****

Infrastructure Planning   
and Design

Series Introduction

Version 2.1

Published: November 2007

Updated: February 2010

For the latest information, please see [www.microsoft.com/IPD](http://www.microsoft.com/IPD)

Copyright © 2010 Microsoft Corporation. This documentation is licensed to you under the Creative Commons Attribution License.  To view a copy of this license, visit <http://creativecommons.org/licenses/by/3.0/us/> or send a letter to Creative Commons, 543 Howard Street, 5th Floor, San Francisco, California, 94105, USA.  When using this documentation, provide the following attribution: Infrastructure Planning and Design is provided with permission from Microsoft Corporation.

This documentation is provided to you for informational purposes only, and is provided to you entirely "AS IS". Your use of the documentation cannot be understood as substituting for customized service and information that might be developed by Microsoft Corporation for a particular user based upon that user’s particular environment. To the extent permitted by law, MICROSOFT MAKES NO WARRANTY OF ANY KIND, DISCLAIMS ALL EXPRESS, IMPLIED AND STATUTORY WARRANTIES, AND ASSUMES NO LIABILITY TO YOU FOR ANY DAMAGES OF ANY TYPE IN CONNECTION WITH THESE MATERIALS OR ANY INTELLECTUAL PROPERTY IN THEM.

Microsoft may have patents, patent applications, trademarks, or other intellectual property rights covering subject matter within this documentation. Except as provided in a separate agreement from Microsoft, your use of this document does not give you any license to these patents, trademarks or other intellectual property.

Information in this document, including URL and other Internet Web site references, is subject to change without notice. Unless otherwise noted, the example companies, organizations, products, domain names, e-mail addresses, logos, people, places and events depicted herein are fictitious.

Microsoft, Active Directory, Windows Server, Windows Server System and Visio are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

You have no obligation to give Microsoft any suggestions, comments or other feedback (“Feedback”) relating to the documentation. However, if you do provide any Feedback to Microsoft then you provide to Microsoft, without charge, the right to use, share and commercialize your Feedback in any way and for any purpose. You also give to third parties, without charge, any patent rights needed for their products, technologies and services to use or interface with any specific parts of a Microsoft software or service that includes the Feedback. You will not give Feedback that is subject to a license that requires Microsoft to license its software or documentation to third parties because we include your Feedback in them.

Contents

[Introduction to the Infrastructure Planning and Design Series 1](#_Toc243292480)

[The IPD Approach 2](#_Toc243292481)

[Conclusion 6](#_Toc243292482)

[Appendix A: IPD Background 7](#_Toc243292483)

[Appendix B: Mapping to Frameworks 8](#_Toc243292484)

[Version History 9](#_Toc243292485)

[Acknowledgments 10](#_Toc243292486)

# Introduction to the Infrastructure Planning and Design Series

Planning the next generation of technical infrastructure for corporations can be a complex and daunting task. If done well, the Information Technology (IT) group’s capabilities will be well aligned with the business and will become a strategic asset for the company. If done poorly, IT can be a barrier to the agility of the organization.

The success of any infrastructure is measured in how well the decisions made regarding the infrastructure match the objectives of the business. Although there are often hundreds or even thousands of pages of product documentation available, historically it has been very difficult to find guidance on how to appropriately plan the core infrastructure for an organization.

The Infrastructure Planning and Design (IPD) series provides concise architectural planning guidance for Microsoft® infrastructure technologies. It also provides a means to validate design decisions with the business to ensure that the solution meets the requirements of both business and infrastructure stakeholders.

This document describes the background for the guides as well as their format and defines characteristics common to all of the guides.

## Who Should Use These Documents

The IPD documents are designed to be used by the following IT personnel:

* Infrastructure planners and architects who have a firm operational grasp of the technology.
* Partners and consultants who design infrastructure solutions.
* Systems engineers who need to learn how their systems will be integrated into the overall infrastructure.
* Business decision makers (BDMs) who wish to understand how the technology decisions being made both support and affect the business.

