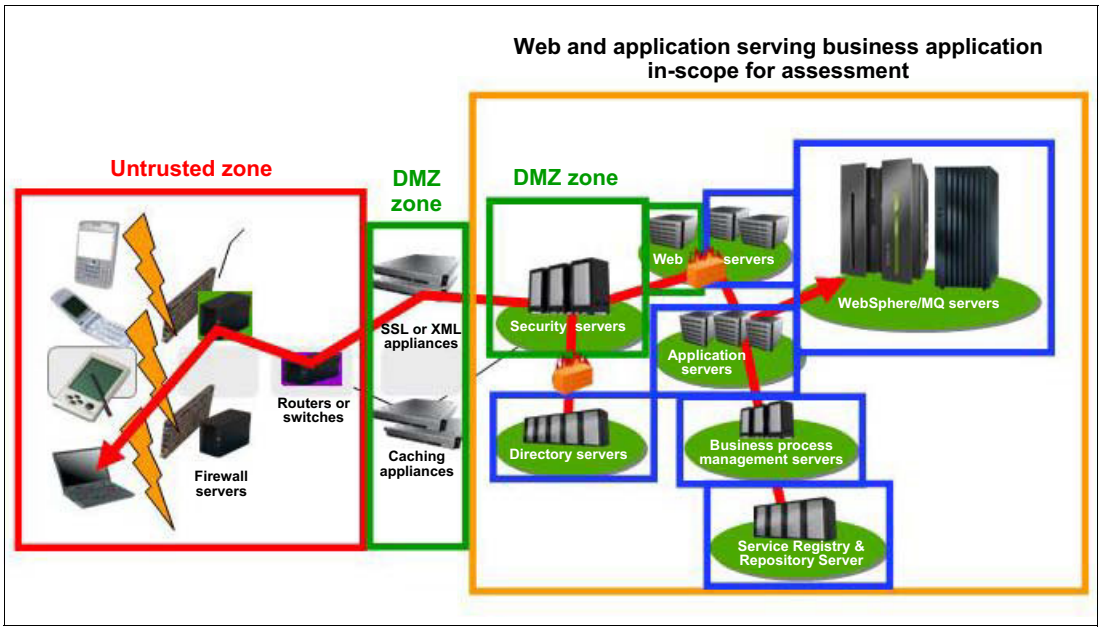

Figure 1-3 Web and application serving business application topology of today

1.2.4 Packaged application topology

Packaged business applications play an important role in enterprises today. Two approaches are possible for application development and delivery. One approach is to develop in-house applications, and the other approach is to use standard packages and standard software components. Examples of such packaged applications include enterprise resource planning (ERP) systems, from SAP, and customer relationship management (CRM) systems, from Siebel.

The packaged application topology has the following characteristics:

- Scalability

  Scalability is considered a key requirement for some components in the packaged application topology. For example, SAP database servers usually require a scalable infrastructure to support a growing demand for additional users. SAP appliances and standalone engines are designed for a specific purpose and usually do not require a highly scalable system. These applications serve as workload optimized systems and focus on performance and throughput.

- Availability

  Depending on the business applications that the packaged application topology serves and how critical the application is to the business, availability can become a key requirement. An in-house SAP environment that supports the inventory of a small department might not be considered as critical to the business. Therefore, the importance of availability as a requirement is mainly defined by the business relevance and effect on the business.

- Standardization

  The fact of using standard software components versus in-house-developed applications is a key characteristic of the packaged application topology. Some enterprises see an advantage of using standard software, because it can be easier to exchange data and information when interacting with partners. Therefore, in the B2B space, a packaged approach can provide an advantage. With standardization, apply industry standards and

technology that is accepted and widely used (such as Java 2 platform, Enterprise Edition (J2EE) and Extensible Markup Language (XML)).

Figure 1-4 illustrates the packaged application topology using SAP as an example.

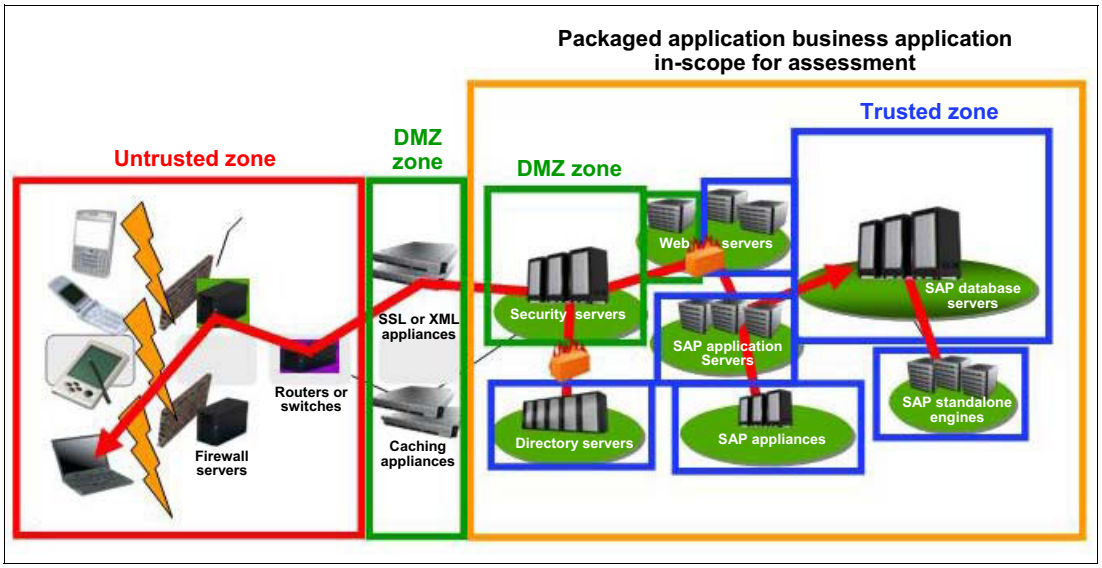

Figure 1-4 Packaged application business application topology of today

2

zEnterprise Business Value Assessment method

At a first glance, assessing the possible business value of running a solution on a certain platform might not seem to require a methodological approach and can be determined by conducting a few meetings and producing a report at the end. However, an appropriate evaluation of the possible business value of an IBM zEnterprise System for a business application requires a well-planned methodological approach. The reason is that some important steps are involved for collecting and evaluating information, and that substantial project organization is needed.

The defined approach involves three stages and six steps. The starting point is the existence of concerns or issues (called *pain points*) regarding the current IT infrastructure. The endpoint is a recommendation to the extent that the zEnterprise System can help to eliminate the concerns or issues.

This chapter describes a method that you can use to assess the business value that can be gained from the zEnterprise System. To follow the method in a structured way, to ensure that no information is overlooked during data collection, and to perform an honest evaluation of the results, IBM developed the *zEnterprise Business Value Assessment tool*. The IBM team can use this tool to help you in steps 3 - 6.

This chapter includes the following sections:

- Overview of the stages and steps
- Stage 1
- Stage 2
- Stage 3
- What is next

2.1 Overview of the stages and steps

Figure 2-1 shows three stages in the process, which are explained in the sections that follow.

Important: Not each activity in the diagram necessarily maps to one single step as documented in this paper. In some cases, multiple activities in the process were combined into one step.

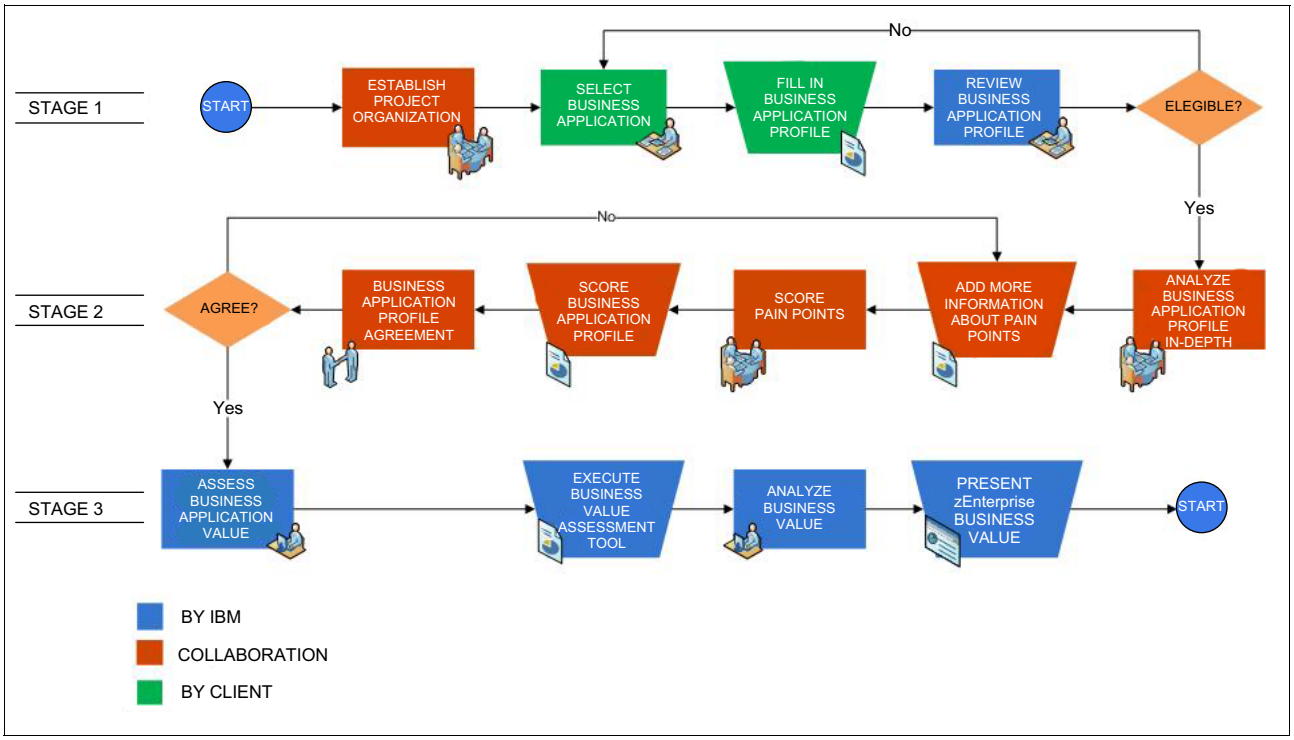

Figure 2-1 Overview of the zEnterprise Business Value Assessment method

2.2 Stage 1

Stage 1 includes preparation activities for the actual business value assessment. No judgments or value assessments are taking place in this stage yet. The objective of this stage is to select the business application to assess and to list the pain points of that business application.

You can select business applications based on any desired criteria. Ideally, if possible, select a heterogeneous business application that runs across several platforms and that has at least one mainframe component. The business application that you select represents a pattern of pain points that also exist in other business applications. That is, although you can do the assessment for one business application, the results can apply to multiple applications.

After you select the business application from the portfolio, you document the pain points of that business application. To simplify the process, you can use the template provided in Appendix A, “Business application profile template” on page 59. You can apply this template to nine different domains, each of which has several services. Each service can be additional pain points for you to address. In this stage, the more you complete the template for each domain, the more accurate the outcome of the assessment is.

After you document the pain points of the business application, you can advance to the next stage. Typically this stage involves collaboration between the client and IBM. The IBM subject matter expert (SME) performs an evaluation of the selected business application and profile to determine whether the business application is eligible for this exercise.

If the selected business application is not eligible (an unlikely situation), you can select another business application to continue with the process.

Stage 1 has the following steps, which are explained in detail in the following sections:

- Step 1: Establishing project organization
- Step 2: Selecting and documenting the candidate business application
- Step 3: Completing and reviewing the business application profile

2.2.1 Step 1: Establishing project organization

To perform a business value assessment and lead it to a successful conclusion, confirm that all required professionals and decision makers are committed it. Therefore, the first step in this method is to establish the project organization. Not having commitment from the key SMEs or stakeholders is a red flag for continuation. This step involves the following activities:

1. Identify and confirm the champion, sponsor, or advocate at the client organization.
2. Determine the key stakeholders for the candidate business application.
3. Establish the project organization.

Figure 2-2 shows an example of a project organization. The project organization spans both the client and IBM, and both sides must be established and committed.

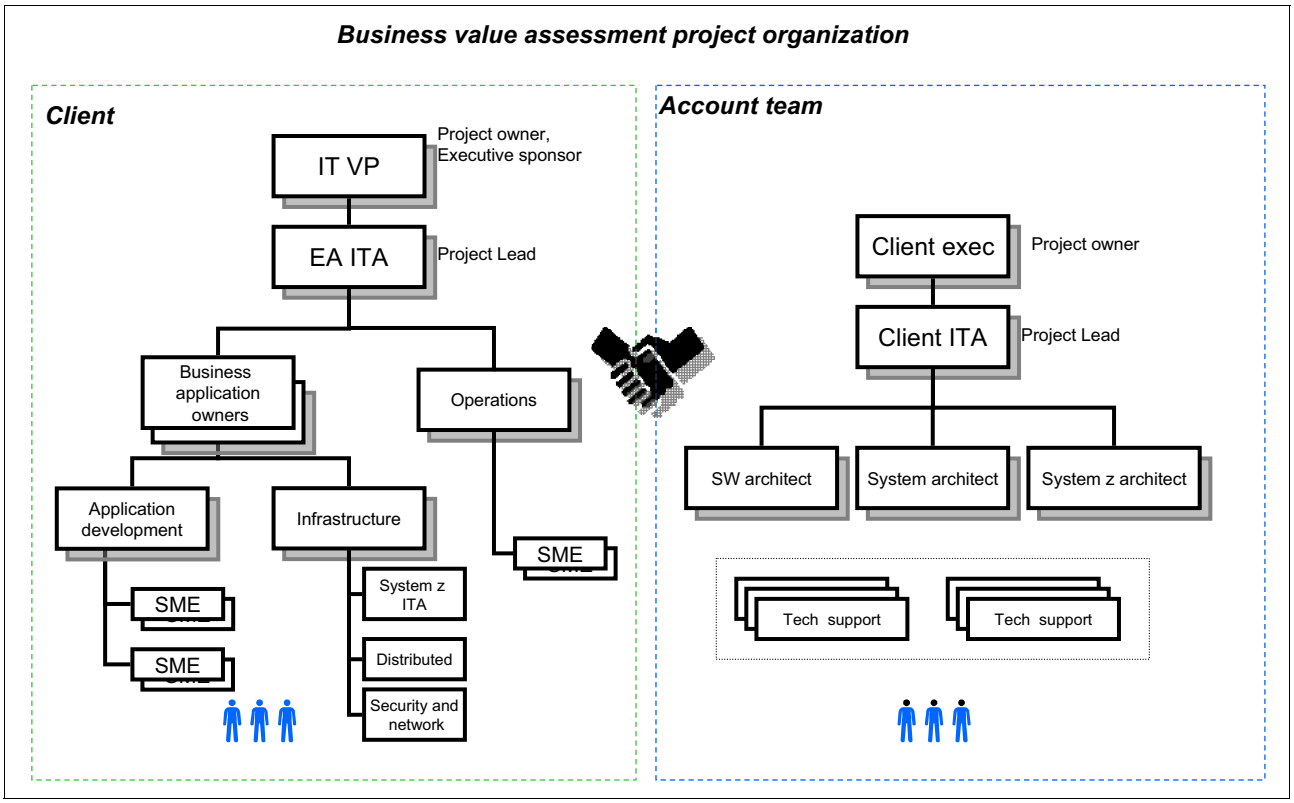

Figure 2-2 Possible project organization for a business value assessment

2.2.2 Step 2: Selecting and documenting the candidate business application

In the process of assessing the possible business value of the zEnterprise System for a particular workload or application, trade-offs must be made. The assessment is a process that takes time and resources. Therefore, you must set a domain where the assessment is to be made. The ideal business application to select is one with perceived pain points and that is representative of other business applications.

If the resources and time are available, you can do the assessment in a cycle for a set of business applications. However, the main objective of the process is to assess the business value of the zEnterprise System for a single business application. For multiple assessments, the total business value is close to the summation of each individual assessment.

This step consists of the following activities:

1. Selecting the business application.
2. Selecting the business application topology.
3. Documenting the application.

Selecting the business application

First, you must select the business application from the business application portfolio that the company currently has in place. A *business application* is a group of hardware, middleware, databases, and software that supports several nested applications for a common business purpose. In this paper, a business application contains multiple smaller IT applications.

The process to select the business application has two complementary areas. One area is related to the topology of the business application. It is helpful to understand the business application topology and to try to match it with one of the topologies defined by IBM. These standard, defined topologies are generic enough to match the topology of any business application. If the topology matches more than one topology, depending on the actual business application and the IT environment, one topology prevails over the rest.

The more accurate way to select a business application from the portfolio in the business ecosystem of an organization is to apply a list of criteria. The list of criteria that follows is specific for the zEnterprise Business Value Assessment. You can use or apply other criteria, but the result can be disappointing or useless.

