

IBM FlowMark



# Installation and Maintenance

*Version 2 Release 3*



IBM FlowMark



# Installation and Maintenance

*Version 2 Release 3*

**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page xi.

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This edition applies to Version 2 Release 3 of IBM FlowMark (5697-216) and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

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| CICS/MVS   | C Set ++           | Common User Access |
| DATABASE 2 | DB2                | DB2/2              |
| DB2/6000   | FlowMark           | IBM                |
| IMS        | IMS/ESA            | MQSeries           |
| NetView    | Operating System/2 | OS/2               |
| OS/400     | MVS                | RS/6000            |
| SAA        | VisualAge          | Workplace Shell    |

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## About this book

This book explains how to install and administrate FlowMark. It includes information about how communications software should be configured to run correctly with FlowMark.

It is assumed that you are familiar with:

- OS/2
- AIX, if you are setting up an AIX domain
- HP-UX, if you are setting up an HP-UX FlowMark server
- AS/400 FSIOP card, if you are setting up a FlowMark server and database server using the FlowMark support for the Integrated PC Server (FSIOP) card of the AS/400
- Windows NT, if you are setting up a Windows NT domain
- Windows 3.1, if you are setting up Windows 3.1 Runtime clients
- Lotus Notes 4.1\*\*, if you are setting up Runtime clients for Lotus Notes

It is also assumed that you have some experience with configuring communications software, such as TCP/IP or NetBIOS.

---

## Who should read this book

This book is for system administrators who do the following:

- Install and configure FlowMark and its prerequisite and corequisite products
- Administrate FlowMark databases and the day-to-day operation of FlowMark
- Install corrective service updates and new releases of FlowMark

---

## How this book is organized

The book consists of these parts:

**Part 1, Planning your FlowMark configuration** contains an overview of the FlowMark components. It also contains *maps* that guide you to and through the appropriate configuration scenario.

**Part 2, Preparing your FlowMark installation** contains information about configuring communications software for FlowMark, testing your LAN, setting up an installation code server, building installation diskettes, and about migrating data from a previous release.

**Part 3, Installing FlowMark** contains information about the installation of FlowMark. It describes how to install servers on AIX, HP-UX, OS/2, Windows NT, and the AS/400 FSIOP card, clients on AIX, OS/2, Windows 3.1, Windows NT, a stand-alone workstation on OS/2, and how to install FlowMark on an ObjectStore AIX workstation.

It also contains information about the installation of the Runtime client for Lotus Notes, the Service Broker Manager, building blocks, automating, and verifying the installation.

**Part 4, Starting and stopping FlowMark components** contains information about starting and stopping the FlowMark components in a client/server environment or on a stand-alone workstation.

**Part 5, Maintaining FlowMark** contains information about maintaining FlowMark.

**Part 6, Managing workflow models and databases** contains information about managing workflow model information and databases.

**Part 7, Appendixes** contains information about code page support, about settings of FlowMark, and ObjectStore\*\* environment variables.

---

## Conventions used in this book

The procedures and examples are described for the IBM LAN server. The examples contain terms and commands, such as *alias* and **net use**, that are unique to IBM LAN software. If you are using different LAN software, follow your usual procedures for accessing a LAN server and doing other tasks.

The following typographical conventions are used throughout this book:

| Element   | Examples  |
|---|---|
| Book titles are shown in italics.   | <i>Installation and Maintenance</i>   |
| Buttons, fields, and menu choices in the FlowMark graphical interface are shown in boldface.            | <b>Path and file name, Audit trail</b>  |
| File and path names that are case-sensitive are shown in their appropriate case, otherwise in capitals. | /usr/lpp/exm<br>CONFIG.SYS, D:\EXM\API  |
| Program and message variables are shown in italics.   | <i>filename, linenumber</i>   |
| In procedure steps, names of variables whose values you have to supply are shown in italics.            | <b>cd</b> <i>path</i>   |
| Commands are shown in boldface. Commands that are case-sensitive are shown in their appropriate case.   | Enter <b>install</b> to start the installation program.                           |
| Field text, sample code, and data structures are shown in a monospace font.                             | Include the protocol definition, for example,<br>SET OS_NETWORK=04NETNP,04NETTCP. |



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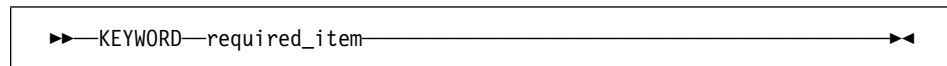
## How to read syntax diagrams

In this manual diagrams are used to illustrate the programming syntax. To use a diagram, follow a path from left to right, top to bottom, adding elements as you go. In these diagrams, all spaces and other characters are significant.

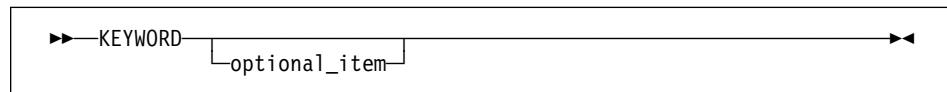
Each diagram begins with a double right arrowhead and ends with a right and left arrowhead pair.

Lines ending with a single right arrow indicate that the syntax diagram continues. Lines beginning with single right arrows are continuation lines. In these diagrams, all spaces and other characters are significant.

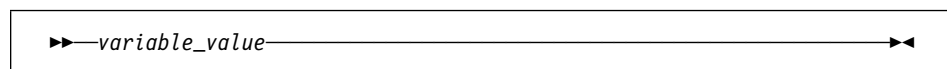
Required items appear on the main path.



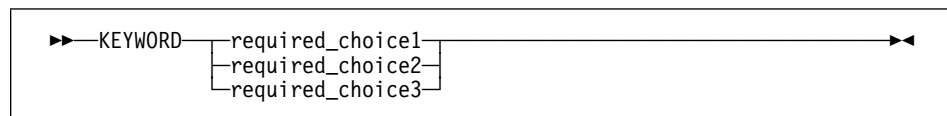
Optional items appear below the main path.



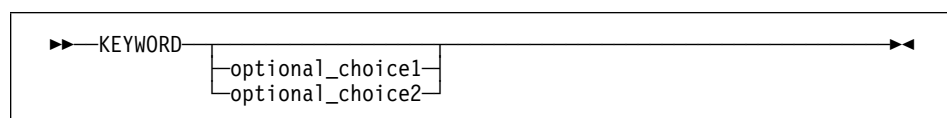
Variable values that you provide are shown in *italics* and are usually in lowercase. Where values are shown in uppercase, they should be entered as they appear.



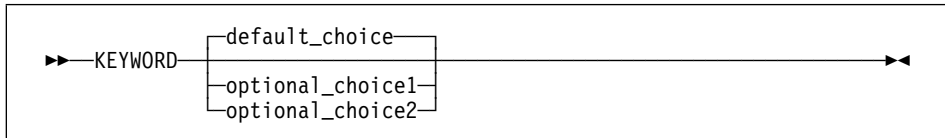
If you can choose from two or more items, they appear vertically in a stack.



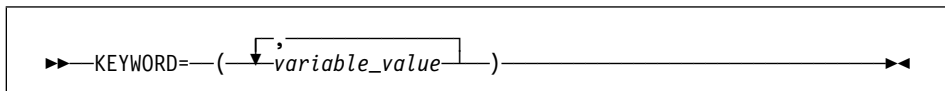
If choosing one of the items is optional, the entire stack appears below the main path.



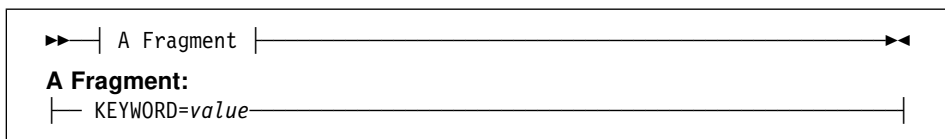
In a choice of items, the default item is always shown above the main path. If you do not code anything, the default is used.