# The IPD Approach

The IPD series is a collection of documents that leads the reader through a sequence of core decision points to design an infrastructure for Microsoft technologies. Every guide uses this methodological approach and shares a consistent look and feel.

These guides are structured and intended to complement and augment the product documentation. Although the guides educate readers on the key design decisions that infrastructure professionals must make, they are not intended to provide a feature education for a particular technology. However, additional references are provided that link to further information on the technology.

Each release in the series addresses a unique infrastructure technology or scenario and consists of an Infrastructure Planning and Design guide and a presentation deck.

## Document Structure

Each IPD guide is designed to provide a consistent structure for addressing the decisions/activities that are most critical to successfully planning a given infrastructure technology or solution.

Each guide is divided into sections that thoroughly explain the following processes:

* The Design Process
* The Design Decision Steps

### The Design Process

This section gives the reader a high-level introduction to the processes that the guide will follow. It contains the following elements:

* **Decisions list.** A high-level list of decision points and/or activities that need to be addressed in order to complete a given design.
* **Decision flow diagram.** A graphical representation of the decision process that the guide uses. Each decision point is mapped in a sequence that allows the reader to see the entire decision flow used in planning the infrastructure.



**Figure 1. Example decision flow diagram**

* **Information collection*.*** Lists the information that should be gathered as inputs into the decision-making process. A description explaining how the collected data will be used in the process and when it will be required is also provided.
* **Applicable scenarios.** Describes which scenarios were considered in the creation of the guide. This fourth section helps readers understand whether requirements for their designs will be addressed by the guide. An effort is made to cover the most common scenarios so that most readers can find value in the guide.

### The Design Decision Steps

Each design decision is documented in a series of steps to guide readers through the process presented in the guide. Each decision/activity point consists of four subsections:

* **Decision or Activity.** This section provides readers with background information, any necessary context, and general considerations to keep in mind when planning a given infrastructure technology or solution.
* **Options or Tasks.** If a decision will be required, then multiple options are presented. For each option, readers are given the background information necessary to evaluate the choice as well as any subquestions that need to be answered when making that choice. If a task will be performed, then readers are provided with background information for that task.
* **Evaluating the Characteristics.** To make an informed choice, readers need to understand the trade-offs that are inherently included when making a particular decision. This section provides a means for comparing each of the options—and what their impact would be—against certain characteristics of the infrastructure.

The following table lists the full range of characteristics discussed in the evaluation sections. Only those characteristics relevant to a particular option or task are included in each section. These tables will appear in guides where this information is applicable to the technology and type of guide.

| Characteristic | Description |
| --- | --- |
| Complexity | This characteristic relates the effect a choice will have on overall infrastructure complexity. |
| Cost | This value shows the relative cost associated with a particular option. This takes into account initial and repetitive costs associated with the decision. |
| Fault Tolerance | The Fault Tolerance characteristic indicates the effect the option will have on the ability of the infrastructure to sustain operation during system failures. |
| Performance | Performance is rated based on the effect the option will have on the performance of the technology featured in the guide. This does not necessarily reflect the impact on other technologies within the infrastructure. |
| Scalability | This characteristic depicts the effect the option will have on the ability of the solution to be augmented to achieve higher sustained performance within the infrastructure. |

Each of the design options is compared against the above characteristics and is subjectively rated in order to provide a relative weighting of the option against the characteristic. The options are not explicitly rated against each other as there are too many unknowns about the business drivers to accurately compare them.

The ratings take two forms:

* Cost and Complexity are rated on a scale of High, Medium, or Low.
* The remaining characteristics are rated on the scale listed in the following table.

| Symbol | Definition |
| --- | --- |
| ↑ | Positive effect on the characteristic. |
| → | No effect on the characteristic or there is no comparison basis. |
| ↓ | Negative effect on the characteristic. |

The characteristics are presented either as two-column or three-column tables. The two-column table is used when the characteristic is applicable to all options or when there are no options available—for example, when performing a task.

The three-column table is used to present an option, the description, and the effect—in that order—for the characteristic.