Figure 2-3 on page 15 shows how the business application is filtered from the current portfolio using the following criteria. Ideally, the candidate business application meets the following criteria for the value assessment to be effective:

- The business application must have one or more components with IBM z/Architecture®, and IT management must be knowledgeable in this architecture.
- The business application must be supported by a heterogeneous IT infrastructure, with both IBM and platforms that are not from IBM. Distributed servers at the mid- to high-end must be based on a UNIX architecture. Low-end distributed servers must be based typically on an x86 architecture.
- The IT environment where the business application runs identifies persistent service management issues.
- The business application nests IT applications. The main characteristic is that these IT applications have little or no “homemade” stand-alone code, meaning that the IT applications are flexible enough to run on all or almost all the platforms.
- The business application must be representative in the business ecosystem of the company, meaning that it must be as business critical as possible.

- The business application must have similarities with other business applications in the portfolio, so that a potential business value for the selected application also applies to as many other business applications as possible.

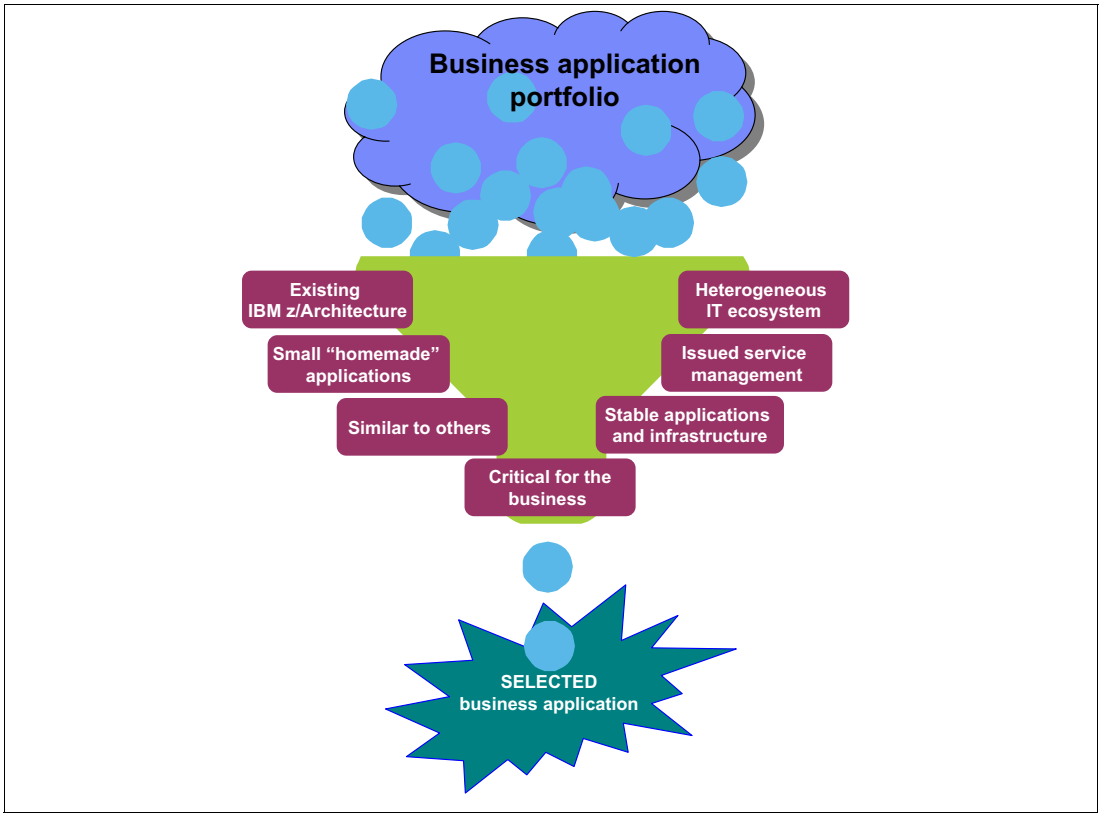

Figure 2-3 Business application filtering

Selecting the business application topology

In this step, you decide which topology comes closest to the selected business application. It is possible to choose more than one topology, in which case you can make your choice based on such aspects as the following examples:

- Components where you have most of your pain points
- Components where you process most of your resources (such as processor and I/O)

For information about the business application topologies, see 1.2, "Business application topologies" on page 3. For specific details about each one, see the following sections:

- Transaction processing topology
- Data serving and analytics topology
- Web and application serving topology
- Packaged application topology

Documenting the application

You can document a business application in many ways. In this process, the business application must be documented in a way that helps to complete the remaining steps of the zEnterprise Business Value Assessment. This documentation is primarily infrastructure-related, but documentation at the application level can also be helpful to have.

The following examples of documentation must be available:

- Overview architecture

  An overview architecture includes a high-level overview of the business application, the components involved, and the flow of the requests. Figure 2-4 shows an example of such an architecture.

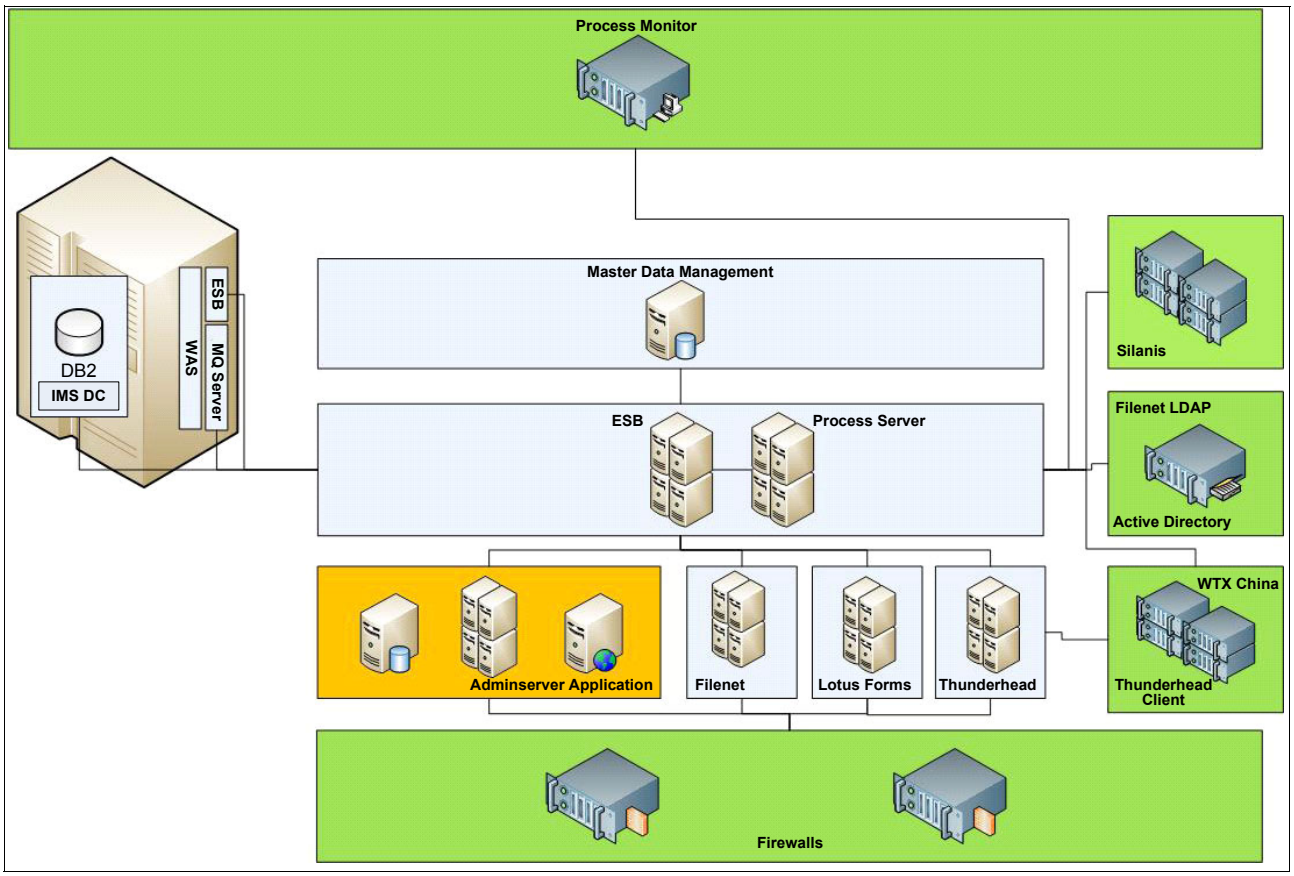

Figure 2-4 Example of an overview architecture

- Component architecture

  A component architecture includes a detailed diagram with all components involved in the business application. For example, it includes servers, storage devices, network routers, domain name servers, file servers, and firewalls. The diagram must also explain which software products are used in each components, the operating systems used, and hardware specifications, such as processor, memory size, and number of I/O cards. Figure 2-5 shows an example of such an architecture.

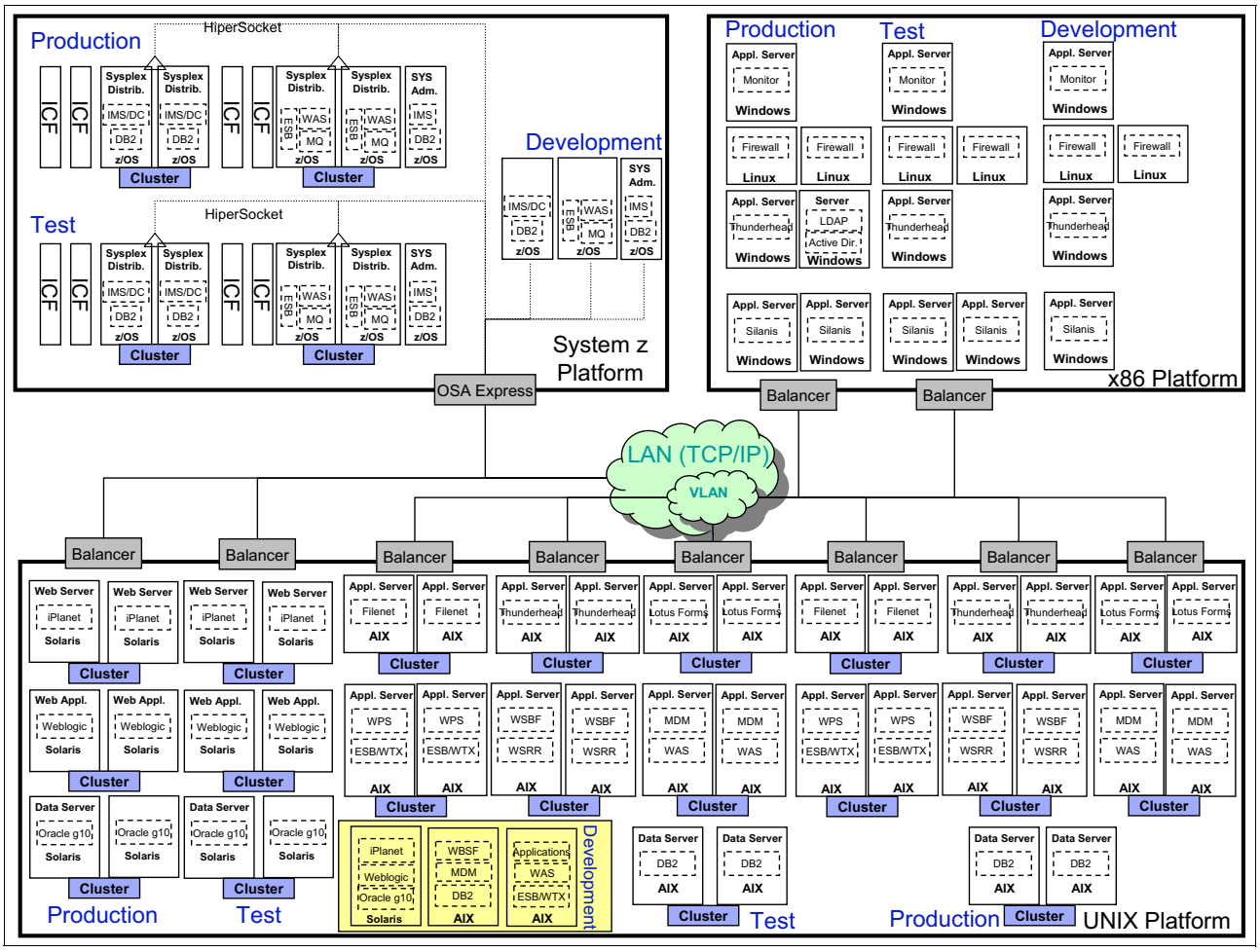

Figure 2-5 Example of a component architecture

- Operational architecture

  This documentation must explain the production environment of the business application, with a focus on availability, scalability, and disaster recovery. It must clearly indicate the type of availability that is implemented, how disaster recovery is performed, and the techniques that the business application uses to scale (horizontally, vertically, or both). This information helps to determine to what extent the service level agreement (SLA) and service level objective (SLO) are likely to be met. Figure 2-6 shows an example of such an architecture.

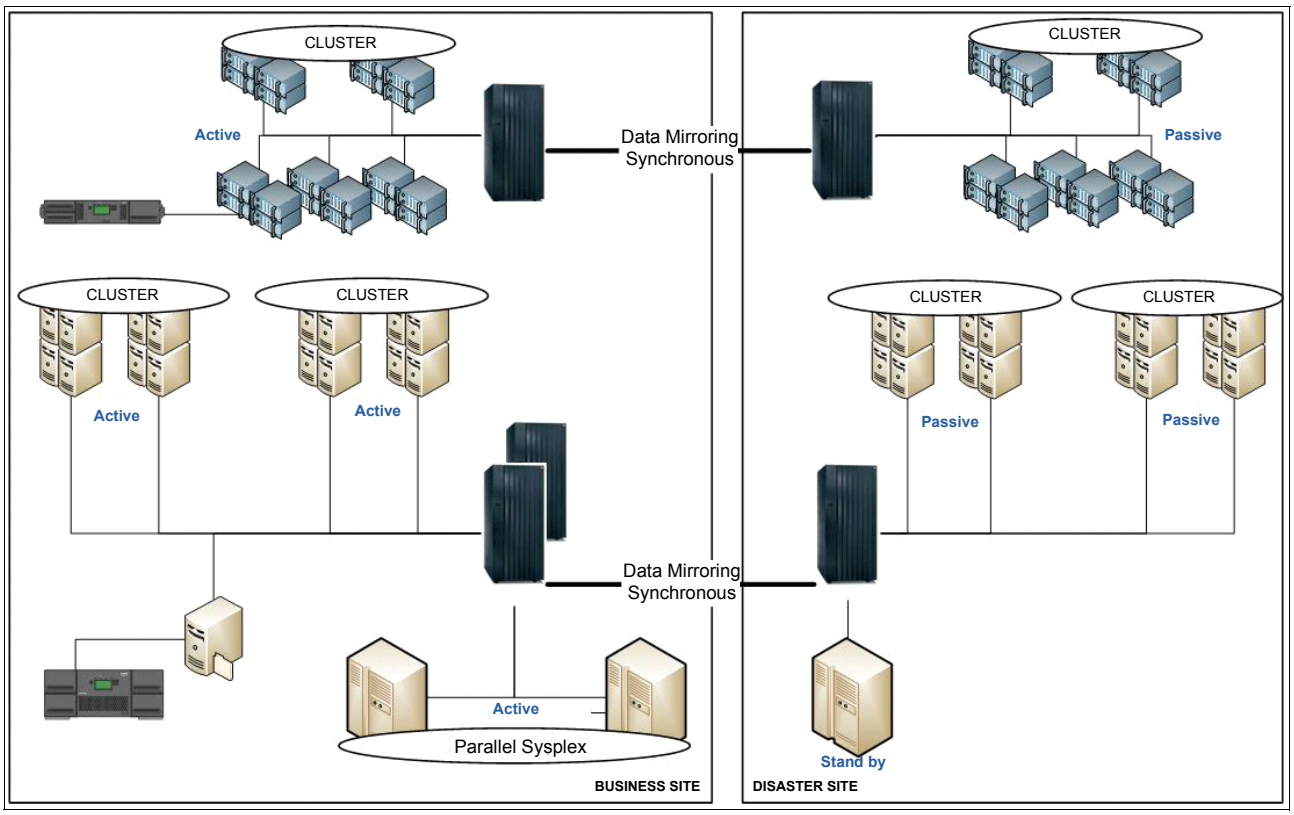

Figure 2-6 Example of an operational architecture

- Security architecture

  Many business applications today require a complex security architecture. Security might need to be implemented in all layers and components of the business application, which can affect the servers, network, and storage. Figure 2-7 shows an example of such an architecture.