A repeatable operand is shown like this:



Syntax diagrams may be broken into fragments. A fragment is indicated by vertical bars with the name of the fragment between the bars. The fragment is shown following the main diagram, like so:



---

## Part 1. Planning your FlowMark configuration

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## Chapter 1. FlowMark components and requirements

This chapter describes the components of FlowMark and the hardware and software requirements for installing FlowMark.

---

### FlowMark components

FlowMark is a client/server application and is designed for a heterogeneous environment. A FlowMark *domain* consists of:

- One database with one database server
- One or more Runtime servers
- One Delivery server
- One Notification server
- One or more Buildtime clients
- One or more Runtime clients

FlowMark server components run on the OS/2 Warp 3.0, AIX 4.1.3 or 4.1.4, HP-UX 10.01, and Windows NT 3.51 platforms. You can also install the FlowMark server and the Database server on the Integrated PC Server (FSIOP) card of the AS/400 V3R2. Runtime client components run on OS/2 Warp 3.0, AIX 4.1.3 or 4.1.4, Windows NT 3.51, and Windows 3.1 or Windows for Workgroups 3.11. The FlowMark Buildtime client must be installed on OS/2 Warp 3.0.

FlowMark servers communicate with FlowMark clients on a TCP/IP network. The following overview briefly describes the FlowMark components:

#### Database server

The Database server includes the ObjectStore server and the FlowMark databases, which contain all information used in workflow models. The Database server coordinates database transactions. FlowMark requires a certain version of ObjectStore that cannot coexist with other versions of ObjectStore on the same machine. If you have other applications that are using ObjectStore, make sure that these applications can use the ObjectStore version that is shipped with FlowMark. As an alternative, plan to use separate machines for applications that need a different ObjectStore version.

**Note:** There is no need to have ObjectStore installed on FlowMark Runtime clients.

## **FlowMark server**

The FlowMark server includes:

- **Runtime server**

The Runtime server coordinates running processes. It is the link between the Database server and Runtime clients, and acts as a database client.

- **Delivery server**

The Delivery server coordinates the communication between different domains and acts as a database client.

- **Bundle service**

The Bundle service coordinates bundle activities and acts as a database client. Bundles are multiple instances of a particular activity in a FlowMark process.

- **Notification service**

The Notification service checks processes and associated activities, then notifies a designated person when a process or activity is not completed within a specified time. The Notification service also checks for finished processes and deletes them. The Notification service acts as a database client.

## **OS/2 Buildtime client**

The OS/2 Buildtime client includes:

- **Server Definition facility**

The Server Definition facility registers the FlowMark servers that are to be used in your workflow, and used for remote subprocesses. All Runtime servers within the domain as well as the target Runtime servers of other domains must be registered. The Server Definition facility acts as a database client.

- **Staff Definition facility**

The Staff Definition facility creates a database of definitions of staff assigned to activities in FlowMark and acts as a database client.

- **Data Structure Definition facility**

The Data Structure Definition facility supports the specification of information that is to be transmitted by FlowMark between activities in a FlowMark process. The Data Structure Definition facility acts as a database client.

- **Program Registration facility**

The Program Registration facility registers the programs in FlowMark that are to be invoked when a FlowMark process is run. The Program Registration facility acts as a database client.

- **Process Definition facility**

The Process Definition facility supports graphical definition and maintenance of the process diagrams that represent FlowMark workflow models. The Process Definition facility acts as a database client.

- **Export and Import utilities**

The Export utility reads workflow model descriptions from a FlowMark database and writes them to an ASCII file in FlowMark definition language (FDL). The Import utility reads workflow model descriptions in FDL from an ASCII file and writes them to a FlowMark database. In a multi-server environment, the Export and Import utility allows the replication of the workflow model on all FlowMark databases.

For database migration, that is, migrating to a new release of FlowMark, there are Export and Import utilities for Runtime data.

- **Sample workflow models**

The sample workflow models demonstrate how FlowMark workflow models are constructed and used.

### **Program execution clients**

A program execution client enables a program to be started by a FlowMark activity. FlowMark includes program execution clients for OS/2, AIX, HP-UX, Windows, Windows NT, and the AS/400 FSIOP card. The program execution client must be installed on every workstation on which a program resides that must be started by FlowMark. This includes workstations that are not configured as FlowMark servers or clients.

### **Runtime client for**

- **OS/2**

The Runtime client for OS/2 includes the functions for managing runtime processes and work lists on OS/2 workstations. The OS/2 Program Execution client must be installed on every workstation on which the OS/2 Runtime client is installed.

- **AIX**

The Runtime client for AIX includes the functions for managing runtime processes and work lists on AIX workstations. The AIX Program Execution client must be installed on every workstation on which the AIX Runtime client is installed.

- **Windows**

The Runtime client for Windows includes the functions for managing runtime processes and work lists on DOS/Windows workstations. The Windows Program Execution client must be installed on every workstation on which the Windows Runtime client is installed.

- **Windows NT**

The Runtime client for Windows NT includes the functions for managing runtime processes and work lists on Windows NT workstations. The Windows NT Program Execution client must be installed on every workstation on which the Windows NT Runtime client is installed.

**Runtime client for Lotus Notes**

The Runtime client for Lotus Notes client allows you to access all the functions that are available in the FlowMark Runtime client from the Lotus Notes workspace. You can work with FlowMark processes and work lists in the Lotus Notes environment. The user interface is based on the Lotus Notes interface standards and can be customized by the Lotus Notes user. The Runtime client for Lotus Notes creates Lotus Notes documents in a Lotus Notes database as representation of FlowMark objects, such as process templates, process instances, and work items. The OS/2 Program Execution client must be installed on every workstation on which the Runtime client for Lotus Notes is installed.

**FlowMark API**

The API component consists of the FlowMark application program interface functions and sample code. The Programming Guide contains detailed information on how you can use the FlowMark application program interface functions. For an overview of the compilers for the different platforms, see "Hardware and software requirements" on page 7.

**Online Overview**

The Online Overview introduces workflow management concepts and FlowMark features. It is installed on Buildtime client workstations. The Online Overview includes exercises designed to familiarize users with the sample workflow models and the FlowMark workflow modeling and management features.

**Service Broker Manager**

The Service Broker Manager allows the integration of other applications or tools without the need to reload the tool each time. The aim is to allow all required sessions, programs, and tools to be available during the work session without knowing about the application execution or logic. Together with the Service Broker Manager, the FlowMark Broker and Lotus Notes Broker are also supplied. For any further application integration, you can create your own DLLs. For details, refer to the *Application Integration Guide*.

**MQSeries - Support Building Block**

MQSeries - Support Building Block enables communication between FlowMark and the MVS Application Integration Feature using MQSeries as communication layer. For details, refer to the *Application Integration Guide*.



### **FlowMark support for the Integrated PC Server (FSIOP) card of the AS/400**

FlowMark support for the Integrated PC Server (FSIOP) card of the AS/400 runs in a dedicated processor inside the AS/400, hereafter referred to as FSIOP. The programs and data used by the FSIOP server and FlowMark reside in the AS/400 disk storage.

---

## **Hardware and software requirements**

FlowMark includes components that are OS/2, AIX, HP-UX, Windows NT, and Windows based. Use the information in the following sections to plan for each component that you need to install. The hardware requirements are valid for running the FlowMark components and do not include hard disk space or memory requirements needed by other prerequisite software.

**Note:** FlowMark is distributed on CD-ROM. A CD-ROM drive is required for workstations to be used as FlowMark installation code server, and for each workstation on which you install FlowMark directly from the FlowMark CD-ROM. You can prepare your own installation diskettes for OS/2 and Windows from the CD-ROM (see Chapter 5, "Building installation diskettes" on page 53).