When considering infrastructure architecture, a number of additional characteristics are either used as input to a decision or are realized during operations as a result of an architectural decision. The following chart contains a list of these additional considerations that the authors used in creating these guides. They are not referenced in the individual guides but are presented here to help describe the intent applied to each guide.

| Characteristic | Description |
| --- | --- |
| Audit | This characteristic depicts the impact a choice will have on the ability to successfully audit operations within the infrastructure as a whole and, specifically, within the featured technology. |
| Availability | This indicates the effect of a choice on the ability of a technology and the related infrastructure to achieve highly available operation. |
| Compliance | This characteristic indicates whether a choice will have an impact on the ability of a business to demonstrate or achieve compliance with certain regulatory policies. |
| Continuity | This characteristic relates the effect a choice will have on the ability of the business to continue operations during system failures (related to fault tolerance). |
| Interoperability | This indicates whether a choice will have an impact on the ability of the technology to interoperate with other technologies within the infrastructure. |
| Risk | This characteristic reflects whether the business will experience risk based on the choice made for a particular option. |

* **Validating with the Business**. Sometimes decisions made within the business may have far-reaching effects throughout the organization. This section provides questions for the business’s leaders about business situations or requirements that may affect the infrastructure design. In addition, this section serves as a checkpoint, giving business leaders a way to provide additional input into the design process.

### Additional Sections

The “Dependencies” section documents any dependencies that are relevant to the guide’s topic. These dependencies need to be considered during the design process as they could affect the overall design. Additional IPD guides are referenced here if they cover a dependent service or technology.

The “Out of Scope” section in each guide lists the areas that might be related to the topic but will not be discussed in order to keep the topic concise and focused.

The “Conclusion” section provides a summary of the guide.

The “Additional Reading” section lists links to further reading to provide more background on the topic being discussed.

The “Appendix” is an optional section within the IPD guides. Generally, this will contain one or more job aids to assist in documenting the design or collecting additional information required for the design. Information that does not fit in another section of the guide might also be presented here.

## Presentation Decks

Each IPD guide will be accompanied by a presentation deck that summarizes the design process for the technology included in the guide. The slides cover the steps from a high level and are also useful when explaining the effects of certain decision processes to business stakeholders.

## Architecture Diagrams

Each IPD guide will be accompanied by a Microsoft Visio® diagram that illustrates an example of the architecture that can be customized for that specific technology.

# Conclusion

The Infrastructure Planning and Design series is a unique library of architectural guidance that, when used appropriately, provides the reader with a comprehensive understanding of what is required to design a specific technology. The guides do not attempt to influence a particular decision, but instead ensure that the reader asks the right questions to guarantee that the technology planning processes are complete and aligned with the business.

## Feedback

Please direct questions and comments about this guide to [satfdbk@microsoft.com](mailto:satfdbk@microsoft.com?subject=IPD%20-%20Series%20Introduction).

Please provide feedback on the usefulness of this guide by filling out the following survey: <http://go.microsoft.com/fwlink/?LinkID=132579>.

# Appendix A: IPD Background

In 2002, Microsoft Systems Architecture (MSA) 1.5 was released; it provided plan, design, build, and operations guidance for both an enterprise and an Internet data center. Test data centers, upon which the guides were based, were built and validated in an extensive lab. This provided Microsoft customers with the confidence that the guidance being provided was applicable in real-world scenarios, and were not “ivory tower” thinking.

An update to MSA 2003, known as Microsoft Systems Architecture 2.0, consolidated the enterprise and Internet data centers into a single data center based on Windows Server® 2003.