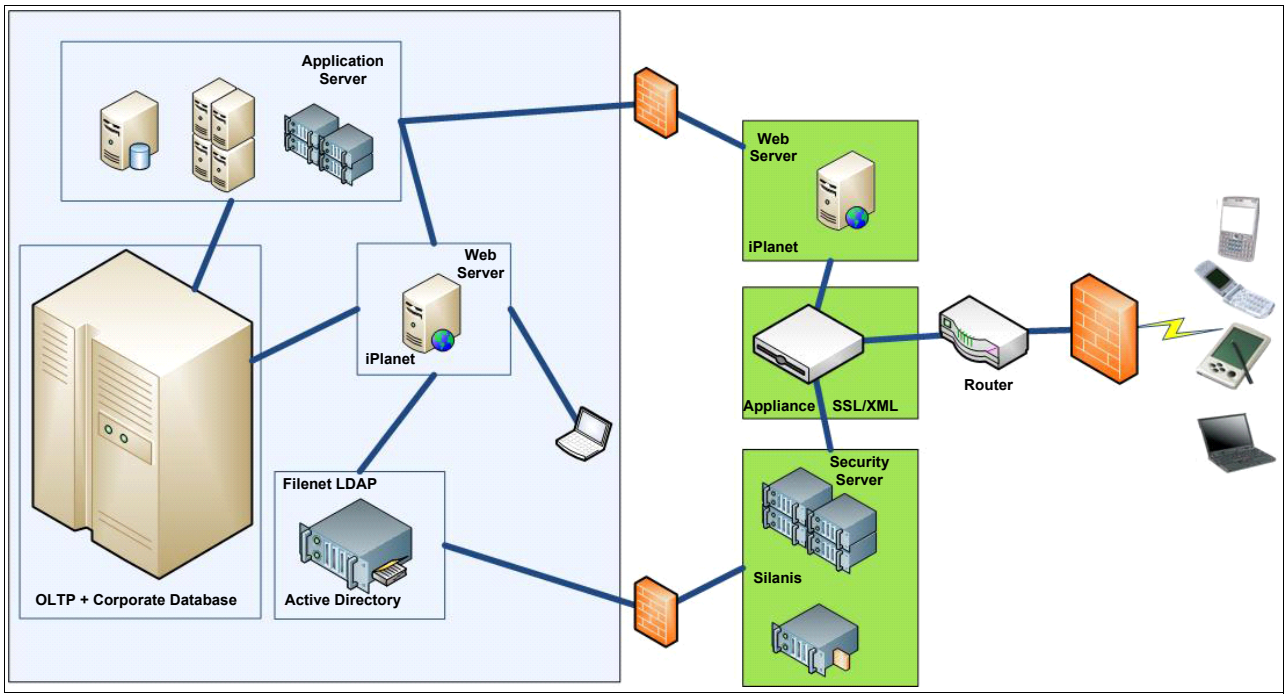

Figure 2-7 Example of a security architecture

2.2.3 Step 3: Completing and reviewing the business application profile

The most important tasks are to collect information regarding the issues and to clarify the pain points with respect to the candidate business application. To reveal and gather the obvious and hidden pain points in a business application from various viewpoints, you gather information about the pain points in a structured way and document them in a *business application profile* (see 1.1.1, “Business application” on page 2). With this approach, you can gather pain points about the candidate business application from the stakeholders. You can also conduct the zEnterprise Business Value Assessment more quickly and efficiently. You perform this step before the real assessment as described in “Step 5: Assessing the business application value” on page 25.

Business application profile template

The business application profile template helps you to document the perceived pain points in the current IT environment. The template helps you to organize your documentation so that you can ensure that you have all the necessary information. For a blank template, see Appendix A, “Business application profile template” on page 59.

Figure 2-8 shows how we defined the domains and the services within those domains.

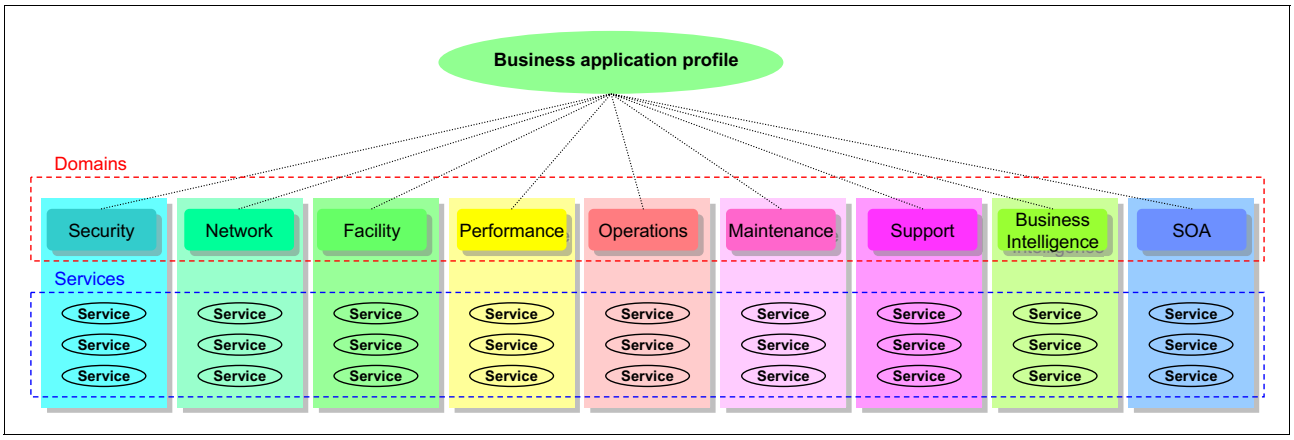

Figure 2-8 Business application profile structure

Look at all domains during the value assessment. If a domain has no pain point, you can write “no pain points” or “not applicable” on the template, and then continue with the next domain.

The following sections summarize the domains and services that we defined to help you get started.

Domains

We defined the following domains to study during the assessment:

- Security

  The security domain encompasses all the systems, subsystems, components, and processes that are related to the security that is needed to run the business application. This domain covers all aspects of security from an IT perspective, including the network components, firewalls, and appliances. This domain also includes the services related to the encryption of the messages that is performed between the components.

  A heterogeneous business application usually has several components regarding the security of the complete system of the business application. The business application cannot function properly if any of these components is missing or is not working properly.

- Network

  The network domain encompasses all the systems, subsystems, components, and processes that are related to the network of the business application that it is needed to run the business application in a heterogeneous environment. This domain covers all aspects of the network, including physical or virtual. This domain also includes all network aspects of the hardware appliances, software appliances, or both.

  The operation of a heterogeneous business application depends on the quality of all network components involved. If any of these network components is not available, or is undersized, the entire business application is affected.

- Facility

  The facility domain encompasses all the systems, subsystems, components, and processes that are related to the facilities that configure the data centers of the customer for the business application.

  A heterogeneous business application can be run in a single facility or in more than one facility. For example, a part of the business application is hosted in a third-party location,

or a regulatory party provides certain services that are hosted outside your own facilities for your business application.

- Performance

  The performance domain encompasses the performance characteristics of the business application. This domain also includes the monitoring infrastructure to track the behavior of the business application.

  A heterogeneous business application must perform in a range of values, which allows you to qualify how well the business application is doing from an IT perspective. This approach is important for keeping the business and IT organization aligned.

  For example, you must define, measure, collect, analyze, and publish the performance metrics of the application in each platform to establish the current performance of the application and to see how its performance is affecting other applications. This information helps to determine how good the business application is and to understand how much the business application is contributing to the success of the company.

- Operation

  The operation domain encompasses the operation of the heterogeneous business application. This domain includes all aspects of hardware and software management in terms of the available IT resources and how they are used and managed to run the business application.

  A heterogeneous business application is run by using IT hardware and software resources to complete all the tasks with a certain qualitative business value. For example, an application runs on different physical and virtual servers. The results must be provided within a certain time to be considered profitable. Then the application suddenly needs more process throughput because the economic situation changed or a new campaign is added from the business side.

- Maintenance

  The maintenance domain encompasses the lifecycle of the hardware and software components of the heterogeneous business application. This domain also includes all the planning and scheduling of tasks related to the maintenance of components of the business application.

  A heterogeneous business application has many components, each of which has a lifecycle that must be managed. For example, hardware regularly needs a firmware upgrade. For the software, new versions and releases must be installed to keep the business application running in the best conditions. In a heterogeneous environment, you must maintain the compatibility between the components to avoid outages produced by firmware or software incompatibilities. Also, you must perform maintenance by following a strict schedule to avoid unplanned outages that can affect the business and harm the revenue of the company.

- Support

  The support domain manages the monitoring and control aspects of the heterogeneous business application, including diagnosing error situations and taking corrective actions. A heterogeneous business application has several components. Each component is prone to malfunctions and errors. The errors and malfunctions must be detected and isolated so that the business application can continue functioning without a deep affect on the business process. To detect and isolate errors, tools and techniques must be in place to perform tracing. It must be possible to perform this tracing on each layer that is part of the business application, including the infrastructure level, operating system level, middleware level, database level, and application level.

- Business intelligence

  The business intelligence domain encompasses many aspects and components with respect to maintaining a business intelligence environment. However, in this assessment,

the focus is on the functions that are provided by the IBM DB2 Analytics Accelerator. With this component, certain queries are accelerated. Because of the speed, this component can provide more timely and effective information to help the company make better business decisions.

- Service oriented architecture (SOA)

  The SOA domain encompasses all the systems, subsystems, components, and processes that are related to the infrastructure and functions of the SOA. However, in the assessment, the focus is really on the IBM WebSphere DataPower® Integration Appliance for zEnterprise. You can use this appliance in the areas of XML acceleration, integrated enterprise service bus (ESB) functions, and security services.

Services

For each domain to study, we defined several services, but you can define additional services. A *service* is the item to be assessed. Services help you to further narrow down and focus on the different pain points in a heterogeneous business application. Services are also associated with the process described in Figure 2-9, which shows the relationship between services and the domains. Each service is used to assess the value of the zEnterprise System for the selected business application. (For details about the assessment, see “Step 5: Assessing the business application value” on page 25).

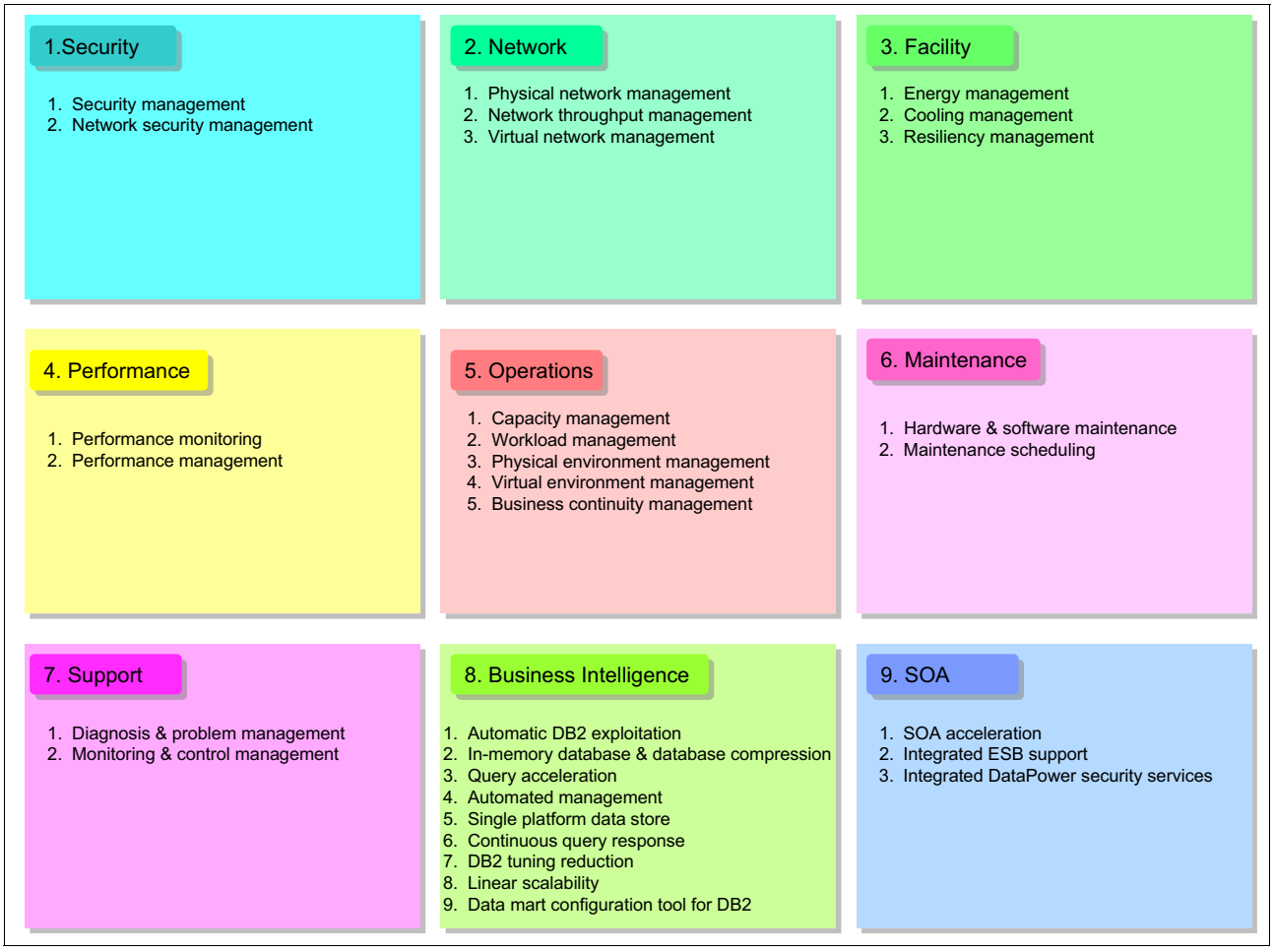

Figure 2-9 Services and domains in the business application profile

Rules of thumb for business application profiling

The business application profile template has about 30 services in 9 domains that must be assessed. To make the assessments easier, use the following rules of thumb to perform the business application profiling.

- When possible, assess all services in all domains to reveal the hidden pain points.

  To perform the business value assessment effectively, make efforts to collect the pain points related to all services if possible.

- Assess with a value of *neutral* those services that are not assessed in the business application profile.

  If a service has no pain point and no score, set the score of the service to “M.”

- If several pain points are in a service, score each pain point, and then choose the highest score as the score for the service.

- If a question is already answered, and you need to answer that question again, choose the highest score.

  The templates have several questions that can look similar. If you need to assess again, use the highest score.

- Assess only the business intelligence domain if the IBM Smart Analytics Optimizer is being evaluated.

  Assess the services in the business intelligence domain only if you understand the IBM Smart Analytics Optimizer capabilities, and consider them a possible solution now or in the future.

2.3 Stage 2

In Stage 2 of the process, the client and IBM must collaborate to extract more information from the pain points addressed in the profile. The IBM team discusses the pain points with each member of the client team. For each of the pain points, more information is added to the business application profile. Also in this stage, from the discussions, new pain points are addressed and added to the business application profile.

During the meetings and discussions, the customer scores each pain point in terms of the risk and potential hazard that it represents for the business application and ultimately for the business. After each pain point for each service is scored, an overall score is set for each of the services with the highest score of all pain points of that service.

After the overall score is set, the customer and IBM must make a formal agreement that the information about the business application profile is accepted by all stakeholders.

The step in stage 2 is Step 4: Performing in-depth analysis and scoring of pain points.

2.3.1 Step 4: Performing in-depth analysis and scoring of pain points

Before starting the assessment, the client and IBM team confirm the pain points that are collected and documented in the previous step. Eventual missing information is added, and points that are unclear are clarified. A deeper dive into the documented pain points can now take place, where symptoms are translated in real causes. This activity result in more detailed templates.

The pain points that are initially found in “Step 3: Completing and reviewing the business application profile” on page 19 and that are further refined in this step receive a risk score by using the following scale:

Very high	Very high risk for meeting the business objectives. The impact of this situation causes direct economic losses to the company. These effects are uncontrolled and difficult to contain.
High	High risk for meeting the business objectives. The impact of this situation occurring causes indirect economic losses to the company. The effects are uncontrolled and difficult to contain.
Medium	Medium risk for meeting the business objectives. The impact of this situation can cause some disturbance. It is likely to get worse and become high or very high risk in the future. The effects are uncontrolled, but can be contained.
Low	Low risk for meeting the business objectives. The impact of this situation is minimal. The effects are controlled and can be contained.
Very low	Very low risk for meeting the business objectives. No impact occurs. The effects are controlled in all stages.

After all pain points are discussed and scored, the client and the IBM team achieve formal agreement. This agreement is the starting point of the next stage, Stage 3. Stage 3 entails using the zEnterprise Business Value Assessment tool to determine the zEnterprise business value for the selected business application and to examine the pain points that are identified.

2.4 Stage 3

With the information available from the business application profile, the IBM team performs the translation to the individual questions of the *zEnterprise Business Value Assessment tool.* After each question is answered, the team feeds the tool questions and generates the report. The team then analyzes the information and findings for the selected business application. The result is a presentation that is given to the stakeholders. This presentation shows the value of the zEnterprise System for this business application.