### **AIX server and AIX Runtime client**

The AIX server and Runtime client require an IBM RS/6000 workstation running AIX 4.1.3 or 4.1.4.

#### **Hardware requirements**

The minimum hardware requirements are:

|                              | <b>Server</b>       | <b>Runtime client</b> |
|------------------------------|---------------------|-----------------------|
| RS/6000 processor            | C10 <sup>1</sup>    | 220 <sup>2</sup>      |
| Speed                        | 80 MHz <sup>3</sup> | 33 MHz                |
| Memory for FlowMark          | 64 MB <sup>4</sup>  | 32 MB                 |
| Hard-disk space for FlowMark | 90 MB               | 40 MB                 |

**Notes:**

1. Any IBM Server RS/6000 can be used.
2. XStation 120, 130, 140, 150, and 160 can be used optionally for the Runtime client on AIX. Depending on the configuration, terminals, workstations without disk drive, or workstations with local hard disk storage can be used.
3. 80 MHz is the speed of the C10, but lower rates of other IBM Server RS/6000 are also supported.
4. This must be real memory.

The system unit must have access to a CD-ROM drive.

Each workstation also requires the following hardware:

- An IBM token-ring adapter or equivalent
- A video adapter and video display supported by AIX 4.1.3 or 4.1.4
- A mouse or other pointing device

An ASCII printer supported by AIX 4.1.3 or 4.1.4 can be used optionally.

These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

## Software requirements and options

The software requirements and options for using the FlowMark AIX server and AIX Runtime client are:

| Program name  | Required version | Server   | Runtime client |
|---|------------------|----------|----------------|
| IBM AIX   | 4.1.3 or 4.1.4   | Required | Required       |
| IBM DATABASE 2 AIX/6000 <sup>1</sup>                                | 1.2 or 2.1       | Optional |                |
| IBM AIX Rexx/6000 <sup>2</sup>                                      | 1.0              | Optional | Optional       |
| IBM MQSeries for AIX <sup>3</sup>                                   | 2.2              | Optional | Optional       |
| IBM FlowMark for MVS - Application Integration Feature <sup>4</sup> | 1.1              |          |                |
| IBM C for AIX <sup>5</sup>  | 3.1              | Optional | Optional       |
| IBM C Set ++ for AIX <sup>6</sup>                                   | 3.1              | Optional | Optional       |

### Notes:

1. IBM DATABASE 2 AIX/6000 (DB2/6000) or any other relational database that allows you to import delimited ASCII data files is needed if you want to import audit-trail information into DB2/6000.
2. IBM AIX Rexx/6000 (Rexx/6000) is needed to run the Rexx sample programs included with FlowMark, and to develop Rexx applications that communicate with the FlowMark process and container APIs.
3. IBM MQSeries for AIX is needed to communicate with FlowMark for MVS - Application Integration Feature through the MQSeries Support - Building Block or to start AS/400 applications as FlowMark activities.
4. IBM FlowMark for MVS - Application Integration Feature is needed to allow MVS applications to participate in an enterprise-wide workflow through the integration of FlowMark for OS/2 and AIX.
5. IBM C for AIX is needed to develop C applications that communicate with the FlowMark process and container APIs.
6. IBM C ++ Set for AIX is needed to develop C ++ applications that communicate with the FlowMark process and container APIs.

## HP-UX server

The FlowMark HP-UX server requires an HP server or workstation, series 700 or 800, running HP-UX.

### Hardware requirements

The minimum hardware requirements are:

|                              | Server                        |
|------------------------------|-------------------------------|
| HP server or workstation     | HP 700 or HP 800 <sup>1</sup> |
| Memory for FlowMark          | 64 MB <sup>2</sup>            |
| Hard-disk space for FlowMark | 100 MB                        |

#### Notes:

1. Performance depends on factors like the number of attached clients, database size, and system load.
2. This must be real memory.

The system unit must have access to a CD-ROM drive.

These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

### Software requirements and options

The software requirements and options for using the FlowMark HP-UX server are:

| Program name                               | Required version | Server   |
|--|------------------|----------|
| HP-UX <sup>1</sup>                         | 10.01            | Required |
| IBM DATABASE 2 for HP-UX <sup>2</sup>      | 2.0              | Optional |
| HP-UX C compiler for HP-UX <sup>3</sup>    | A.10.11          | Optional |
| HP-UX C ++ compiler for HP-UX <sup>4</sup> | A.10.11          | Optional |

#### Notes:

1. The following patches are required:  
For HP 700 series: PHKL\_6076, which is also included in the cumulative patch PHKL\_6075 and PHKL\_6272.  
For HP 800 series: PHKL\_6077, which is also included in the cumulative patch PHKL\_6273.  
Patch bundle PB\_07\_700\_1001 for HP 9000 series model 700 is recommended. HP-UX 10.10 is not supported.
2. IBM DATABASE 2 for HP-UX is needed if you want to import audit-trail information into DB2 for HP-UX.
3. HP-UX C compiler for HP-UX is needed to develop C applications that communicate with the FlowMark process and container APIs. You cannot use the HP (Bundled) C compiler that is delivered with the system.
4. HP-UX C ++ for HP-UX is needed to develop C applications that communicate with the FlowMark process and container APIs.

## OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes

The OS/2 server, OS/2 Buildtime client, OS/2 Runtime client, and Runtime client for Lotus Notes operate on programmable workstations running OS/2 Warp 3.0. The Runtime client for Lotus Notes client can be used as Runtime client interface.

### Hardware requirements

The minimum hardware requirements are:

|                              | Server             | Buildtime client | Runtime client       | Runtime client for Lotus Notes |
|------------------------------|--------------------|------------------|----------------------|--------------------------------|
| Processor                    | 80486 <sup>1</sup> | 80486            | 80386 <sup>2,3</sup> | 80486                          |
| Speed                        | 50 MHz             | 50 MHz           | 25 MHz               | 50 MHz                         |
| Memory                       | 24 MB              | 16 MB            | 8 MB                 | 12 MB                          |
| Hard disk space for FlowMark | 23 MB              | 27 MB            | 10 MB                | 21 MB                          |

#### Notes:

1. Pentium processor is recommended.
2. 486 processor is recommended.
3. If you plan to use applications that are resource intensive, for example, SmallTalk, you need the hardware that is recommended for a server.

The system unit must have access to a CD-ROM drive.

Each workstation also requires the following hardware:

- An IBM token-ring adapter or equivalent
- A video adapter and video display supported by OS/2 Warp 3.0
- A mouse or other pointing device

Any printer supported by OS/2 Warp 3.0 can be used optionally. To print process diagrams, the printer must have graphics capability.