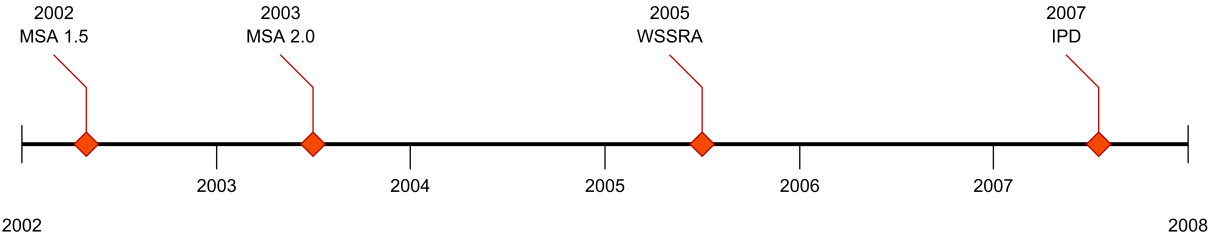


Figure A-1. Architectural guidance historical timeline

In early 2005, the MSA series was updated and rebranded as Windows Server System™ Reference Architecture (WSSRA). Although there have been some minor updates and an occasional new service added to the WSSRA platform, there has not been a major revision to the guidance since 2005.

WSSRA is a complex set of guidance, spanning more than 3,500 pages of content. According to surveys that were conducted, this material, while valuable, was difficult for readers to consume.

The Infrastructure Planning and Design (IPD) series is the next step in the evolution of architectural guidance for Microsoft infrastructure. IPD is designed to make the consumption of architectural guidance easier for the reader. Over time, the services covered by WSSRA will be updated, and some of them will be placed in the IPD format. Initially, the IPD series will focus on helping the reader to plan and design the implementation of individual technologies such as Windows Server virtualization, Windows Server 2008 Active Directory®, and Windows Deployment Services.

As the IPD portfolio grows, additional guides will be introduced to offer higher-level scenario guidance. These new IPD scenario guides will utilize the materials provided in the IPD technology guides to assist the architect in planning for complex scenarios requiring multiple infrastructure technologies.

# Appendix B: Mapping to Frameworks

This section describes how IPD maps to Microsoft Operations Framework (MOF) and the Microsoft Infrastructure Optimization (IO) Model.

## Microsoft Operations Framework

Use Microsoft Operations Framework (MOF) with IPD guides to ensure that people and process considerations are addressed when changes to an organization’s IT services are being planned.

MOF offers integrated best practices, principles, and activities to assist an organization in achieving reliable IT solutions and services. MOF provides guidance to help IT individuals and organizations create, operate, and support IT services, while helping to ensure the investment in IT delivers expected business value at an acceptable level of risk. MOF’s question-based guidance helps to determine what is needed for an organization now, as well as providing activities that will keep the IT organization running efficiently and effectively in the future. For more information, see [www.microsoft.com/mof](http://microsoft.com/mof).

## The Infrastructure Optimization Model at Microsoft

The Infrastructure Optimization (IO) Model at Microsoft groups IT processes and technologies across a continuum of organizational maturity. (For more information, see [www.microsoft.com/infrastructure](http://www.microsoft.com/infrastructure).) The model was developed by industry analysts, the Massachusetts Institute of Technology (MIT) Center for Information Systems Research (CISR), and Microsoft's own experiences with its enterprise customers. A key goal for Microsoft in creating the Infrastructure Optimization Model was to develop a simple way to use a maturity framework that is flexible and can easily be applied as the benchmark for technical capability and business value. Each IPD guide describes how implementing the technology featured in the guide can change where an organization falls within the IO Model.

# Version History

|  |  |  |
| --- | --- | --- |
| **Version** | **Description** | **Date** |
| 2.1 | Added Architecture Diagrams section | February 2010 |
| 2.0 | Updated entire document and added Appendix B. | October 2009 |
| 1.0 | First release. | November 2007 |

# Acknowledgments

The Solution Accelerators – Management and Infrastructure (SA-MI) team acknowledges and thanks the people who make up the core team producing the Infrastructure Planning and Design series. The following people were either directly responsible for or made a substantial contribution to the writing, development, and testing of these guides.

Contributors:

* Jude Chosnyk – *GrandMasters*
* Joe Coulombe – Microsoft
* Michael Kaczmarek – Microsoft
* Robin Maher – *Microsoft*
* Fergus Stewart – Microsoft
* Melissa Stowe *– Microsoft*

Editors:

* Laurie Dunham – *Microsoft*
* Pat Rytkonen – *Volt Technical Services*