Microsoft Business Solutions

Installing Microsoft® Business Solutions–Navision® Database Server on an IBM eServer *i*Series (OS/400 V5R2)

MICROSOFT BUSINESS SOLUTIONS–NAVISION

INSTALLING MICROSOFT® BUSINESS SOLUTIONS-NAVISION® DATABASE SERVER ON AN IBM ESERVER /SERIES (OS/400 V5R2)

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Published by Microsoft Business Solutions ApS, Denmark.

Published in Denmark 2003.

DocID: NA-370-ING-007-v01.00-W1W1

PREFACE

This document describes how to install and run Microsoft Business Solutions–Navision Database Server on an IBM eServer *i*Series OS/400 V5R2.

We recommend that you only run Navision on IBM eServer *i*Series OS/400 V5R2 or later.

You should also be familiar with the symbols and typographical conventions used in the Navision manuals. In the list below, you can see how various elements of the program are distinguished by special typefaces and symbols:

Appearance	Element
Ctrl	Keys on the keyboard. They are written in small capitals.
Design	Menu items and buttons in windows. They always start with a capital letter, and the access key is underlined.
Address	Field names. They appear in medium bold and start with a capital letter.
Department	Names of windows, boxes and tabs. They appear in medium bold italics and start with a capital letter.
Hansen	Text that you must enter, for example: "...enter Yes in this field." It is written in italics.
`fin.flf`	File names. They are written with the Courier font and lowercase letters.
⬆ ⬇ ▼ ✳ ▸ …	The special symbols that can be seen in the windows on the screen.

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Chapter 1
Setting Up an IBM eServer *i*Series Server

This chapter describes how to set up an IBM eServer *i*Series so that you can install and run Navision Database Server on it.

This chapter contains the following sections:

- Introduction
- Installing and Setting Up an iSeries Server
- The Database Disks
- Setting up the File System

1.1 INTRODUCTION

This document describes how to install and run Navision Database Server on an IBM *i*Series computer. This document does not contain any general information about *i*Series or Navision Database Server. We recommend that you read the whole of this document before installing Navision Database Server on an *i*Series computer.

Required Knowledge

Several of the procedures that are described in this manual require in-depth knowledge about setting up and operating an IBM *i*Series computer and the OS/400 operating system. We therefore recommend that a consultant who possesses this knowledge is part of the team that installs and sets up Navision Database Server on an *i*Series computer.

Command Environments

There are two distinct command line environments that are used when administering databases on *i*Series:

- CL is the native OS/400 command environment. CL commands are used for system management functions like creating users and managing the auxiliary (disk) storage on the server. When connected to the server using a 5250 (GreenScreen) emulator, menus and most other displays present a command line at the bottom of the screen. This is a CL command entry line.
- The shells provided with OS/400 PASE (Portable Application Solutions Environment) is the other command line environment. The command line presented by these shells will only run programs which are executable stream files. This can be either a binary program or a text script. The command interface of PASE shells is a Unix-like environment.

To open a PASE shell from the CL command line, enter the following command:

```
call qp2term
```

In this document, these two different types of command are identified as:

CL command (GreenScreen)

and

PASE shell command (qp2term)

respectively.

1.2 Installing and Setting Up an *i*Series Server

This section contains some brief information about setting up an *i*Series computer.

Installing OS/400 V5R2

When you install OS/400, you must remember to reserve a physical disk for each user Auxiliary Storage Pool (ASP).

For a list of the standard optimizations that can be carried out to maximize the performance of Navision, see Optimizations and Terminology on page 27.

PTF & CUM Packs

Make sure that all the appropriate Program Temporary Fixes (PTF) and Cumulative (CUM) packs are installed. For more information see, Optimizations and Terminology on page 27.

We generally recommend that you upgrade to the latest CUM packs.

1.3 The Database Disks

The performance of Navision Database Server depends mainly on the number and speed of the hard disks and not on the speed of the CPUs. To get the best performance, you must use as many hard disks as possible. The maximum number of hard disks that you can use for Navision Database Server is 16.

OS/400 uses single storage abstraction. Single storage abstraction means that the number of hard disks that are available is hidden from the applications that run on this operating system, including Navision. However, Navision balances the hard disks itself, and must therefore be able to see the individual hard disks in order to balance them optimally.

To ensure that Navision can balance the hard disks, you must make one user Auxiliary Storage Pool (ASP) for each hard disk that is dedicated to the Navision Database Server. Use the Dedicated Service Tool (DST) to create the user ASPs.

For information about the Dedicated Service Tool and how to create user ASPs, see the "*i*Series Backup and Recovery Guide", SC41-5304:

http://publib.boulder.ibm.com/iseries/v5r2/ic2924/books/sm04/c4153046.pdf

Important

To get the best performance, these disks must ONLY be used for Navision.

1.4 Setting up the File System

After you have set up the server with all the hard disks that you want to use, you must:

- Create the file systems.
- Mount the file systems.

Creating a File System on an Auxiliary Storage Pool (ASP)

Before you can use a particular ASP from an Integrated File System (IFS), a User-Defined File System (UDFS) must be created in that ASP.