These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

## Software requirements and options

The software requirements and options for using the OS/2 components of FlowMark are:

| Program name   | Required version | Server   | Buildtime client | Runtime client |
|--|------------------|----------|------------------|----------------|
| <i>Either</i>  |                  |          |                  |                |
| IBM OS/2 Warp 3.0  | 3.0              | Required | Required         | Required       |
| <i>or</i>  |                  |          |                  |                |
| IBM OS/2 Warp Connect  | 3.0              | Required | Required         | Required       |
| IBM OS/2 Developer's Toolkit <sup>1</sup>  | 3.0              |          | Optional         |                |
| <i>Either</i>  |                  |          |                  |                |
| IBM TCP/IP for OS/2  | 2.0 or 3.0       | Required | Required         | Required       |
| <i>or</i>  |                  |          |                  |                |
| IBM Communications Manager/2 <sup>2</sup>  | 1.1              | Required | Required         | Required       |
| IBM AnyNet/2 <sup>3</sup>  | 2.0              | Optional | Optional         | Optional       |
| IBM DATABASE 2 OS/2 <sup>4</sup>   | 1.0              | Optional |                  |                |
| IBM Application Support Facility<br>IBM Application Support Facility<br>Workstation Feature <sup>5</sup> | 3.1              |          |                  | Optional       |
|  | 3.1              |          |                  | Optional       |
| IBM MQSeries for OS/2 <sup>6</sup>   | 2.0              |          |                  | Optional       |
| IBM FlowMark for MVS -<br>Application Integration Feature <sup>7</sup>                                   | 1.1              |          |                  | Optional       |
| IBM BookMaster <sup>8</sup>  | 4.0              |          | Optional         |                |
| Lotus Notes for OS/2 <sup>9,10</sup>   | 3.3 or 4.1       |          |                  | Optional       |
| IBM VisualAge for C ++ for OS/2 <sup>11</sup>  | 3.0              |          |                  | Optional       |
| IBM VisualAge for Cobol for<br>OS/2 <sup>12</sup>  | 1.0              |          |                  | Optional       |

| Program name  | Required version | Server | Buildtime client | Runtime client |
|---|------------------|--------|------------------|----------------|
| IBM VisualAge for SmallTalk for OS/2 Professional Version <sup>13</sup> | 3.0              |        |                  | Optional       |

**Notes:**

1. The Developer's Toolkit is needed to display output from the FlowMark export utility using the OS/2 View command.
2. Communications Manager/2 can be used for an all-OS/2 installation to run APPC as the installed network. For communications between the ObjectStore and the FlowMark Runtime server TCP/IP, NetBIOS or AnyNet is needed if the database is on a separated workstation.
3. AnyNet/2 can be used optionally instead of TCP/IP to connect the Runtime server to a remote database, or to connect the Buildtime client to a remote database.
4. DB2/2 is needed if you import audit-trail information into DB2/2.
5. Application Support Facility can be used to invoke CICS/MVS, CICS/ESA, IMS/VS, and IMS/ESA transactions from the workstation. To invoke TSO programs through Application Support Facility, you need Application Support Facility under either CICS or IMS plus NetView Access Services (or an equivalent session manager). Authorized program analysis report (APAR) PN54376 for Application Support Facility must be installed.
6. IBM MQSeries for OS/2 is needed to communicate with FlowMark for MVS - Application Integration Feature through the MQSeries Support - Building Block or to start AS/400 applications as FlowMark activities.
7. IBM FlowMark for MVS is needed to allow MVS applications to participate in an enterprise-wide workflow through the integration of FlowMark for OS/2 and AIX.
8. IBM BookMaster is needed to format the output of the Export utility of FlowMark and print it.
9. Lotus Notes Version 3.3 or 4.1 for OS/2 is needed if the FlowMark Lotus Notes Broker is used.
10. Lotus Notes Version 4.1 for OS/2 is needed if the Lotus Notes Runtime client is used.
11. IBM VisualAge for C ++ for OS/2 is needed if you want to develop either C ++ applications that communicate with the FlowMark worklist handler APIs, or C applications that communicate with the Workflow Coalition Interface 2, or the FlowMark process or container APIs.
12. IBM VisualAge for Cobol for OS/2 is needed if you want to develop Cobol applications that communicate with the FlowMark container APIs.
13. IBM VisualAge for SmallTalk for OS/2 is needed if you want to develop SmallTalk applications that communicate with the FlowMark process and container APIs via the VisualAge SmallTalk Service Broker. If you want to execute SmallTalk FlowMark applications (images), VisualAge SmallTalk is not required.

### **FlowMark support for the Integrated PC Server (FSIOP) card of the AS/400**

The FlowMark OS/2 server and database server can be installed on the AS/400 FSIOP card running on an AS/400 supported by OS/400 Version 3.2.

## Hardware requirements

The hardware requirements are:

| Integrated PC Server (FSIOP) | Runtime server     |
|------------------------------|--------------------|
| Processor                    | 80486              |
| Speed                        | 66 MHz             |
| Memory                       | 32 MB <sup>1</sup> |

### Notes:

1. The minimum required for FlowMark is 24 MB, however the FSIOP card is offered, for example, with 16 MB and 32 MB.

## AS/400

|           |   |
|-----------|---|
| Processor | Models D, E, and F, except for D02, E02, F02. Also Advanced Server models 20S, 30S, and Advanced System models 200, 300, 310, and 320. <sup>1</sup> |
| Hard disk | 70 MB   |

### Notes:

1. FlowMark does not have any further requirements for the AS/400 on top of what is needed for OS/400 Version 3.2.

## Software requirements

The software requirements and options for using the FSIOP are:

| Program name                                   | Required version | Server   |
|--|------------------|----------|
| OS/400   | V3R2             | Required |
| TCP/IP Connectivity Utilities/400 <sup>1</sup> | V3R2             | Required |
| Integration Services for FSIOP <sup>2</sup>    | V3R2             | Required |
| MQSeries for OS/400 <sup>3</sup>               | V3R2             | Optional |

### Notes:

1. The TCP/IP Connectivity Utilities are included in the base operating system.
2. The Integration Services for FSIOP are required to use the FSIOP as a LAN card to be able to install and use FlowMark.
3. MQSeries for OS/2 is needed if AS/400 applications should be started as FlowMark activities.

## FlowMark stand-alone

The OS/2 server, OS/2 Buildtime client, and OS/2 Runtime client can be installed as a stand-alone configuration on a single programmable workstation running OS/2 Warp 3.0.

Stand-alone can be useful as a test system for familiarizing yourself with FlowMark or for process modeling.

## Hardware requirements

The minimum hardware requirements are:

|                              | <b>Stand-alone</b> |
|------------------------------|--------------------|
| Processor                    | 80486              |
| Speed                        | 50 MHz             |
| Memory                       | 24 MB              |
| Hard disk space for FlowMark | 60 MB              |

Each workstation also requires the following hardware:

- A video adapter and video display supported by OS/2 Warp 3.0
- A mouse or other pointing device
- The system unit must have a CD-ROM drive

Any printer supported by OS/2 Warp 3.0 can be used optionally. To print process diagrams, the printer must have graphics capability.

These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

## Software requirements and options

The software requirements and options for using FlowMark stand-alone are the same as specified for "Software requirements and options" on page 11. The only difference is that you do not need TCP/IP or APPC for a stand-alone configuration.

## Windows Runtime client

The Windows Runtime client operates on a programmable workstation running Windows Version 3.1 or Windows for Workgroups Version 3.11.

## Hardware requirements

If you install FlowMark on an existing system, ensure that you have the following hardware available. The minimum hardware requirements are:

|                              | <b>Runtime client</b> |
|------------------------------|-----------------------|
| Processor                    | 80386                 |
| Speed                        | 25 MHz                |
| Memory                       | 4 MB                  |
| Hard-disk space for FlowMark | 6 MB                  |



Each workstation also requires the following hardware:

- An IBM token-ring adapter or equivalent
- A video adapter and video display supported by Windows 3.1 or Windows for Workgroups 3.11
- A mouse or other pointing device
- If the Japanese or Chinese edition of FlowMark is used, double-byte character set (DBCS) support is needed.