Stage 3 includes the following steps:

- Step 5: Assessing the business application value
- Step 6: Analyzing the business value

2.4.1 Step 5: Assessing the business application value

After the pain points are scored in Step 4: Performing in-depth analysis and scoring of pain points, the next step is to run the zEnterprise Business Value Assessment tool. The tool is an IBM internal tool with limited access. The IBM team enters all the answers to the questions based on the scored pain points, as documented in the previous steps.

The IBM SME performs the following activities with the zEnterprise Business Value Assessment tool. The scope is the business application or applications that were selected in “Selecting the business application” on page 14. As input, the agreed templates with scored pain points are used (resulting from Step 4: Performing in-depth analysis and scoring of pain points).

1. Select the topology of the business application. For information about the topologies, see 1.2, “Business application topologies” on page 3.
2. Answer the questions, which are organized into the following groups:
   - Group I: Exploring new zEnterprise 196 capabilities
   - Group II: Exploring infrastructure integration
   - Group III: Exploring dynamic IT infrastructure
   - Group IV: Exploring application enablement

   Each group has multiple sections with a subgrouping of questions. The IBM SME ensures that all relevant questions are answered, based on the pain point analysis and the business application information.

   Translate the pain point scores that were identified previously and that were documented in the templates, to the appropriate score in the zEnterprise Business Value Assessment tool. Table 2-1 shows the translation.

Table 2-1 Pain point score: zEnterprise Business Value Assessment tool score translation

Pain point score	zEnterprise Business Value Assessment tool score[a]
Very high	4
High	3
Medium	2
Low	1
Very low	0

a. The value 0 means “strongly disagree,” and a value of 4 means “strongly agree.”

When all questions are answered, you see a window similar to the example in Figure 2-10. The tool shows the results in the form of a diamond, which is called the *zEnterprise infrastructure business value grid*. The diamond is green with the four drivers of the business value in each vertex:

- New capabilities
- Quality of services
- Time to Value
- Increased Efficiency

Also, the lower half of the window shows an overview (in a table format) of the benefits and values for each drivers.

Figure 2-10 Infrastructure score of the zEnterprise Business Value Assessment tool

Next, the tool shows the zEnterprise overall business value grid, which is a green diamond with the four drivers of the business value in each vertex (Figure 2-11):

- New capabilities
- Quality of services
- Time to Value
- Increased Efficiency

Also, the lower half of the window shows an overview (in a table format) of the benefits and values for each driver.

Figure 2-11 End-to-end score of the zEnterprise Business Value Assessment tool

In the next step, the business value is analyzed in collaboration between IBM and the client.

2.4.2 Step 6: Analyzing the business value

Step 6 entails exploring the business value diamond and discussing the relationship of the outcome with the identified pain points earlier.

The graphic is plotted as a diamond. The center of the diamond that is shaded in gray represents the area where there is no additional business value for the selected business application when using the zEnterprise System.

Center of the diamond: In this paper, the center part of the diamond is shaded light gray to ease comprehension. The tool uses the white color for the same area.

The white area represents the potential business value gained for the business application when using the zEnterprise System. The areas shaded in green provide additional business value when using the zEnterprise System.

The business value diamond has a scale with gray lines. The inner most gray lines represent no business value when using the zEnterprise System. The outer most gray line represents a complete business value from the zEnterprise System. The gray line in the middle represents a 50% business value from the zEnterprise System.

The diamond is divided into four coordinates, each representing one of the following business value areas. These four business values areas identify the strengths and values of the zEnterprise System.

New Capabilities The ability to enable new business offerings, to better align IT to business processes, or both. Refers to how the business position is improved soon.

Quality of Services The ability to improve some aspects of the non-functional requirements of the existing and new business services.

Time to Value The ability to decrease the time need for the IT business services to begin providing a positive impact on revenue, profit, or both.

Increased Efficiency The ability to perform technological, organizational, and process improvements. Such improvements can lead to a cost reduction (such as a reduction of the labor force) or to a productivity improvement (such as doing more work with the same resources).

The following four cases provide examples to ease your understanding of the diamond and to help you interpret the business value diamond.

No business value

Figure 2-12 shows a diamond where no business value is expected in any of the four business value areas. The diagram is shown in the tool as entirely white. You see only the gray lines.

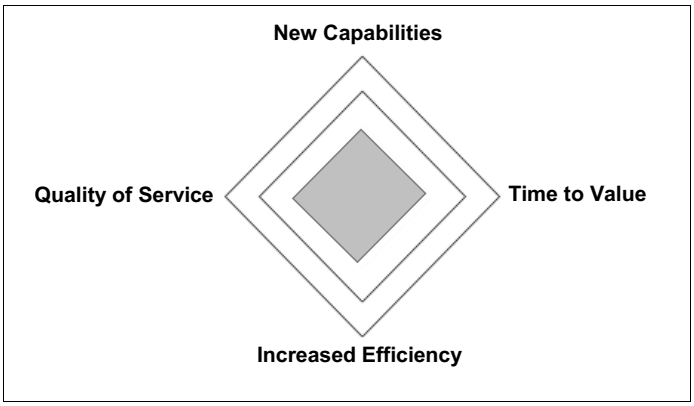

Figure 2-12 zEnterprise Business Value Assessment tool diamond: No business value

Total business value

Figure 2-13 shows a diamond with maximum achievable business value. In the tool, the area in the core of the diagram is shown as white, and the surrounding areas are green for a full 100%.

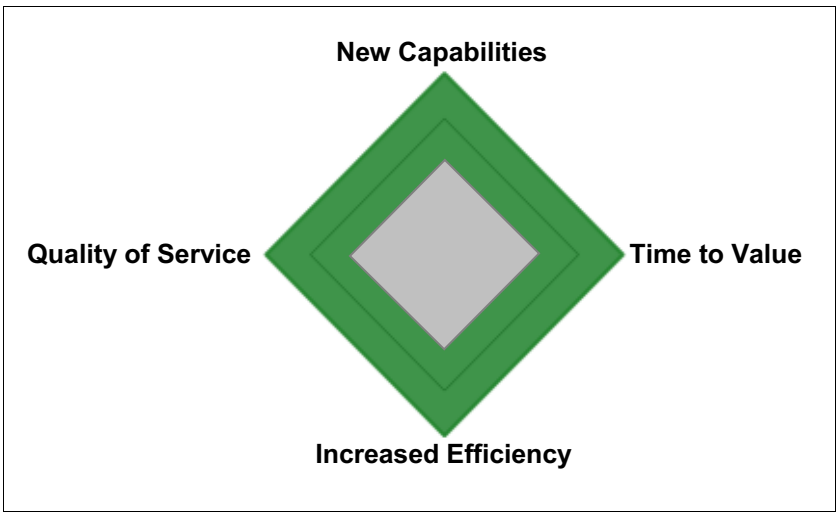

Figure 2-13 zEnterprise Business Value Assessment tool diamond: Total business value

Great business value

Figure 2-14 shows a diamond with a good business value. In the tool, the area in the core of the diagram is shown as white, and the surrounding areas are mostly green. Some of the four business value areas might be more green than the other areas, but the overall amount of green is substantially more than 50%.

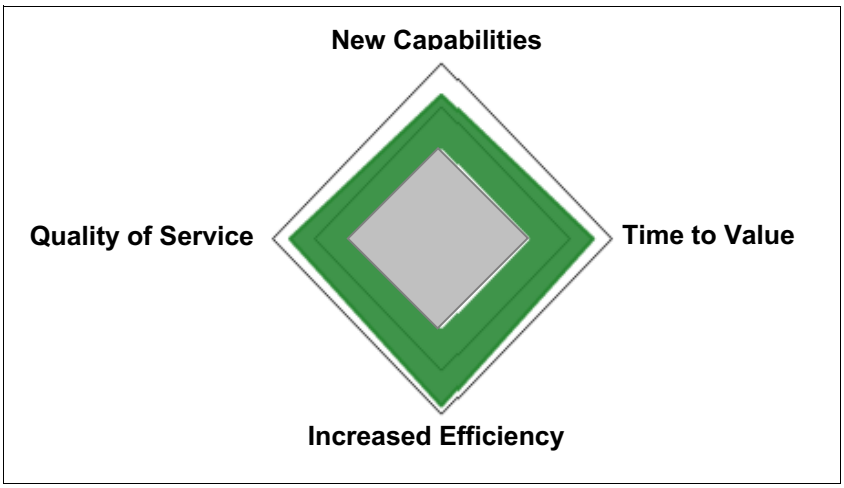

Figure 2-14 zEnterprise Business Value Assessment tool diamond: Great business value

Some business value

Figure 2-15 shows a diamond with some business value. In the tool, the area in the core of the diagram is shown as white, and the surrounding areas are green for some part. Some of the four business value areas might be more green than the other areas, but the overall amount of green is substantially less than 50%.

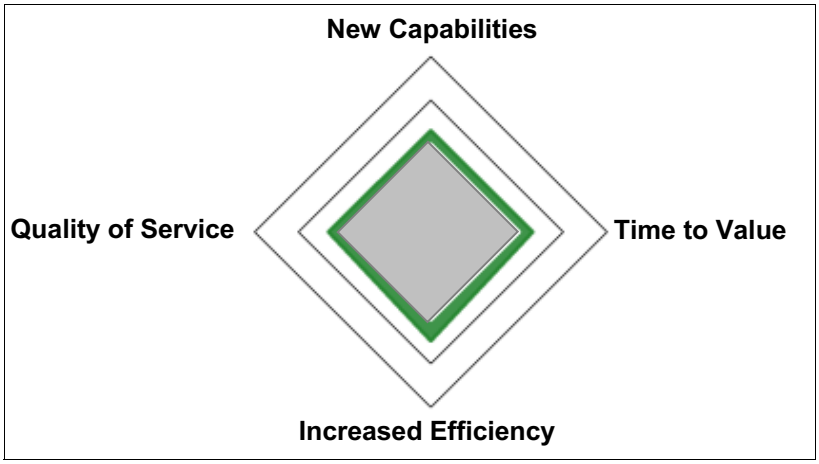

Figure 2-15 zEnterprise Business Value Assessment tool showing some business value

Other possible cases

The amount of green for each of the four business value areas can vary. Theoretically one area might be 100% green, and another area might not be green at all. However, in most cases, the four areas have some form of consistency.

Business value areas

The tool presents a list of potential business value topics to obtain with the zEnterprise System for the selected business application. This list comes as a table organized into the following categories:

- New capabilities
  - Enable increased IT integration
  - Improve position for the future
  - Enable new service offerings
- Quality of service
  - Improve throughput
  - Improve response time
  - Increase user business productivity
  - Enable consistent service level attainment
  - Improve security
  - Reduce unplanned outages
  - Reduce planned outages
  - Reduce incidence of operator error
  - Reduce problem determination time
  - Improve security
  - Improve quality of service operations
  - Improve FFDC/Diagnosis
  - Improve throughput

- Increase efficiency
  - Reduce process lifecycle time
  - Increase server utilization
  - Improve power utilization
  - Reduce skill levels required
  - Reduce cost of coordination
  - Reduce or eliminate tasks
  - Reduce process error rate
  - Increase network utilization
- Time to value
  - Increase revenue or profit
  - Increase value of business function
  - Reduce the level of workload disruption
  - Reduce complexity of change deployment
  - Enable faster implementation of capability
  - Reduce the test lifecycle

2.5 What is next

After you perform all six steps, you have a newly found insight into whether the zEnterprise System provides business value for the examined business application based on the identified pain points. If you expect the zEnterprise System to provide business value, such as to improve significantly on the identified pain points, the project team can decide to move on to the next step in the process. In this step, the team chooses and documents the proposed zEnterprise architecture, which IBM sometimes refers to as *Fit for Purpose*. For more information, see Chapter 3, “Choosing and documenting the proposed zEnterprise architecture” on page 33.

3

Choosing and documenting the proposed zEnterprise architecture

This chapter explains each of the four application topologies. For all four topologies, it shows the current and zEnterprise topology. In addition, the transaction processing and web and application serving topologies include a more in-depth explanation about placement of the components.

This chapter includes the following sections:

- Transaction processing business application topology
- Web and application serving business application topology
- Data serving and analytics topology
- Packaged application topology

3.1 Transaction processing business application topology

The transaction processing business application topology is the most common business application type. Clients in the financial services, insurance, and electronic commerce industries rely on transaction processing business applications to deliver their business functions.

This topology can be mixed with other architectures or use specific functional components. However, this model consists of presentation layers that serve as front-end layers to multiple application servers that access shared sources of data.

3.1.1 Current topology

A workload can be placed on a specific platform for many reasons. Such reasons might include executive preferences and the skills and experience of application developers or ISVs. They can also include cost/performance factors or emotional decisions based on pleasant or painful past experiences and relationships.

This section describes a common platform placement pattern that is used for transaction processing business applications. Although platform placements in your environment can vary, most statements in the model can be the same. The scope described in this topology is the one highlighted in the orange box under “Transaction processing business application in-scope for assessment” on the right side of Figure 1-1 on page 4.

Figure 3-1 shows a generic view of this topology, although variations exist.

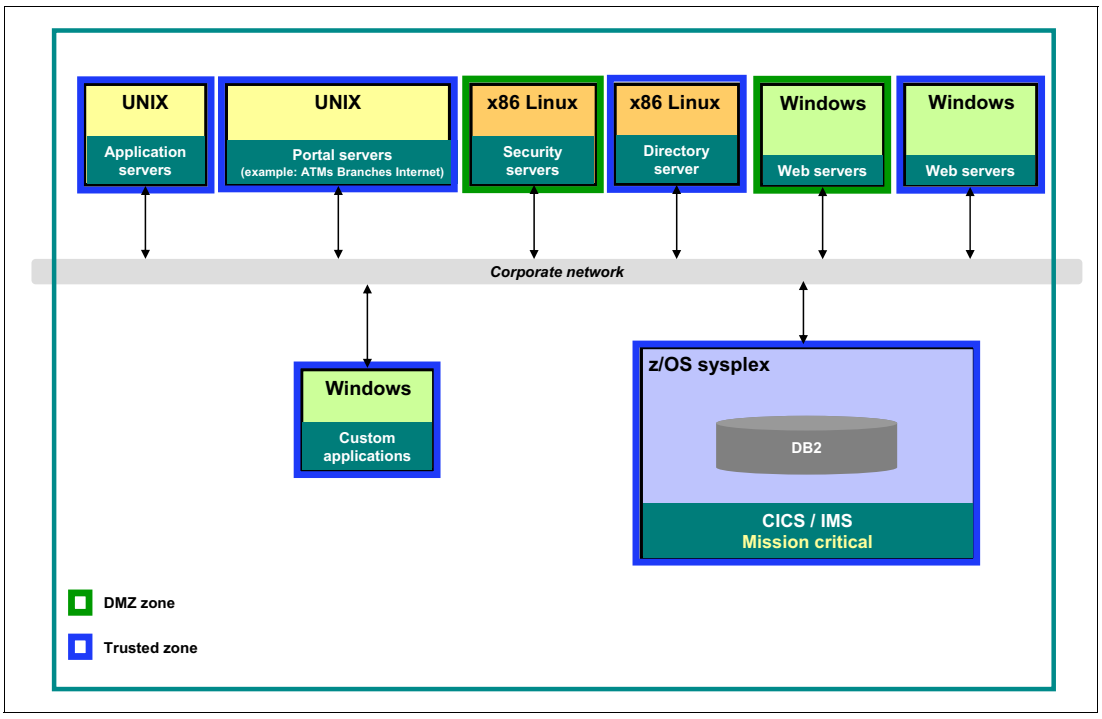

Figure 3-1 Current transaction processing business application topology

Web servers

The two boxes in the upper right corner of Figure 3-1 are the web servers, which are also called *HTTP servers*. In this topology, the web servers are used as the front-end layer before the application servers that access internal information server providers. They are used to deliver static content, such as HTML documents, images, style sheets, and JavaScript, to browser clients.

These static files are directly accessed from local storage or cached during the transfer process from the web server to a client. Thus, most or all data used is not shared between the servers. As a result, they have low contention and coherence delays.

With these characteristics, web servers can scale almost linearly by adding new servers. In addition to being a standard type of server that is suitable for all platforms, web servers are commonly placed on servers with the lowest cost of acquisition, such as Intel servers.

These Intel technology-based environments usually grow by adding servers rather than replacing existing ones, which leads to large server farms, consisting of obsolete and low capacity hardware. Also, the lack of proper virtualization and resource sharing results in high amounts of white space and wasted energy, heat, and floor space.

Management of the infrastructure, version control, maintenance, and availability is a complex and time-consuming task. The lack of control leads also to security and availability problems.

Security servers

Security servers are in the center of the upper part of the topology diagram in Figure 3-1 on page 34 They are named “Security servers” and “Directory server.”