Any printer supported by Windows 3.1 or Windows for Workgroups 3.11 can be used optionally. These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

### Software requirements and options

The software requirements and options for using the FlowMark Windows Runtime client are:

| Program name                                  | Required version | Runtime client |
|---|------------------|----------------|
| <i>Either</i><br>IBM DOS                      | 6.0              | Required       |
| <i>or</i><br>MS-DOS                           | 6.3              | Required       |
| <i>Either</i><br>Microsoft Windows            | 3.1              | Required       |
| <i>or</i><br>Microsoft Windows for Workgroups | 3.11             | Required       |
| IBM TCP/IP for DOS <sup>1</sup>               | 2.1.1            | Optional       |
| Microsoft Visual Basic <sup>2</sup>           | 3.0              | Optional       |
| Borland C ++ <sup>3</sup>                     | 4.5              | Optional       |
| Lotus Notes for Windows <sup>4</sup>          | 3.3              | Optional       |

**Note:**

1. The TCP/IP implementation of Windows for Workgroups 3.11 is also supported.
2. Visual Basic is needed to run the Visual Basic sample programs included with FlowMark, and can be used to write programs that use the FlowMark API for Visual Basic.
3. Borland C ++ is needed if the C process and container APIs of FlowMark are used, or if the C ++ worklist handler APIs are used.
4. Lotus Notes Version 3.3 for Windows is needed if the FlowMark Lotus Notes Broker is used.

### Windows NT server and Windows NT Runtime client

The Windows NT server and Windows NT Runtime client operate on programmable workstations running Windows NT 3.51.

## Hardware requirements

The minimum hardware requirements are:

|                              | Server | Runtime client |
|------------------------------|--------|----------------|
| Processor <sup>1</sup>       | 80486  | 80486          |
| Speed                        | 50 MHz | 33 MHz         |
| Memory                       | 24 MB  | 8 MB           |
| Hard disk space for FlowMark | 23 MB  | 10 MB          |

**Note:**

1. This must be an Intel processor.

The system unit must have access to a CD-ROM drive.

Each workstation also requires the following hardware:

- An IBM token-ring adapter or equivalent
- A video adapter and video display supported by Windows NT 3.51
- A mouse or other pointing device

Any printer supported by Windows NT 3.51 can be used optionally.

These hardware requirements for FlowMark do not include the hardware requirements for other required and optional software.

## Software requirements and options

The software requirements and options for using the Windows NT components of FlowMark are:

| Program name                                    | Required version | Server   | Runtime client |
|---|------------------|----------|----------------|
| <i>Either</i>                                   |                  |          |                |
| Microsoft Windows NT server                     | 3.51             | Required | Required       |
| <i>or</i>                                       |                  |          |                |
| Microsoft Windows NT workstation                | 3.51             | Required | Required       |
| IBM Visual Age C ++ for Windows NT <sup>1</sup> | 3.5              |          | Optional       |
| Microsoft Visual C ++ <sup>1,2</sup>            | 4.0              |          | Optional       |
| Borland C ++ for Win <sup>1</sup>               | 4.5              |          | Optional       |
| Microsoft Visual Basic <sup>3</sup>             | 4.0              |          | Optional       |

**Note:**

1. The program is needed to develop C applications that communicate with the FlowMark process and container APIs.
2. The program is needed to develop C ++ applications that communicate with the FlowMark worklist handler APIs.
3. Microsoft Visual Basic is needed to develop Basic applications that communicate with the FlowMark process and container APIs.

---

## Chapter 2. Choosing a configuration

This chapter describes the FlowMark configuration scenarios. There is an installation map for each configuration scenario that guides you through the appropriate installation sections in this book.

---

### Using configuration scenarios

Before installing FlowMark components, you need to decide how you want to set up the FlowMark workstations.

The following configuration scenarios represent ways to install the FlowMark components:

- Stand-alone
- Standard client/server
- Client/server with a dedicated Database server
- Client/server with multiple FlowMark servers
- Client/server with multiple Database servers

Choose the scenario that best matches your requirements for the configuration of FlowMark. For each scenario, an example configuration is shown.

**Note:** If you want to use the FlowMark support for the Integrated PC Server (FSIOP) card of the AS/400 for the Database server and FlowMark server, you must have a TCP/IP network.

### Preparing the communications configuration

For any of the client/server scenarios, you have to plan and check the communication protocol and configuration. For details, see Chapter 3, "Communications within FlowMark" on page 31.

**Note:** You can use only the TCP/IP versions that are delivered with the operating system or the versions that are explicitly mentioned in "Hardware and software requirements" on page 7.

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### Using installation maps

Use the installation map for the scenario that you choose.

You decide the appropriate paths to take through an installation map. For example, you may need only OS/2 and Windows Runtime clients, and you may need several of each, plus several Buildtime clients. Or you may want to use the multiple FlowMark servers scenario but also want to install a Database server on the same workstation as one of the FlowMark servers.

Where variations on a scenario are possible, these are explained in the installation instructions.

You can install as many FlowMark servers and clients as you have licenses for and as your system resources allow. You can install more than one Database server on your FlowMark network. You can install the Buildtime client and the OS/2 Runtime client on their own workstations or on a workstation running the FlowMark server.

For each workstation where you install FlowMark components, go through the appropriate path in the installation map from the top. If you are installing more than one FlowMark component on a workstation (for example, the FlowMark server and the AIX Runtime client), you need to go through the installation map only once, following the appropriate path for each component. The installation instructions explain how to install multiple components.

---

## **Performance considerations**

The performance of FlowMark depends to some extent on how the load is balanced on your hardware. You have to consider if you want to install the FlowMark server and the Database server on one or on different physical machines. The speed and memory size of the server and client machines have to be considered as well as the process model and its implementation.

## **Database limitations**

For better performance, you have to consider the size of the database. It should not exceed 128 MB on OS/2, 1.2 GB on AIX, and 512 MB on HP-UX and on Windows NT.

---

## **Configuration scenario for stand-alone**

In the stand-alone workstation scenario, you install all the FlowMark components that are OS/2-based on one OS/2 workstation. The FlowMark server, Database server, Buildtime client, and OS/2 Runtime client are configured to operate locally.

A stand-alone configuration is useful for becoming familiar with FlowMark functions. Later you can reconfigure a stand-alone FlowMark workstation for one of the client/server scenarios.

Use the illustration Figure 1 as a basis for planning a stand-alone configuration of FlowMark.



- DATABASE SERVER  
 FLOWMARK SERVER  
 BUILDTIME CLIENT  
 RUNTIME CLIENT for OS/2
- Database server component
  - FlowMark server component
  - Buildtime client component
  - OS/2 Runtime client component
  - OS/2

Figure 1. Example of a stand-alone configuration

### Installation map for stand-alone

Use this installation map to install a FlowMark stand-alone configuration. No communications software is required.

| Task                                   | Environment             | Reference  |
|--|-------------------------|--|
| Check operating system                 | Stand-alone workstation | "FlowMark stand-alone" on page 13                              |
| Check optional software                | Stand-alone workstation | "FlowMark stand-alone" on page 13                              |
| Set up FlowMark code server (optional) | Stand-alone workstation | Chapter 4, "Setting up an installation code server" on page 47 |
| Install FlowMark                       | Stand-alone workstation | "Installing FlowMark stand-alone on OS/2" on page 125          |
| Start FlowMark                         | Stand-alone workstation | "Starting and stopping FlowMark stand-alone" on page 173       |

---

## Configuration scenario for standard client/server

In the standard client/server scenario, install the Database server and FlowMark server on one workstation. Install the Buildtime and Runtime clients on workstations that are connected to the server workstation. This configuration both optimizes the use of the available resources and improves performance.

Use the illustration Figure 2 as a basis for planning a standard client/server configuration of FlowMark.