The *Security servers* box represents the servers that are used to perform authentication, authorization, single sign-on (SSO), reverse proxy, access control, and other security tasks. The *Directory server* is a software system that is used to store, organize, and centralize information such as user and group profiles, access control information, and application settings. The directory server is the source of information for the “Security servers”.

The *Lightweight Directory Access Protocol* (LDAP) is the standard used by most available solutions to implement this technology.

The security server architecture is similar to the web server architecture. However the security server architecture usually needs replication-based clusters for high availability. Thus they can be affected more by contention or coherence delays.

In the diagram in Figure 3-1 on page 34, the security servers are placed on Linux, because it is a popular platform for this type of product, and most existing solutions have Linux versions available. Even if your current deployment is placed on another platform, the example used here serves as an acceptable reference.

The efficiency of these servers is tightly coupled with network architecture, because the quality of protection varies depending on the network security zones. Thus, a complex network design and limitations in network management can compromise their effectiveness.

Application servers

The upper left corner of Figure 3-1 on page 34 shows two servers with the names “Application servers” and “Portal servers.” These servers provide the infrastructure for the execution of Java technology-based applications. They handle part of the transaction processing business logic and work as a middle tier between the clients and the back-end information providers. They are also used for reuse and modernization of services and content produced by the information providers. In that role, they compose and format information from different back-end application servers and databases before passing this information back to various client devices. In this topology, application servers produce dynamic content to be delivered as web pages and work with the web servers to add static content to clients.

Application servers must scale vertically and horizontally. Usually the best approach is a mix between horizontal and vertical scaling. A single server has some contention delays but low coherence delays. However, if cluster members have session replication to support high availability requirements, coherency delays increase depending on the number of servers in the cluster.

Complex or nonexistent management processes to monitor and control application server performance and maintenance, along with integration between the application servers and the information providers, are common issues in this topology.

Custom applications

Custom applications are represented by the green box in the lower left corner in Figure 3-1 on page 34. This box illustrates in-house developed or proprietary ISV applications that are used to provide specific functions. In-house developed middleware, connection solutions, and business-specific applications are good examples of custom application servers.

Although custom applications are usually client/server, the architectures used in this type of workload are specific and often proprietary. Although they can be found on different platforms, Windows best exemplifies these characteristics.

Change management is complex and slow due to the lack of documentation and skills to maintain and develop new functions.

Information provider servers

The information provider servers are the heart of the transaction processing topology. These server components are responsible for coordinating the shared access from multiple application server instances to the central information repositories, ensuring consistency and integrity. These components can be database systems or enterprise information systems (EISs) where most of the business logic processes run.

Information provider servers must be able to process large amounts of data fast, ensuring integrity. Therefore, they require a high internal I/O and memory bandwidth. Qualities of service requirements, such as security and availability, are high because downtimes in these components directly affect the business transaction as a whole.

The information provider servers in this topology are placed on z/OS because most of the core business applications and corporate data resides on the mainframe. Also System z hardware, operating systems, and middleware provide the application environment with the highest availability and security levels.

3.1.2 zEnterprise topology

This section describes design principles for workload placement of business applications in the transaction processing topology to run in a zEnterprise environment. Figure 3-2 shows the same topology illustrated in Figure 3-1 on page 34, but moved to a zEnterprise environment using “as-is” placement criteria. In this criteria, the components are moved to the new environment, keeping the same operating system platform whenever possible or using the closest platform option.

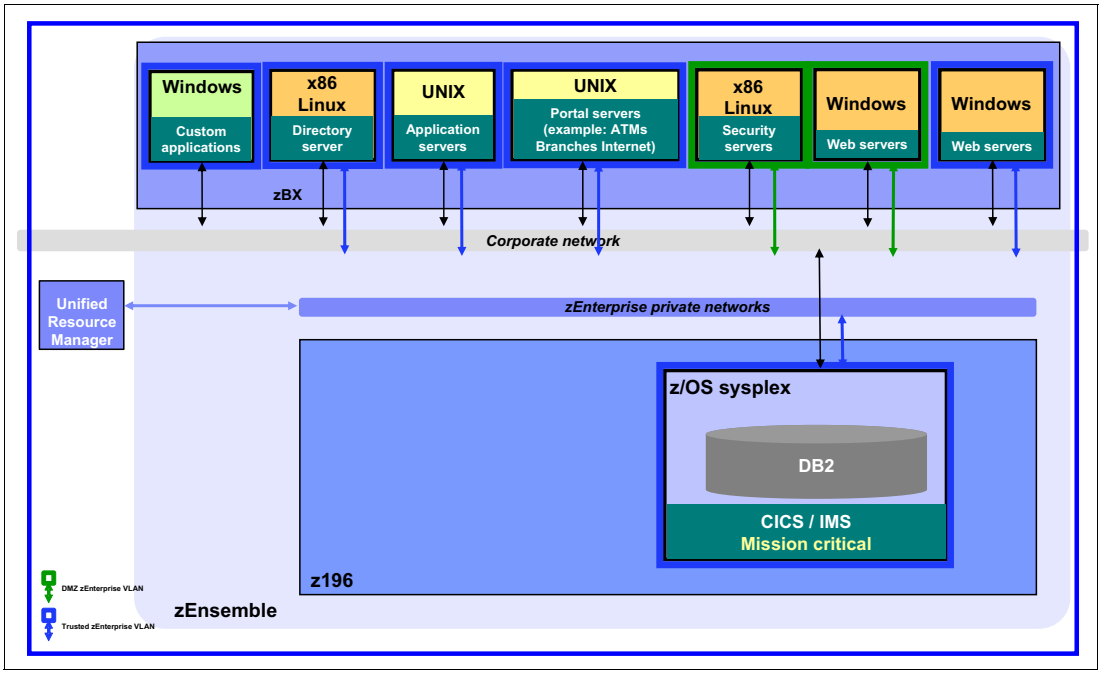

Figure 3-2 zEnterprise transaction processing business application topology

Web servers

In the current topology diagram illustrated in Figure 3-1 on page 34, the web servers are placed on the x86 or Windows platform. By using the as-is approach, these web servers must be moved to Intel or Windows blades on the zEnterprise System. However, you can use Intel or Linux blades instead.

Table 3-1 compares the current topology with the zEnterprise topology for the web server component, assuming the use of Linux instead of Windows.

Table 3-1 Comparison of the current topology with the zEnterprise topology for web servers

		Non-w eighted	Weighted	Non-w eighted	Weighted
Weighting	**Category**	**Current topology**	**Current topology**	**zBX x86 Blades**	**zBX x86 Blades**
5	Performance (response time)	5	**25**	5	**25**
3	Availability	5	**15**	5	**15**
3	Security	5	**15**	6	**18**
1	Scalability (scale up)	5	**5**	3	**3**
4	Scalability (scale out)	5	**20**	6	**24**
2	Service management (E2E)	5	**10**	7	**14**
2	Integration	5	**10**	7	**14**
			100		113

The web server workload can benefit from the zEnterprise private network, IBM zEnterprise Unified Resource Manager management capabilities, and zEnterprise virtualization practices. We found that the service management and integration categories are more affected by the zEnterprise capacities, which is why they receive better rates in our comparison table. However, the zEnterprise System received a lower rate for vertical scalability (scale up) because blade capacity can be limited compared to high-end, single server configurations.

Figure 3-3 is based on the rates from Table 3-1 on page 37 and illustrates possible gains when moving the web server workload component to the zEnterprise System.

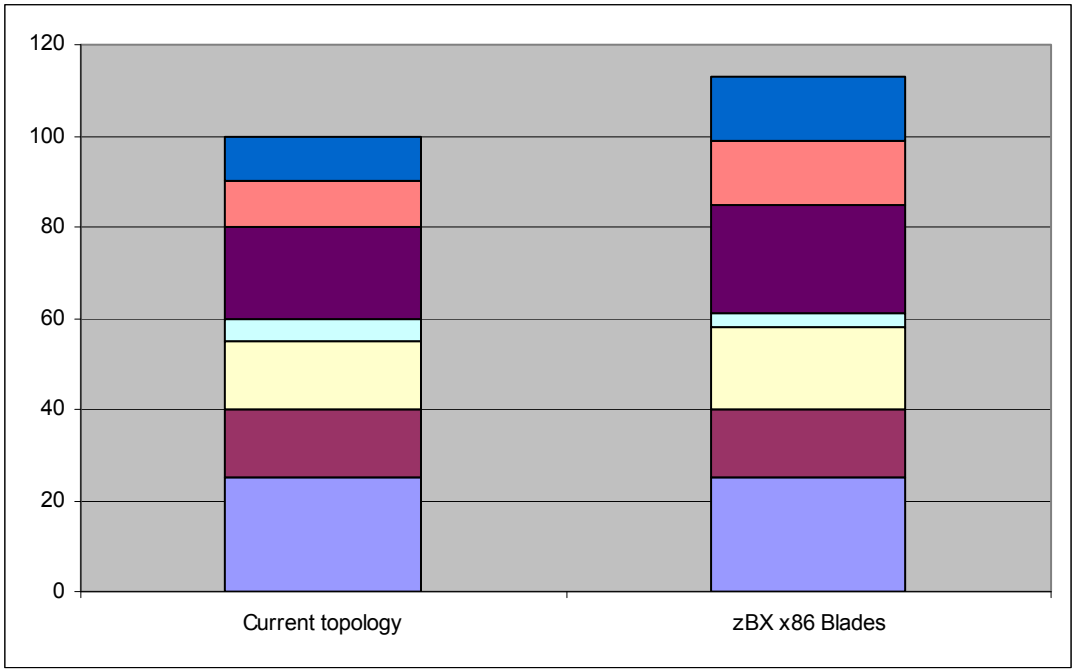

Figure 3-3 Web server scoring table

Linux on System z can be another option for web server placement. In this case, the rates for service management, integration, and security can be higher than the as-is option.

As mentioned previously, web servers are a standard server, and the web server software product used is probably available for various operating systems, including Windows, UNIX, IBM AIX®, and various Linux distributions for various processor types. The migration of web servers to another operating system or processor combination is, in most cases, a smooth process. However, migration issues can arise in cases where the web server performs both its standard role and specific functions, by using proprietary APIs and frameworks or accessing hardware-specific features, such as hardware encryption devices or attached hardware. In this case, they might be better classified in the workload as “custom applications.”

Security servers

Looking again at Figure 3-2 on page 37, using the same approach, the security servers are kept on the same platform as they were originally in Figure 3-1 on page 34. Although they remain on the same platform, some workload characteristics are slightly different. Therefore, the rating table in Table 3-2 on page 39 looks a bit different.

Table 3-2 Comparison of the current topology with the zEnterprise topology for security servers

Weighting	Category	Non-weighted Current topology	Weighted Current topology	Non-weighted zBX x86 Blades	Weighted zBX x86 Blades
5	Performance (response time)	5	**25**	5	**25**
5	Availability	5	**25**	5	**25**
3	Security	5	**15**	6	**18**
3	Scalability (scale up)	5	**15**	3	**9**
2	Scalability (scale out)	5	**10**	6	**12**
3	Service management (E2E)	5	**15**	7	**21**
3	Integration	5	**15**	7	**21**
			120		131

The weighting factor for the scalability categories changed because we did not expect to have that many security server instances as we have for the web servers.

However, security servers have a more critical role. Therefore, the availability, security, and service management have a higher importance. They also need to provide information to other servers in the topology. At least the network integration between the security and directory servers must be effective.

Figure 3-4 is based on the rates from Table 3-2 and illustrates possible gains when moving the security server workload component to the zEnterprise System.

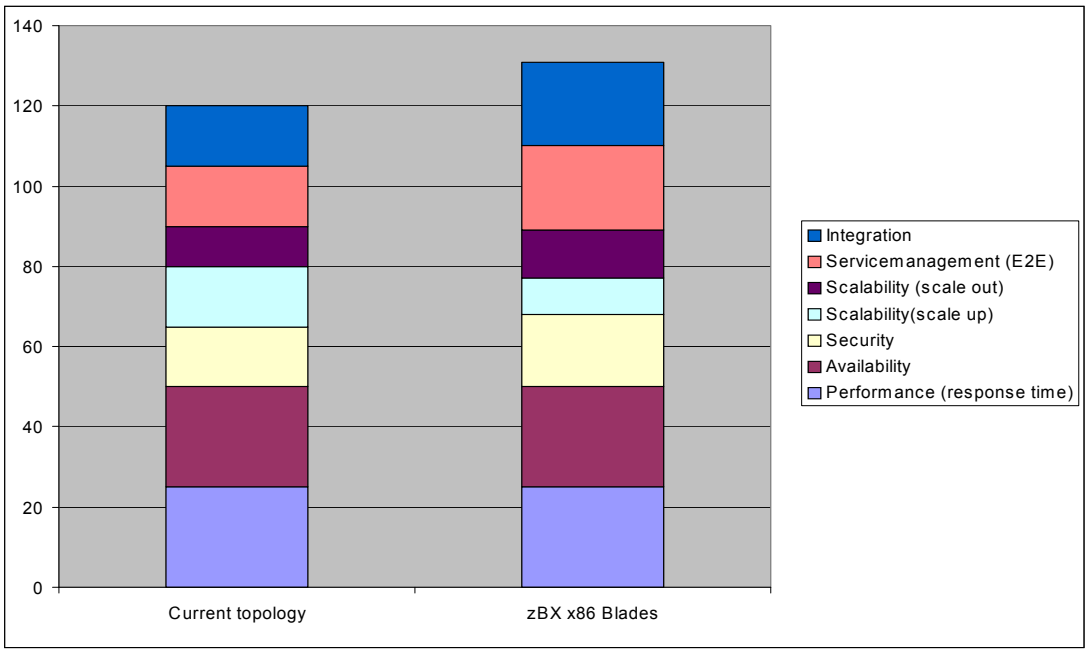

Figure 3-4 Security servers scoring table

Another placement option for the directory server is z/OS. On z/OS, LDAP can interface with Resource Access Control Facility (RACF®) to improve SSO capabilities. In this case, the rates for availability, security, and scale up are even higher than the rates represented in the as-is model.

Because the workload is kept on the same operating system and processor combination, the migration process in the as-is model is simple. Possible issues can only be associated to the support and compatibility for the different Linux distribution or kernel versions.

Application servers

In Figure 3-1 on page 34, the application servers are placed on UNIX. By using the as-is approach, the closest platform is the Power or AIX blades on IBM zEnterprise BladeCenter® Extension (zBX).

Application servers need a more balanced weighting factor than other servers. For this workload, integration is also an important requirement. This scale assumes that the UNIX hardware shown in Figure 3-1 on page 34 is a UNIX stand-alone server and not a UNIX blade, which justifies the rate difference for the scale up category. This point is also true for the performance category. These statements do not apply if the hardware in the current topology is also a UNIX blade. Table 3-3 shows the ratings.

Table 3-3 Comparison of the current topology with the zEnterprise topology for application servers

		Non-weighted	Weighted	Non-weighted	Weighted
Weighting	**Category**	**Current topology**	**Current topology**	**zBX Power Blades**	**zBX Power Blades**
5	Performance (response time)	5	**25**	4	**20**
4	Availability	5	**20**	5	**20**
3	Security	5	**15**	6	**18**
3	Scalability (scale up)	5	**15**	2	**6**
3	Scalability (scale out)	5	**15**	6	**18**
3	Service management (E2E)	5	**15**	7	**21**
5	Integration	5	**25**	7	**35**
			130		138

If the applications running in the application servers have higher requirements for quality of service (QoS), or if other categories, such as collocation and TCO are considered, z/OS is another option to consider for placement.

Figure 3-5 shows another way to demonstrate the differences between placement options.

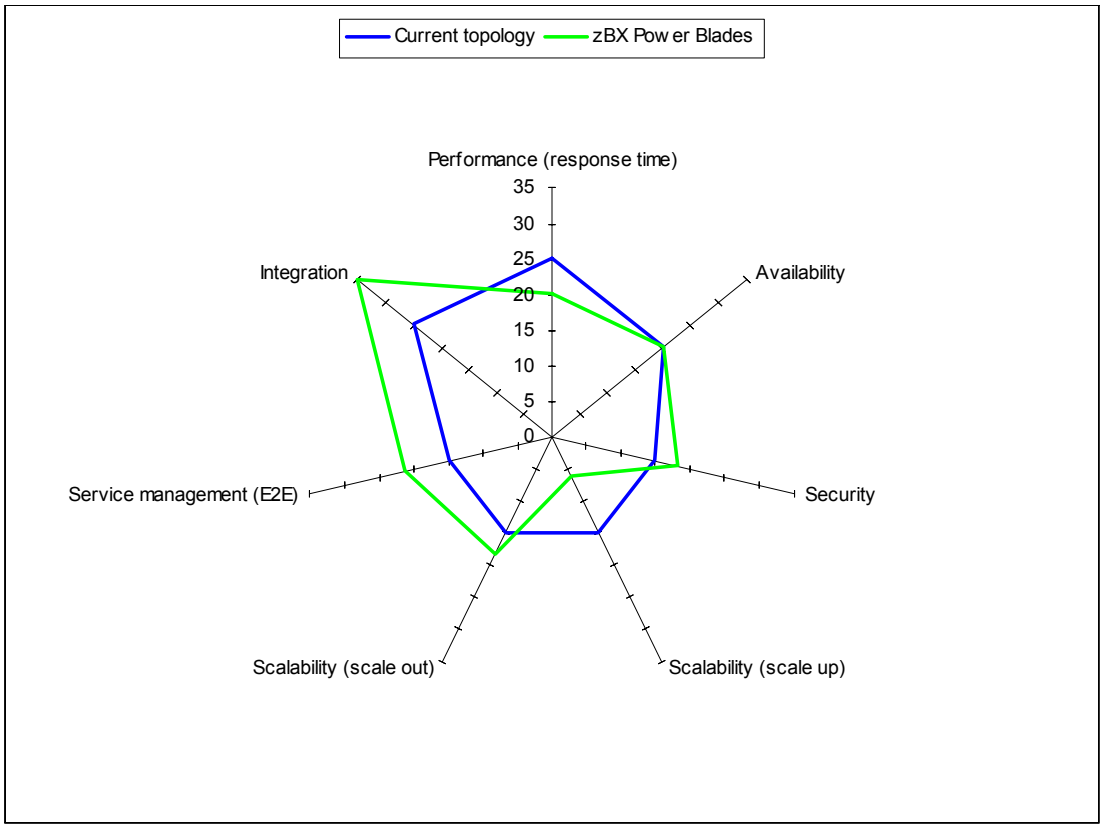

Figure 3-5 Scale rating comparison

As stated earlier for web servers, most application server products have versions available for various platforms. If the server migration does not imply any changes in the application server software product and version used (and thus no impact on the Java specification level), the migration process is simple. Otherwise, migration can become more complex.

The migration process is also affected by the quality of the application. An application that is not compliant with Java Platform, Enterprise Edition (J2EE) specifications or that does not follow best practices can require changes in the code to be migrated. A classic example is an application running on Windows that has a hard-coded reference to a `C:\plaintextfile.txt` file.

Custom applications

Custom applications originally ran on stand-alone Windows servers. In the zEnterprise topology diagram (Figure 3-2 on page 37), this workload component is now positioned on Windows blades, according to the as-is rule.

Information provider servers

In the zEnterprise diagram (Figure 3-2 on page 37), the information provider servers workload component remains on the same platform (z/OS). Workload components that are part of critical workloads and that are already running on z/OS receive the QoS that z/OS offers. Therefore, in most cases, it makes no sense to move these components to another platform, at least not without sacrificing scalability and availability. z/OS is supported inside the zEnterprise platform on the IBM zEnterprise 196 (z196).

When migrating from older System z models, the process follows the same pattern used in the regular migration process done for upgrades.

3.2 Web and application serving business application topology

Business applications in this topology consist of application servers, interoperating in different ways, and domains to provide a set of functions. *Application servers* in this context are components that provide specific services. *Services* are a group of operations that deliver meaningful functions. Thus, other topologies can also be service components in this topology. However, the key element is not the components, but the way in which they integrate and interact.

The application development process in this architecture is platform agnostic, which can give the wrong impression that platform placement for the application deployment is not important. However, each application server fits differently in each platform, and the specific infrastructure directly affects a successful deployment of the topology.

This section describes some of the principles used for platform placement to build a robust infrastructure for the web and application serving business application topology.

3.2.1 Current topology

The current platform placement is sometimes a legacy of decisions taken in the past based on assumptions that are no longer valid. In a topology, such as the web and application serving business application topology, typically the component placement was decided at multiple moments and by different groups, to support different projects. It is also common to find new business applications built on top of components that are implemented with disparate QoS requirements.

Thus, the platform placement depends on different factors, and it is improbable that any reference topology might fit all the possibilities. Figure 3-6 shows a common placement with different options that can be used to exemplify the various platform placement options.

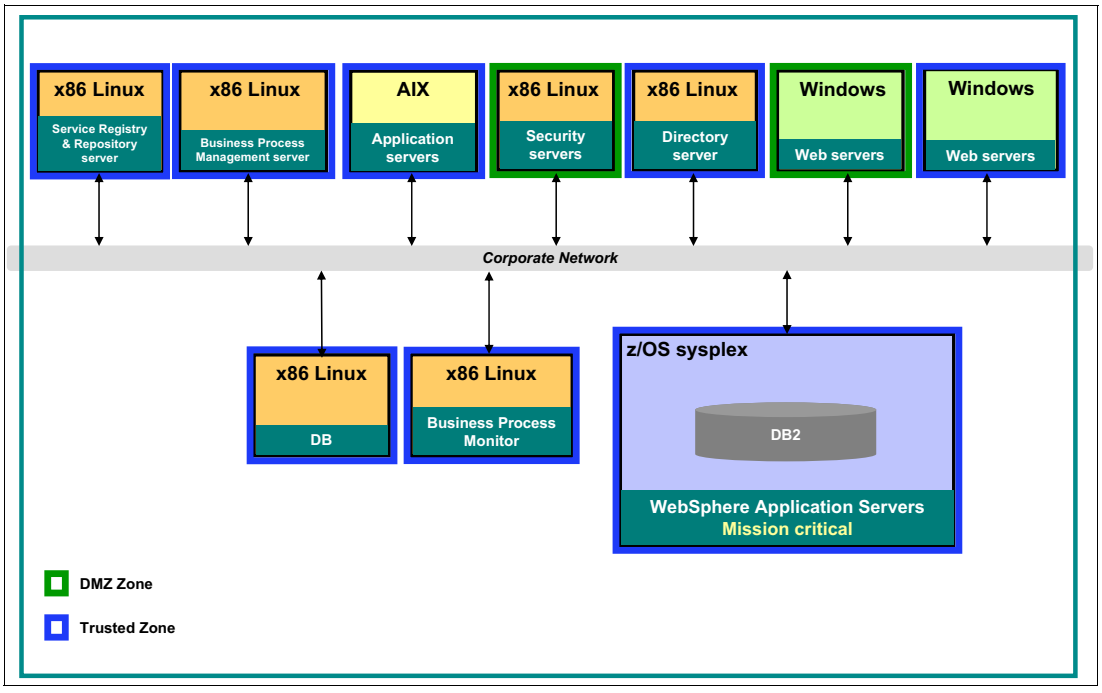

Figure 3-6 Current web and application serving business application topology

Web servers

The two boxes in the upper right corner in Figure 3-6 on page 42 are web servers, which are also called *HTTP servers*. They are used as a front-end layer to the other components in the topology. They are used to deliver static content to the web clients. Alternatively, they are used as a routing mechanism to direct the requests to the correct application server. In both cases, they do not share data between their instances, and as a result, they have low contention and coherence delays.

With these characteristics, they can scale almost linearly by adding new servers. Because they are a standard type of server and are suitable for all platforms, they are commonly held on servers with the lowest cost of acquisition, which usually means Intel servers.

Security servers

Security servers are in the center of the topology in the upper part of Figure 3-7 on page 45. They are used to store, organize, and centralize information to perform functions such as authentication, authorization, SSO, reverse proxy, access control, and other security tasks.

LDAP is the standard that is used by most available solutions to implement directory servers.

The security server architecture is similar to the web server architecture. However, security servers usually need replication-based clusters for high availability. Thus they can be more affected by contention or coherence delays.

In the Figure 3-7 on page 45, the security servers are placed on x86 Linux, because it is a popular platform for this type of product. Also most existing solutions have Linux versions available. If your current deployment is placed on another platform, the example used here can serve as an acceptable reference.

The efficiency of the services is tightly coupled with network architecture, because the quality of protection varies depending on the network security zones. Thus, a complex network design and limitations in network management can compromise their effectiveness.

Application servers

The application servers are represented by a yellow box in the center of the upper part in Figure 3-6 on page 42 and in the z/OS sysplex box. Application servers provide functions through Java applications that deliver business logic or wrap existing applications, allowing reuse by providing standard interfaces.

Compared to the application servers described in 3.1, “Transaction processing business application topology” on page 34, in this topology, they are supposed to deliver content through web services, instead of dynamic content to be used by web clients. However, in the real world, the way application servers are used can vary greatly.

They can also be implemented in various platforms due to different QoS requirements. As shown in Figure 3-6 on page 42, critical applications are served from z/OS, and another server is placed on a UNIX server.

Applications in this architecture are expected to be stateless, which favors horizontal scalability because session replication is not needed. Memory is usually an important driver for scalability, sometimes even more important than processors are.

The lack of a reliable and secure communication process and interoperability is a common issue for application servers.

Specialized application servers

The specialized application servers are in the upper left corner of Figure 3-6 on page 42. They are named “Business Process Management server” and “Service Registry & Repository server.” The lower center box is called “Business Process monitor.” The components are different from the application servers described previously. These components have specific functions to enable SOA. Examples of such servers include business process management (BPM), enterprise service bus (ESB), portal, and service registry and repository.

The business process monitor in this topology is not a low-level event monitor for categories, such as throughput and response times. Instead, it is a business-level server to handle measurements, such as cost, revenue, and profit, as defined and used by business executives.

Usually most specialized application servers are applications running on top of a generic application server to create a framework for specific functions. Thus, most of the scalability and workload profiling statements for the generic application servers also applies to these components.

Databases

Inside a web and application serving architecture are various databases with different functions and QoS requirements. Databases can be used, for example, for corporate information, application profiling, holding configuration data, and as a back-end layer for repositories.

In this topology, databases are on z/OS and on distributed platforms. In Figure 3-6 on page 42, the databases on the distributed platforms are positioned on x86 Linux servers. Also a database component is under z/OS that is implemented in DB2.

In a platform placement discussion, you must understand what the data in each database is used for. You must also understand how the current databases are partitioned and clustered to achieve certain levels of performance and scalability.

3.2.2 zEnterprise topology

In the web and application serving topology, workload placement of business applications must follow design principles to run in a zEnterprise environment. Figure 3-7 shows the same topology as shown in Figure 3-6 on page 42, but with a zEnterprise environment using as-is placement criteria. In this criteria, the components are moved to the new environment, keeping the same operating system platform whenever possible or using the closest option.

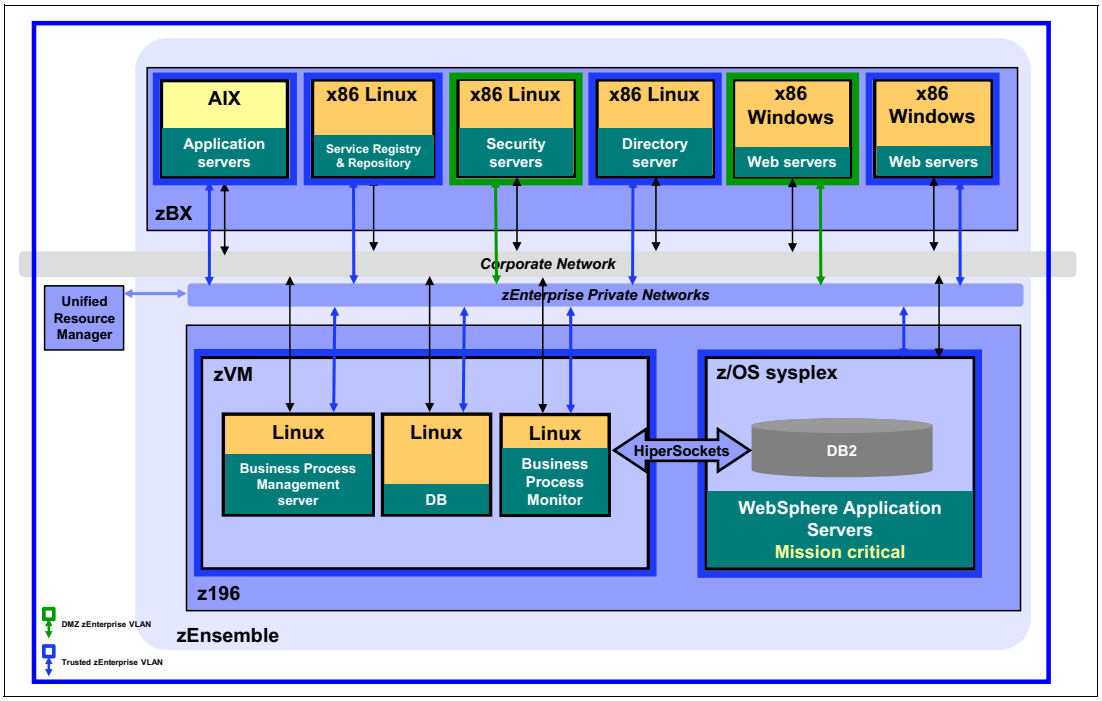

Figure 3-7 Web and application serving business application topology for the zEnterprise System

Web servers

In the current topology illustrated in Figure 3-6 on page 42, the web servers are placed on the x86 or Windows platform. Following the as-is approach, the web servers are moved to x86 Windows blades on the zBX, but you can also consider x86 Linux. An as-is migration from the original Windows server to Windows on a zBX blade might not be possible for many reasons.

Table 3-4 compares the ratings for the current platform and the zEnterprise platform, assuming that the web servers might be moved to x86 Linux blades.

Table 3-4 Comparison of the current topology with the zEnterprise topology for web servers

		Non-w eighted	Weighted	Non-w eighted	Weighted
Weighting	**Category**	**Current topology**	**Current topology**	**zBX x86 Blades**	**zBX x86 Blades**
5	Performance (response time)	5	**25**	5	**25**
3	Availability	5	**15**	5	**15**
3	Security	5	**15**	6	**18**
1	Scalability (scale up)	5	**5**	3	**3**
4	Scalability (scale out)	5	**20**	6	**24**
2	Service management (E2E)	5	**10**	7	**14**
2	Integration	5	**10**	7	**14**
			100		113

Web servers can benefit from the zEnterprise private network, Unified Resource Manager capabilities, and the zEnterprise virtualization process. Our understanding is that the service management and integration categories are more affected by these zEnterprise capacities, which is why they receive better rates in the comparison table. However, the zEnterprise System received a lower rate for vertical scalability (scale up) because blade capacity can be limited when compared to some single servers configurations.

Figure 3-8 shows a bar chart of the ratings.

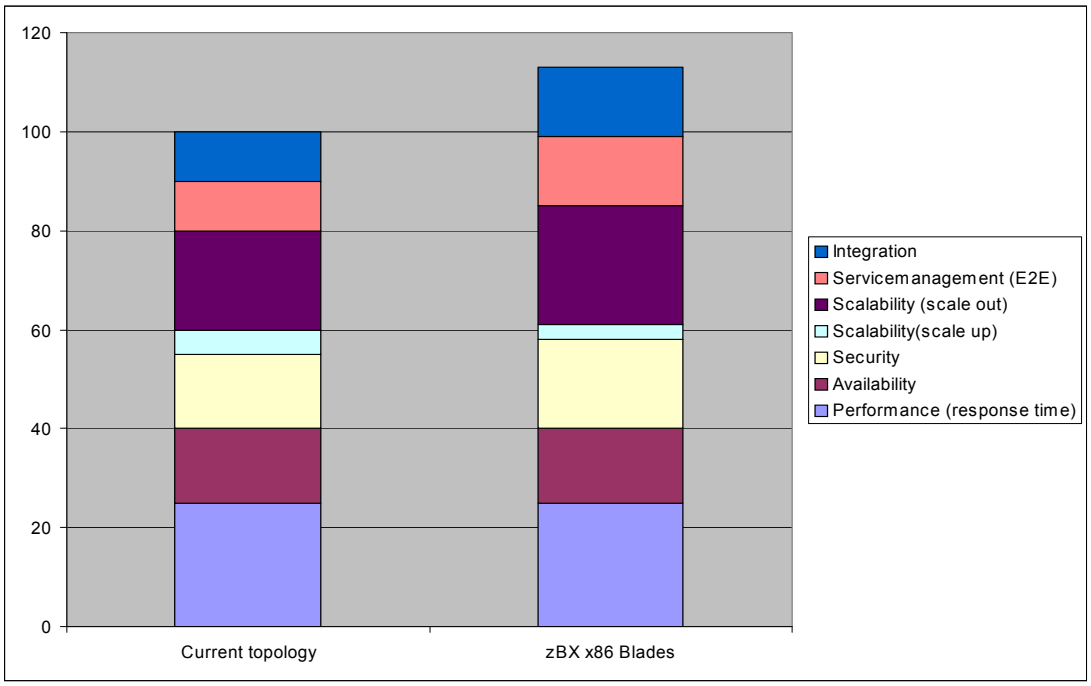

Figure 3-8 Web servers scoring table

The chart in Figure 3-8 is based on the ratings from Table 3-4 on page 45 and illustrates possible gains when moving the web servers to the zEnterprise System.