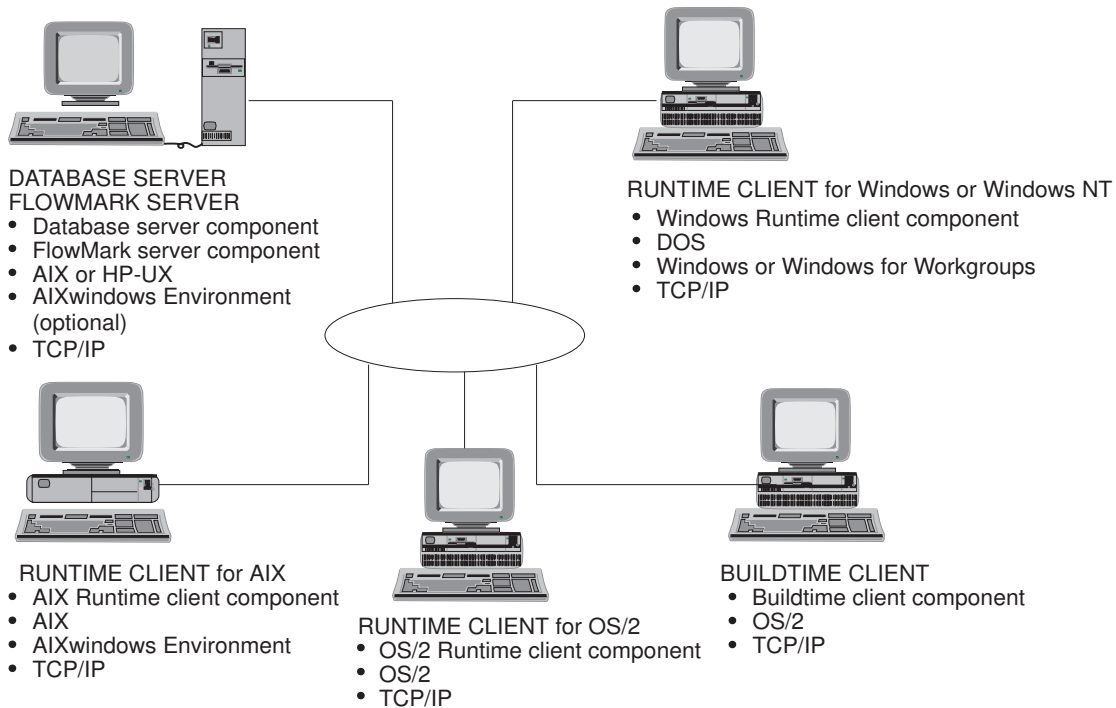


Figure 2. Example of a standard client/server configuration

## Installation map for standard client/server

Use this installation map to install a FlowMark standard client/server configuration.

| Task                                   | Environment  | Reference   |
|--|--|---|
| Check operating system                 | AIX servers<br>AIX clients   | "AIX server and AIX Runtime client" on page 7   |
|  | HP-UX servers  | "HP-UX server" on page 9  |
|  | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|  | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
| Configure communications software      | AIX, HP-UX servers<br>AIX clients  | "Additional configuration parameters for TCP/IP" on page 35   |
|  | OS/2 servers<br>OS/2 clients   | "Additional configuration parameters for TCP/IP" on page 35   |
|  | Windows NT servers<br>Windows NT clients<br>Windows clients                                | "Additional configuration parameters for TCP/IP" on page 35   |
| Check optional software                | AIX servers<br>AIX clients   | "AIX server and AIX Runtime client" on page 7   |
|  | HP-UX servers  | "HP-UX server" on page 9  |
|  | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|  | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
| Test FlowMark LAN                      | All workstations   | "Checking communications at protocol level" on page 40  |
| Set up FlowMark code server (optional) | All workstations   | Chapter 4, "Setting up an installation code server" on page 47                                      |
| Install FlowMark                       | OS/2 servers<br>AIX servers<br>HP-UX servers<br>Windows NT servers<br>OS/2 server on FSIOP | Chapter 7, "Installing servers" on page 71  |
|  | Clients  | Chapter 8, "Installing clients" on page 107   |
|  | Runtime client for Lotus Notes   | Chapter 12, "Installing and customizing the Runtime components for Lotus Notes" on page 143         |
|  | All workstations   | Chapter 3, "Communications within FlowMark" on page 31  |
| Start FlowMark                         | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |

## Configuration scenario for dedicated Database server

In the dedicated Database server scenario, install the Database server on its own workstation. (The “physical” FlowMark databases also reside on this workstation.) Install the FlowMark server on another workstation.

Use the illustration Figure 3 as a basis for planning a dedicated Database server configuration of FlowMark.

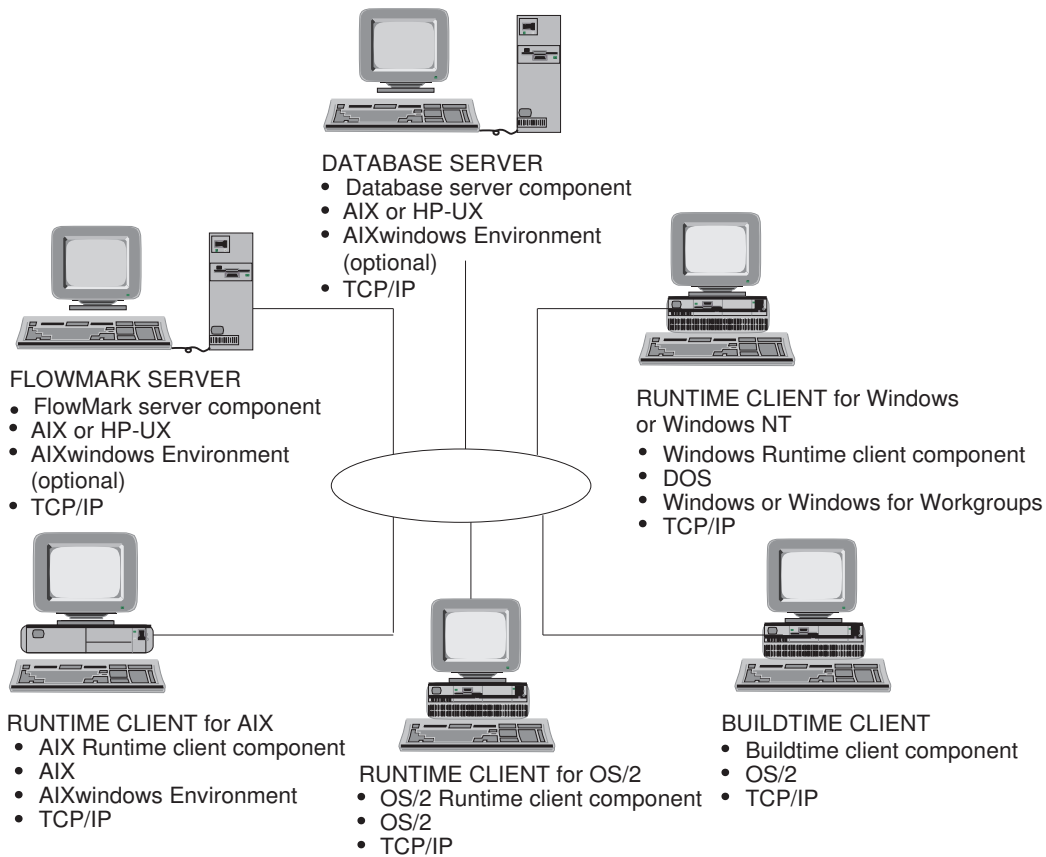


Figure 3. Example of a dedicated Database server configuration



## Installation map for dedicated Database server

Use this installation map to install a FlowMark dedicated Database server configuration.

| Task                              | Environment  | Reference   |
|-----------------------------------|--|---|
| Check operating system            | Database server<br>AIX servers<br>AIX clients  | "AIX server and AIX Runtime client" on page 7   |
|                                   | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   | Database server<br>AIX, HP-UX servers<br>AIX clients                                       | "Additional configuration parameters for TCP/IP" on page 35   |
| Configure communications software | OS/2 servers<br>OS/2 clients   | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | Windows NT servers<br>Windows NT clients<br>Windows clients                                | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | AIX servers<br>AIX clients   | "AIX server and AIX Runtime client" on page 7   |
| Check optional software           | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   | All workstations   | "Checking communications at protocol level" on page 40  |
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|                                   | Clients  | Chapter 8, "Installing clients" on page 107   |
|                                   | Runtime client for Lotus Notes   | Chapter 12, "Installing and customizing the Runtime components for Lotus Notes" on page 143         |
|                                   | All workstations   | Chapter 3, "Communications within FlowMark" on page 31  |
|                                   | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |
| Start FlowMark                    | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |

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## Configuration scenario for multiple FlowMark servers

In the multiple FlowMark servers scenario, the distribution of the workload among Runtime clients and FlowMark servers can be optimized. Runtime clients use different FlowMark servers with different names, but all clients access and use the same Database server.