Linux on System z can be another option for the web server placement. In this case, the rates for service management, integration, and security can be even higher than the as-is option.

As mentioned previously, web servers are a standard server, and the web server software product used is most likely available for Windows, UNIX, AIX, and various Linux distributions on multiple hardware options. Migration of web servers to another operating system and processor combination is a smooth process in most cases. However, migration issues can arise in cases where the web server is performing its standard role and specific functions using proprietary APIs and frameworks or accessing hardware-specific features, such as hardware encryption devices or certain attached hardware. Depending on the importance and how specific these functions are, they can be better classified in the workload as “custom applications”.

Security servers

In Figure 3-7 on page 45, using the same approach, security servers are kept on the same platform (Linux) as they are in the current topology, as shown in Figure 3-6 on page 42. Although they are kept on the same platform, some workload characteristics are slightly different. Thus it has a different rating table, which is shown in Table 3-5 on page 47.

Table 3-5 Comparison of the current topology with the zEnterprise topology for security servers

Weighting	Category	Non-weighted Current topology	Weighted Current topology	Non-weighted zBX x86 Blades	Weighted zBX x86 Blades
5	Performance (response time)	5	**25**	5	**25**
5	Availability	5	**25**	5	**25**
3	Security	5	**15**	6	**18**
3	Scalability (scale up)	5	**15**	3	**9**
2	Scalability (scale out)	5	**10**	6	**12**
3	Service management (E2E)	5	**15**	7	**21**
3	Integration	5	**15**	7	**21**
			120		131

The weighting factor for the scalability categories changed because we do not expect to have many security server instances as we have for the web servers.

However, security servers have a more critical role, and therefore, the availability, security, and service management have a higher importance. They must also provide information to other servers in the topology. At least the network integration between the security and directory servers must be effective.

Figure 3-9 is based on the rates from Table 3-5 and illustrates possible gains when moving the security server workload component to the zEnterprise System.

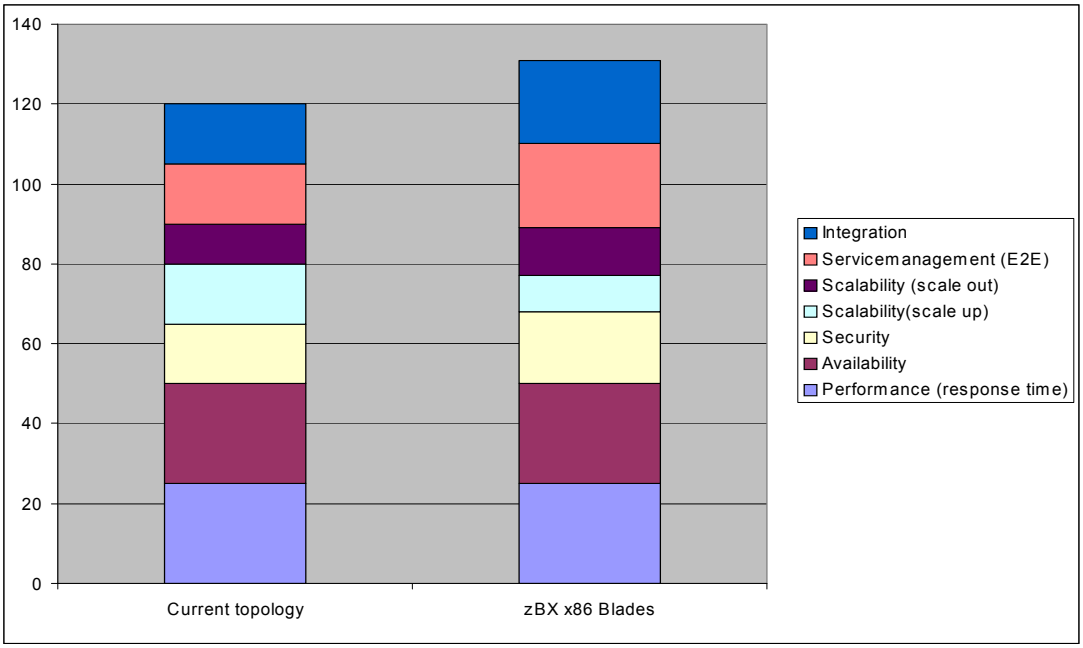

Figure 3-9 Security servers scoring table

Another placement option for the directory servers is z/OS. On z/OS, LDAP can interface to RACF to improve SSO capabilities. In this case, the rates for availability, security, and scale up are even higher than the ones represented in the as-is model.

Because the workload was kept on the same processor and operating system combination, the migration process in the as-is model is simple. Associate possible issues only to the support and compatibility for the different Linux distribution or kernel versions.

Generic and specialized application servers

Although the behavior and functions of the generic and specialized application servers are slightly different from the transaction processing topology, for the same categories, the rating results are similar.

In this topology, because the same component can have instances on different platforms, to help exemplify the platform placement decision process, consider the following scenarios:

- In the first scenario, the application is not critical. Most of the application business logic runs inside the application server, and most or all of the back-end systems that are accessed are in distributed platforms.
- In the second scenario, the application is critical. A part of the application business logic exists inside a server, such as CICS or IMS, wrapped in an application running in the application server.

To help define the best option, we include the collocation category in the rating comparison table. The collocation category reflects the fact that the placement of the application and data layers on the same hardware or on the same logical partition has benefits. The same is true for z/OS.

In the first scenario (Table 3-6), the QoS requirements and (as a result) the weighting values for the categories, such as availability and security, are lower. Collocation also has a low value because the access to the back-end system is through the network.

Table 3-6 Scenario 1: Comparison of the current topology and the zEnterprise topology for application servers

		Non-weighted	Weighted	Non-weighted	Weighted
Weighting	**Category**	**Current topology**	**Current topology**	**zBX x86 Blades**	**zBX x86 Blades**
5	Performance (response time)	5	**25**	5	**25**
3	Availability	5	**15**	7	**21**
3	Security	5	**15**	7	**21**
3	Scalability (scale up)	5	**15**	7	**21**
3	Scalability (scale out)	5	**15**	7	**21**
3	Service management (E2E)	5	**15**	7	**21**
3	Integration	5	**15**	5	**15**
3	Collocation	5	**15**	5	15
			130		160

In the second scenario (Table 3-7 on page 49), the weighting values for availability and security are higher. The collocation value is also high because the collocation on the same z/OS image provides benefits. These benefits include better efficiency of processor utilization by eliminating network traffic and better security through the assertion of identity between threads. Another benefit includes better management through the use of Workload Manager (WLM) to manage execution priorities among the various components.

Table 3-7 Scenario 2: Comparison of the current topology and the zEnterprise topology for application servers

Weighting	Category	Non-w eighted Current topology	Weighted Current topology	Non-w eighted zBX x86 Blades	Weighted zBX x86 Blades
5	Performance (response time)	5	**25**	5	**25**
5	Availability	5	**25**	7	**35**
5	Security	5	**25**	7	**35**
3	Scalability (scale up)	5	**15**	7	**21**
3	Scalability (scale out)	5	**15**	7	**21**
4	Service management (E2E)	5	**20**	7	**28**
4	Integration	5	**20**	5	**20**
4	Collocation	5	**20**	5	20
			165		205

The design considerations made for the transaction processing topology in “Application servers” on page 36 also apply to this topology.

For specialized application servers, additional considerations are necessary due to the requirements of separate databases, messaging providers, or both. Thus, migration tends to be more complex because there might be a need to migrate the applications and the database contents. For example, the migration of a Process Server database must include specific procedures to migrate the database contents that are used by long running processes.

Another possibility is migrating only the application server part of the solution. However, in this case, support and compliance for this mixed configuration must be observed.

Databases

In the current topology diagram (Figure 3-6 on page 42), a database exists on an x86 or Linux server. When moved to the zEnterprise System using the as-is model, this database must be moved to Linux x86 blades. However, we chose to move this database to a Linux on System z server, as shown in Figure 3-7 on page 45, to achieve better vertical scalability.

Table 3-8 shows the comparison table with rates and weights for this workload.

Table 3-8 Comparing the current topology with the zEnterprise topology for database

Weighting	Category	Non-w eighted Current topology	Weighted Current topology	Non-w eighted z/VM Linux	Weighted z/VM Linux
5	Performance (response time)	5	**25**	7	**35**
5	Availability	5	**25**	6	**30**
5	Security	5	**25**	6	**30**
4	Scalability (scale up)	5	**20**	7	**28**
2	Scalability (scale out)	5	**10**	5	**10**
3	Service management (E2E)	5	**15**	6	**18**
3	Integration	5	**15**	6	**18**
			135		169

The z196 provides a superior I/O performance and hardware availability, which is reflected in the weights considered for these categories. Also, the zEnterprise private network increases security. The Unified Resource Manager and IBM z/VM® provide the database server with a better service management and integration. With z/VM, Linux virtual machines can use many processors (cores). The large capacity of the z196 provides good scale-up capacity.

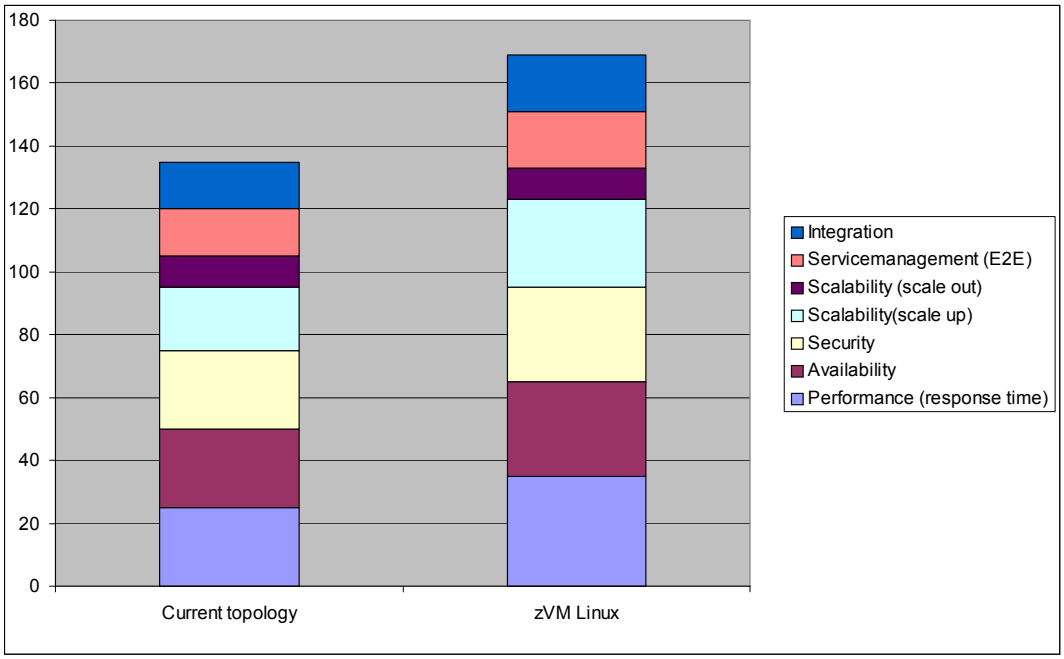

Figure 3-10 Database scoring table

Another platform option for the database is z/OS. DB2 on z/OS with data sharing obtains higher rates for most categories analyzed.

It is possible that the database version or optional components used in the current configuration are not available or certified for other platforms. In this case, the database migration can mean switching to another database vendor and platform. Switching to another platform, with the same database system, is manageable but requires additional planning. Requiring a switch in both the platform and database system for a workload migration can impose an additional challenge. However, by using the proper planning, guidance, and tools, the process is generally manageable.

3.3 Data serving and analytics topology

Business applications in this topology typically consist of multiple operational data sources, data warehouses, data marts, information integration engines for extract, transform, and load (ETL), business intelligence (BI) components, and increasingly analytics components. Also, a master data management component can be part of this topology. Some of these components can be implemented as middleware components or as applications on top of middleware, such as application servers.

The following section shows a sample topology, for which many variations are possible.

3.3.1 Current topology

This section shows a common platform placement pattern for data serving and analytics business applications. Figure 3-11 shows a typical data serving and analytics business application topology with the components involved.

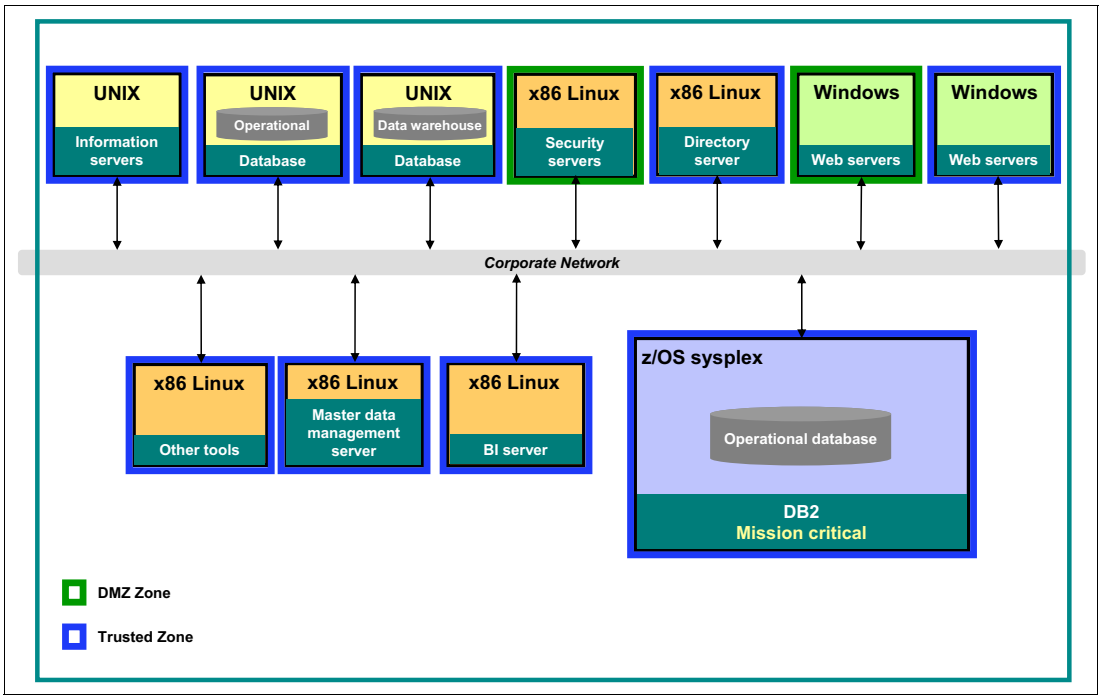

Figure 3-11 Data serving and analytics business application topology

The data serving and analytics environment has the following main components:

- Operational database

  The operational database is the key component of every data and analytics environment. This database is where the critical business data of the company is. This database must have all the obvious qualities, such as high availability, scalability, reliability, and security. DB2 for z/OS is well positioned in that area and serves as the operational database for many business-critical applications in today's environments.

- Data warehouse database

  The data warehouse database usually is a subset of the operational database that is built as an enterprise data warehouse with ETL tools. Many times the data warehouse consists of information that is extracted from DB2 on z/OS and then runs on a UNIX platform.

- Master data management server

  The master data management server component provides a single view of data entities across the enterprise to enable an organization to make better decisions and to achieve better business results. IBM InfoSphere® Master Data Management Server is an example of such a solution. This discipline is becoming more important in today's environments, because the amount of data is continuously growing and many siloed business applications with their own specific data stores exist.

- Business intelligence components

  Business intelligence components provide the reporting and analysis functions. A wide range of products are available in the market. IBM Cognos Business Intelligence suite is a

good example of a rich set of BI capabilities. For this area of components, provide a user interface that gives you an easy way to show the information that is needed.

- Infrastructure-related servers such as a web server, security server, or directory server

  Infrastructure-related servers are more seen as supporting servers for an existing data serving and analytics environment. They provide web serving capabilities, authentication services, and access control. These servers also handle separation between various security DMZs).

3.3.2 Current pain points

Customers in today's data serving and analytics environments are facing the following most common pain points:

- Network-intense data movement between various platforms

  In today's data serving and analytics environments, many complex procedures are implemented to offload data from a DB2 database on z/OS to a distributed database over the network for data warehouse queries. This scenario can become time consuming and complex to manage. An option is to create a DB2 member in an existing DB2 data sharing group on z/OS. This integrated approach can save network overhead and simplify the infrastructure.

- Long running data warehouse queries

  Performance for long running data warehouse queries is a common pain point in many environments, because of a complex heterogeneous infrastructure.

3.3.3 zEnterprise topology

Figure 3-12 shows a possible zEnterprise topology, with components placed on z/OS, z/VM, and zBX.