Use the illustration Figure 4 as a basis for planning a dedicated Database server installation of FlowMark.

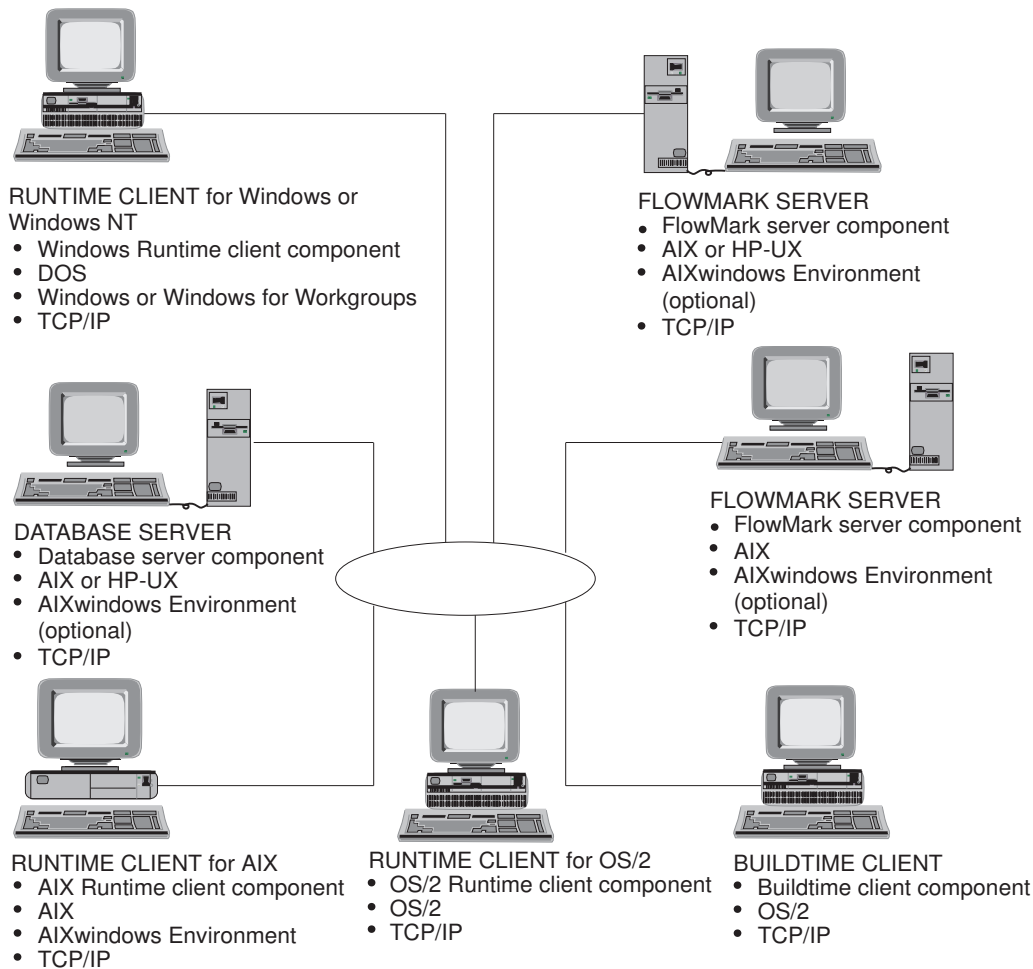


Figure 4. Example of a multiple FlowMark server configuration

## Installation map for multiple FlowMark servers

Use this installation map to install a multiple FlowMark servers configuration.

| Task                              | Environment  | Reference   |
|-----------------------------------|--|---|
| Check operating system            | Database server<br>AIX servers<br>AIX clients  | "AIX server and AIX Runtime client" on page 7   |
|                                   | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   | Database server<br>AIX, HP-UX servers<br>AIX clients                                       | "Additional configuration parameters for TCP/IP" on page 35   |
| Configure communications software | OS/2 servers<br>OS/2 clients   | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | Windows NT servers<br>Windows NT clients<br>Windows clients                                | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | AIX servers<br>AIX clients   | "AIX server and AIX Runtime client" on page 7   |
| Check optional software           | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   | All workstations   | "Checking communications at protocol level" on page 40  |
|                                   | Set up FlowMark code server (optional)   | All workstations  |
| Install FlowMark                  | OS/2 servers<br>AIX servers<br>HP-UX servers<br>Windows NT servers<br>OS/2 server on FSIOF | Chapter 7, "Installing servers" on page 71  |
|                                   | Clients  | Chapter 8, "Installing clients" on page 107   |
|                                   | Runtime client for Lotus Notes   | Chapter 12, "Installing and customizing the Runtime components for Lotus Notes" on page 143         |
|                                   | All workstations   | Chapter 3, "Communications within FlowMark" on page 31  |
|                                   | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |
| Start FlowMark                    | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |

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## Configuration scenario for multiple Database servers

In the multiple Database server scenario, the distribution of the workload among Database servers and FlowMark servers can be optimized. Runtime clients can use different Database servers for executing the processes. The Delivery server is responsible for the communication between the Runtime servers that belong to different local domains. A local domain consists of:

- One database connected to one Database server
- Several Runtime servers
- One Delivery server
- One Notification server
- Several Buildtime clients
- Several Runtime clients

Use the illustration Figure 5 on page 27 as a basis for planning a multiple Database server installation of FlowMark.

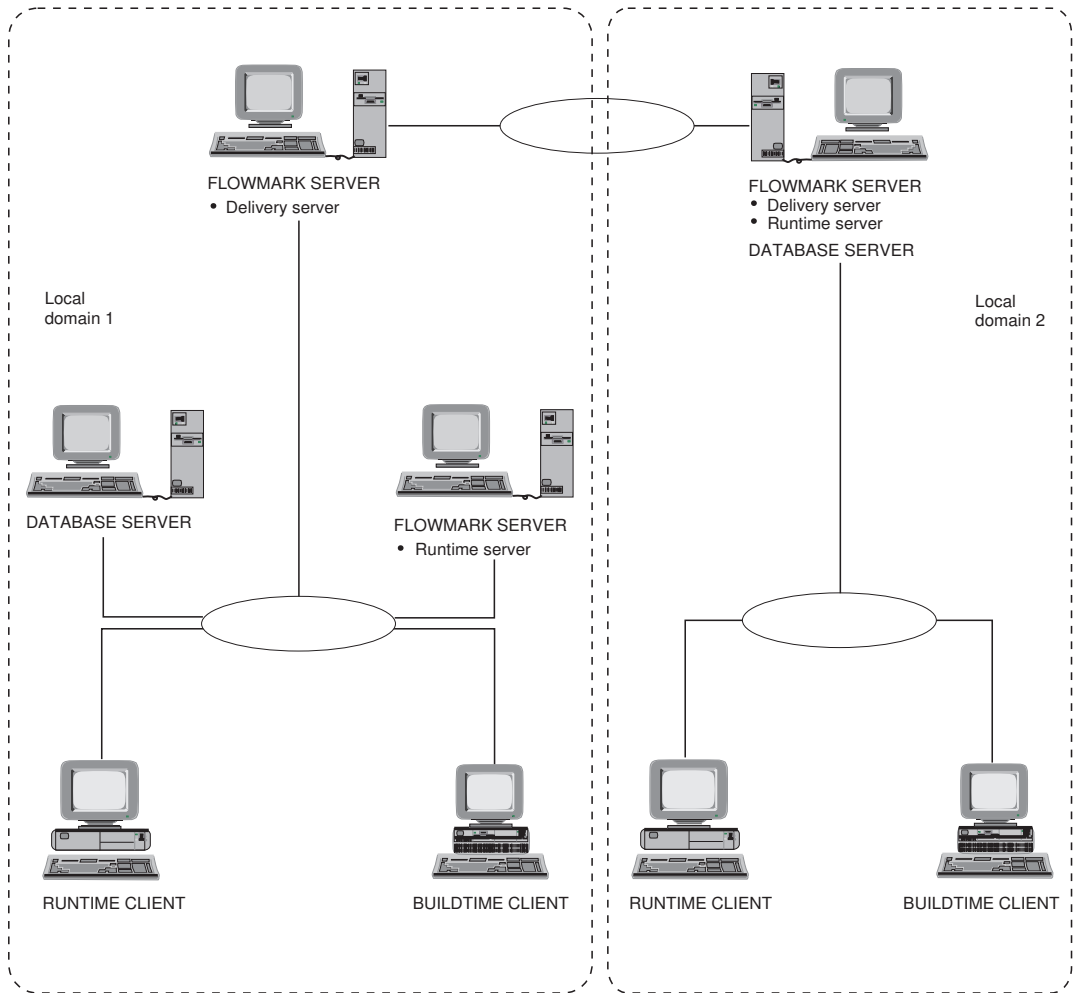


Figure 5. Example of a multiple Database server configuration

## Installation map for multiple Database servers

Use this installation map to install a multiple Database server configuration.

| Task                              | Environment  | Reference   |
|-----------------------------------|--|---|
| Check operating system            | Database server<br>AIX servers<br>AIX clients  | "AIX server and AIX Runtime client" on page 7   |
|                                   | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   |  |   |
| Configure communications software | Database server<br>Delivery server<br>AIX, HP-UX servers<br>AIX clients                    | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | OS/2 servers<br>OS/2 clients   | "Additional configuration parameters for TCP/IP" on page 35   |
|                                   | Windows NT servers<br>Windows NT clients<br>Windows clients                                | "Additional configuration parameters for TCP/IP" on page 35   |
| Check optional software           | AIX servers<br>AIX clients   | "AIX server and AIX Runtime client" on page 7   |
|                                   | HP-UX servers  | "HP-UX server" on page 9  |
|                                   | OS/2 servers<br>OS/2 clients   | "OS/2 server, OS/2 Buildtime and Runtime client, Runtime client for Lotus Notes" on page 10         |
|                                   | Windows clients<br>Windows NT servers<br>Windows NT clients                                | "Windows Runtime client" on page 14<br>"Windows NT server and Windows NT Runtime client" on page 15 |
|                                   |  |   |
| Test FlowMark LAN                 | All workstations   | "Checking communications at protocol level" on page 40  |
|                                   | Set up FlowMark code server (optional)   | Chapter 4, "Setting up an installation code server" on page 47                                      |
| Install FlowMark                  | OS/2 servers<br>AIX servers<br>HP-UX servers<br>Windows NT servers<br>OS/2 server on FSIOF | Chapter 7, "Installing servers" on page 71  |
|                                   | Clients  | Chapter 8, "Installing clients" on page 107   |
|                                   | Runtime client for Lotus Notes   | Chapter 12, "Installing and customizing the Runtime components for Lotus Notes" on page 143         |
|                                   | All workstations   | Chapter 3, "Communications within FlowMark" on page 31  |
|                                   |  |   |
| Start FlowMark                    | All workstations   | Chapter 16, "Starting and stopping FlowMark" on page 167  |

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## Part 2. Preparing your FlowMark installation

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## Chapter 3. Communications within FlowMark

FlowMark servers and clients must be able to communicate in a network. Before you can start FlowMark, you must be sure that the communication subsystems are configured and the Telepath communications services and ObjectStore communication are set up correctly.

The following figure shows a FlowMark network with multiple domains.

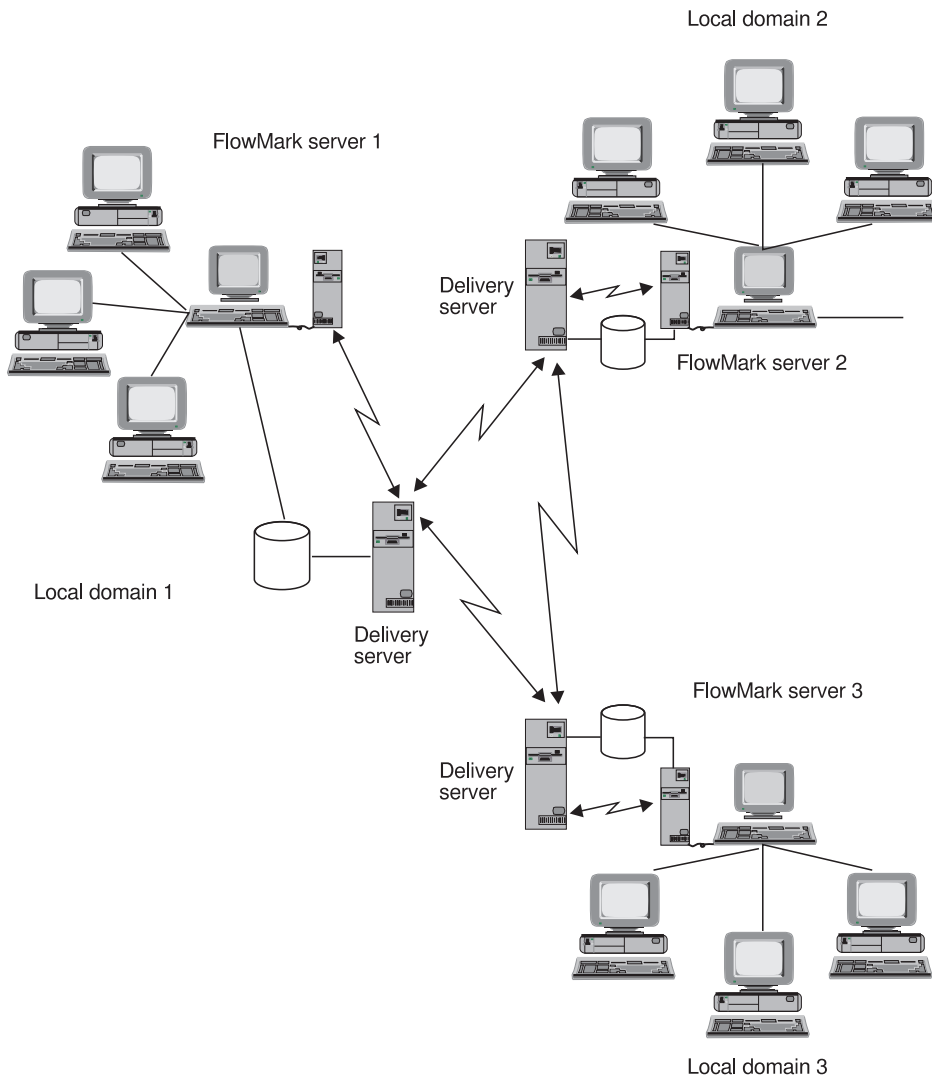


Figure 6. Example of a FlowMark configuration