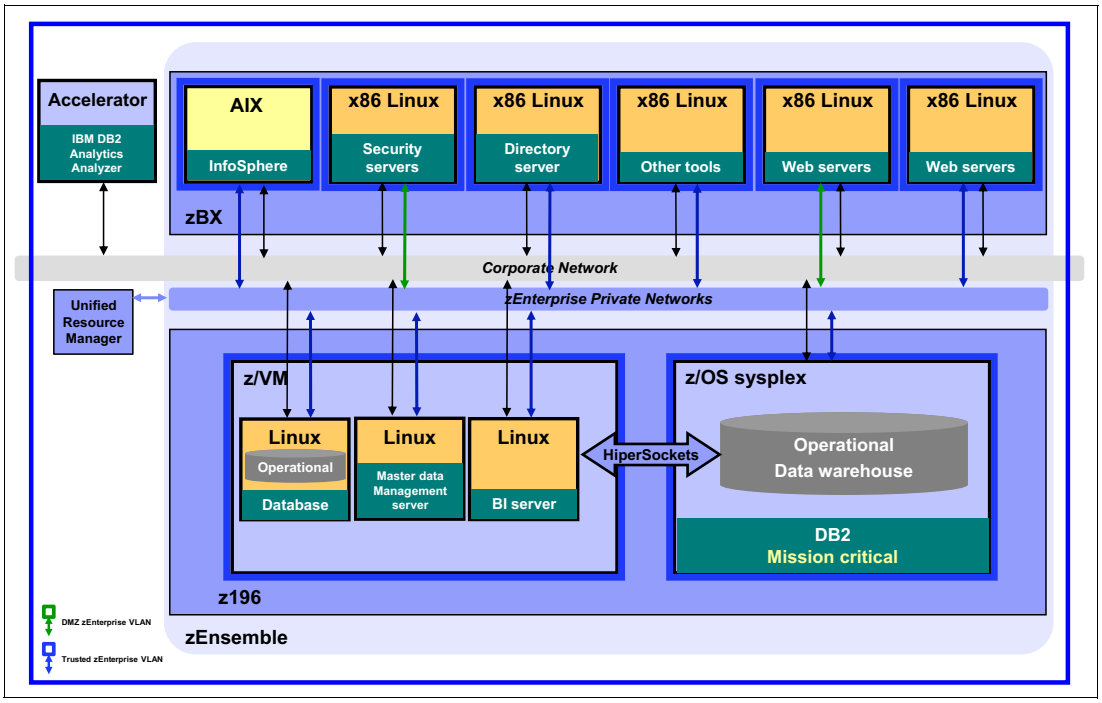

Figure 3-12 Data serving and analytics business application topology for the zEnterprise System

A zEnterprise topology can have several options. Depending on requirements and various factors, you can come up with several topology diagrams. We describe our zEnterprise design under the Fit for Purpose best-fit rationale. We also explain how a possible zEnterprise architecture helps to solve common pain points in today's data serving and analytics environments.

Our zEnterprise design topology has the following Fit for Purpose rationale:

- z/OS placement: Operational and data warehouse database

  We placed the operational database and the data warehouse database on z/OS, because DB2 on z/OS provides significant advantages with Parallel Sysplex and data sharing. With IBM DB2 Analytics Accelerator, the data warehouse database benefits from query acceleration, managed by DB2 on z/OS.

- z/VM placement: Operational database (Linux, UNIX, and Windows), master data management server, and BI server

  These components fit best on Linux on z/VM in our zEnterprise design, because they must provide availability and benefit from locating them close to the data on z/OS (through IBM HiperSockets™ communication).

- zBX placement: IBM InfoSphere, infrastructure servers, web servers, and tools

  We placed all the infrastructure-related components on zBX blades, assuming that availability is not the main requirement, but the infrastructure can be centrally managed by the Unified Resource Manager. The security servers, directory server, and web servers are typical infrastructure-related servers that we placed on x86 Linux blades. In the current topology, the web servers run on the Windows platform, and we considered migration to Linux in the zEnterprise environment. If no operating system-specific features are used, the migration effort must be minimal and without risk. The IBM InfoSphere software runs on UNIX in the current topology. Therefore, we placed it on IBM POWER7® blades with AIX.

The proposed zEnterprise topology helps to address the mentioned common pain points in today's data serving and analytics business application topologies. With the zEnterprise System, you can simplify an existing network infrastructure by eliminating the need for some network-related components. As a result, you can improve network performance and offer an integrated heterogeneous platform with the various technology options (z196, POWER7 blades, and x86 blades).

Another area where the zEnterprise System offers improvement is in the pain point of long running data warehouse queries. The IBM DB2 Analytics Accelerator can be connected to DB2 on z/OS and accelerates qualified queries.

Overall the zEnterprise platform brings significant value to today's data serving and analytics business applications.

3.4 Packaged application topology

At a minimum, business applications in this topology consist of an application server and a database. Depending on the application, additional components might be involved. Also, in a complete implementation infrastructure, components are part of the topology.

This section shows a sample topology, but variations are possible.

3.4.1 Current topology

This section shows a common platform placement pattern for data serving and analytics business applications. Figure 3-13 shows a typical packaged application business application topology with the components involved.

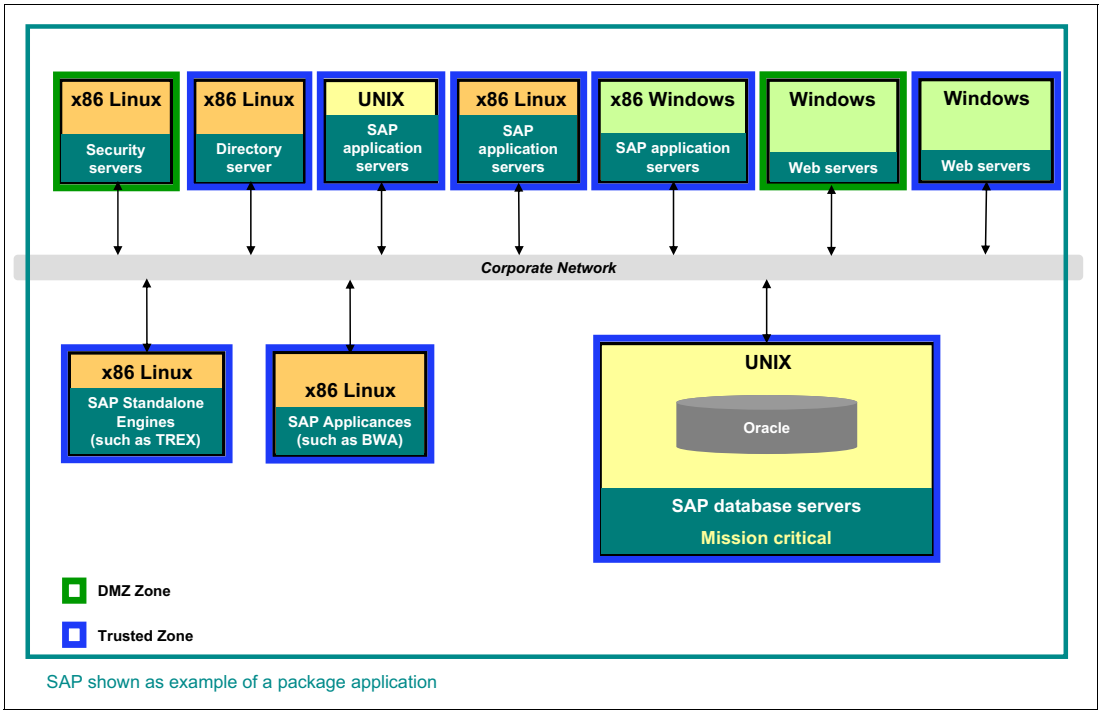

Figure 3-13 Current packaged application business application topology

In this example, SAP was chosen as a sample packaged business application. A packaged business application in this context refers to an IBM or ISV software that is developed for a specific solution scenario and is available for immediate use. Some customers prefer to use standard software, but in other environments, most of the applications are developed in-house.

A packaged business application topology, such as the one using SAP, has the following main components:

- Security or directory servers

  These servers are typical infrastructure-related components that run on x86 Linux in our current topology.

- SAP application servers

  The application servers are a key component of an SAP infrastructure. The actual application components run on these servers, which is also where the connectivity to the back-end database is managed. The SAP application servers often run on distributed platforms, which in our current topology is on UNIX and x86.

- Web servers

  Web servers take incoming requests, perform authentication, and route the requests to the application servers. Web servers are needed both in the DMZ and the trusted zone. x86 is used as the deployment platform in many cases.

- SAP appliances

  SAP also provides appliances, such as SAP NetWeaver Business Warehouse Accelerator (BWA). These components provide query performance improvement through specially configured hardware and software. Appliances, such as BWA, are usually tied to a certain hardware or operating system.

- SAP database servers

  The database is the heart of every SAP infrastructure. The database is where the key corporate data is. Depending on the infrastructure size of the database server and its performance and availability requirements, the database server might already be on z/OS (DB2). For smaller installations, it can be on a distributed platform. In our current topology, the database server is on UNIX with Oracle.

3.4.2 Common pain points

In today's packaged business application topologies, customers are facing the following most common pain points:

- Highly heterogeneous distributed application environment

  In many SAP environments, several platforms or operating systems are involved, and databases are spread and clustered across many heterogeneous infrastructures. The whole environment becomes difficult to manage, and availability often is an issue.

- Complex of infrastructure of firewalls, network, routers, and switches

  The whole SAP environment involves many infrastructure-related components, which can become an issue from a management perspective.

- Flexibility

  Today's SAP environments have an issue with reacting to upcoming demands, such as with dynamic provisioning of new application server instances. It is often configured in a static way, which inhibits a scalable infrastructure.

3.4.3 zEnterprise topology

Figure 3-14 shows a possible zEnterprise design, with z/OS, z/VM, and zBX included.

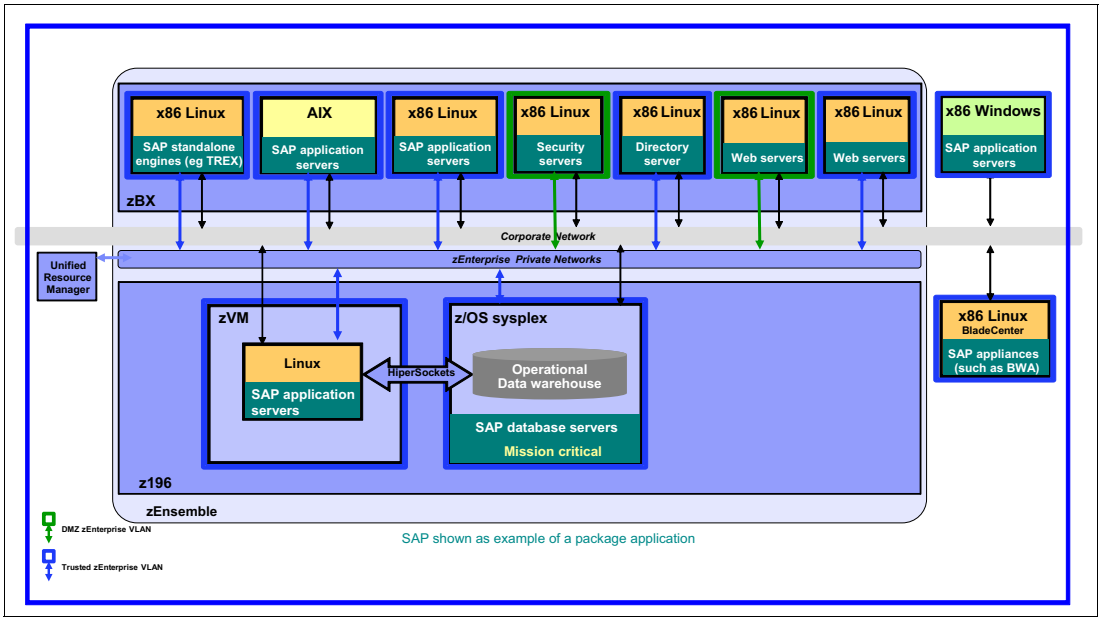

Figure 3-14 Packaged application business application topology for the zEnterprise System

We tried to come up with a possible best-fit placement on zEnterprise. For our SAP environment, some components were unable to be included in the zEnterprise topology (such as BWA), because they are not supported in the zBX context. We also came up with a migration scenario from Oracle on UNIX to DB2 on z/OS, which introduces a migration effort, but also a benefit for the database server.

- Migration to DB2 on z/OS: SAP database server

  We came up with a migration scenario from Oracle on UNIX to DB2 on z/OS. DB2 on z/OS has significant advantages over a distributed solution, with DB2 data sharing and Parallel Sysplex. The customer gains availability and the ability to grow horizontally and vertically.

- z/VM and zBX placement: SAP application servers

  Depending on the nonfunctional requirements, we placed the SAP application servers on z/VM or zBX. An important consideration is to check the status of the combinations that are certified by SAP with the application and database server. If the combination is certified, you can locate the application servers close to z/OS by using HiperSockets or on zBX.

- zBX placement: Security, directory, or web servers

  These infrastructure-related components fit best on zBX, because they usually do not have strong high availability requirements. With the zBX approach, they can be centrally managed. If they require deeper integration on the System z platform, z/VM can be an option to consider.

- Not in scope for the zEnterprise System: SAP appliances (BWA)

  The SAP Business Warehouse Accelerator is not supported in a zEnterprise environment, and therefore, must be left outside.

The proposed zEnterprise topology helps addressing the common pain points in today's SAP environments. By providing a centrally managed scalable infrastructure with the various technology options, the zEnterprise System can be a best-fit candidate for an SAP environment. This topology also helps to simplify an existing network and firewall infrastructure, providing a management benefit over a distributed solution.

Flexibility is another area where the zEnterprise topology can provide value to a packaged business application. z/OS is leading in dynamically managing resources and providing predictable workload results with the z/OS workload manager. However, with Unified Resource Manager, these concepts are extended to POWER7 and x86, which over time provides a workload management solution across platforms.

A

Business application profile template

To document the business application profile, use the blank template shown in Table A-1 on page 60. Although you can use this template as needed, complete a template for each domain, and address each service within each domain.

Table A-1 Blank template for business application profile

DOMAIN	**1.<domain>**			<date>
BUSINESS APPLICATION	<Business Appl. ID>	**CUSTOMER INFO**	**CUSTOMER CONTACT ROLE**	<customer_id> <customer_name> <customer_role>
DESCRIPTION <Description of Domain>				
SERVICE		**TOPICS**		
1 **<Services_1>**		► <example topics> ► ... ► ...		
PAIN POINTS				**SCORE**[a]
SERVICE		**TOPICS**		
2 **<Service_2>**		► <example topics> ► ... ► ... ►		
PAIN POINTS				**SCORE**[a]

NOTES:

a. Valid values for this field are VH, H, M, L, and VL.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this paper.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

- *IBM zEnterprise 114 Technical Guide*, SG24-7954
- *IBM zEnterprise 196 Technical Guide*, SG24-7833
- *IBM zEnterprise System Technical Introduction*, SG24-7832
- *IBM zEnterprise System: Smart Infrastructure for Today's Heterogeneous Business Applications*, REDP-4645
- *Taking Back Control of Your IT Infrastructure: Consolidating to a Data Center in a Box*, REDP-4761

You can search for, view, download or order these documents and other Redbooks, Redpapers, Web Docs, draft and additional materials, at the following website:

ibm.com/redbooks

Online resources

These Web sites are also relevant as further information sources:

- IBM Fit for Purpose offering

  http://www.ibm.com/systems/resources/Fit_for_Purpose_Workshop_SB.pdf

- IBM Workload Optimization Analysis and TCO for zEnterprise offering

  http://www.ibm.com/systems/resources/systems_labservices_optimization_tco_zenterprise_services.pdf

- IBM zEnterprise page

  http://www.ibm.com/systems/info/z/zenterprise/newaccts_resources.html

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A Structured Approach to Assessing Heterogenous Workload Deployment to the IBM zEnterprise System

Redpaper™

Learn how to assess IT infrastructure pain points

See how to assess the business value of the zEnterprise System

Understand how to make platform placement decisions

Examining a possible deployment or migration of an application or workload to the IBM zEnterprise System requires a structured approach. This process entails the following key decisions:

- What will the additional business value be, if any, after the application or workload is deployed on the zEnterprise System?
- What will the topology, or infrastructure architecture, be of the application or workload on the zEnterprise System?

This IBM Redpaper publication describes an approach to help determine the possible business value of deploying a workload or application on the zEnterprise System. It provides a framework to use, and brief information about, the zEnterprise Business Value Assessment tool and the Fit for Purpose method that IBM uses to help Clients make these decisions.

This paper is intended for customer technical managers and architects, and IBM and IBM Business Partner technical sales and architects. Before reading this paper, you must have knowledge about the zEnterprise Business Value Assessment method.

The goal of the approach in this paper is to ensure that the assessment of business value for a customer's business application results in an optimally architected zEnterprise deployment design and a solid business-grounded case for change. The purpose of this paper is to provide guidance for technical managers and IT architects to perform assessments of their own business applications.

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