To create the UDFS, enter the following command in the OS/400 command line:

CL command (GreenScreen):

```
CRTUDFS UDFS('/DEV/QASP##/ASP##.UDFS') DTAAUT(*RWX) OBJAUT(*ALL)
CASE(*MONO)
```

Notice the "`/DEV/QASP##/ASP##.UDFS`" part of the commands:

- `01` denotes the system ASP - DO NOT use this.
- `02` denotes the first user ASP.
- `03` denotes the second user ASP.

Here is an example of an ASP setup with four disks:

CL command (GreenScreen):

```
CRTUDFS UDFS('/DEV/QASP02/ASP02.UDFS') DTAAUT(*RWX) OBJAUT(*ALL)
CASE(*MONO)
CRTUDFS UDFS('/DEV/QASP03/ASP03.UDFS') DTAAUT(*RWX) OBJAUT(*ALL)
CASE(*MONO)
CRTUDFS UDFS('/DEV/QASP04/ASP04.UDFS') DTAAUT(*RWX) OBJAUT(*ALL)
CASE(*MONO)
CRTUDFS UDFS('/DEV/QASP05/ASP05.UDFS') DTAAUT(*RWX) OBJAUT(*ALL)
CASE(*MONO)
```

This command (`CRTUDFS`) must only be run once for each user ASP, that is to say it must be only run once for each database disk. (`CRTUDFS` is the equivalent of the "`FORMAT`" command known from DOS/Windows.)

After you have created the user-defined file systems, you must mount them before they can be used.

Mounting a File System

You must mount the user-defined file system before it can be used. You must create some mount points before you can mount the file system. To create a mount point, enter the following command in the OS/400 command line:

CL command (GreenScreen):

```
MKDIR DIR('/M#')
```

Notice the '`/M#`' part of the command:

- `M1` denotes the mount point for the first user ASP disk.
- `M2` denotes the mount point for the second user ASP disk.

Here is an example of an ASP setup with four user ASP disks:

CL command (GreenScreen):

```
MKDIR DIR('/M1')
MKDIR DIR('/M2')
MKDIR DIR('/M3')
MKDIR DIR('/M4')
```

Please remember that '`/`' and '`\`' are interpreted the same in GreenScreen commands.

Note

It is recommended that you do not create any files or directories in the unmounted '`\M1`' directory or in any one of the other mount points because these directories are designed as mount points for UDFS file systems and not as traditional file directories.

You can now mount the disk(s). To mount the user ASP disks, enter the following command in the OS/400 command line:

CL command (GreenScreen):

```
MOUNT  TYPE(*UDFS)  MFS('/DEV/QASP##/ASP##.UDFS')  MNTOVRDIR('/M#')
```

Notice the `/DEV/QASP##/ASP##.UDFS` part of the commands:

- `01` denotes your system ASP - DO NOT use this.
- `02` denotes the first user ASP.
- `03` denotes the second user ASP.

Notice the '`/M#`' part of the command:

- `M1` denotes the directory onto which you should mount the first file system.

Here is an example of an ASP setup with four user ASP disks:

CL command (GreenScreen):

```
MOUNT  TYPE(*UDFS)  MFS('/DEV/QASP02/ASP02.UDFS')  MNTOVRDIR('/M1')
MOUNT  TYPE(*UDFS)  MFS('/DEV/QASP03/ASP03.UDFS')  MNTOVRDIR('/M2')
MOUNT  TYPE(*UDFS)  MFS('/DEV/QASP04/ASP04.UDFS')  MNTOVRDIR('/M3')
MOUNT  TYPE(*UDFS)  MFS('/DEV/QASP05/ASP05.UDFS')  MNTOVRDIR('/M4')
```

Note

The mounted file systems are not remounted during Initial Program Loads (IPLs). (IPL is the equivalent of reboot known from DOS.) Therefore, you must mount the file systems after every IPL. It is therefore recommended that you place the mount command in the start-up program for the system - typically `QSTRUP` (equivalent to an `autoexec.bat` known from DOS).

For more information, see Using CL Programs to Facilitate Database Management on page 21.

For more information about `QSTRUP`, see IBM's *i*Series documentation.

Chapter 2
Installing Microsoft Business Solutions–Navision Database Server

This chapter describes how to install and run Navision Database Server on an IBM eServer *i*Series server.

This chapter contains the following sections:

- Installing and Running Navision Database Server
- Using CL Programs to Facilitate Database Management
- Making Backups
- Troubleshooting

2.1 Installing and Running Navision Database Server

The following sections describe how to install and run Navision Database Server on an *i*Series computer.

Installing Navision Database Server

Before you can install Navision Database Server, you must create a program directory. This directory should be on the system ASP.

To create the program directory:

1 Enter the following command in the OS/400 command line:

CL command (GreenScreen):

```
mkdir '/home/navision'
```

2 From a client computer extract the installation files by executing `cserver_iseries.exe`. This unpacks the files that you need.

3 From a client computer, copy (ftp) the unpacked installation files to the `/home/navision` directory on the *i*Series computer.

Here is an example of ftp transfer - remember the `bin` command. The commands you must enter are written in bold:

```
e:\server>ftp 10.1.1.1
Connected to 10.1.1.1.
220-QTCP at MyiSeries
220 Connection will close if idle more than 5 minutes.
User (10.1.1.1:(none)): qsecofr
331 Enter password.
Password:
230 QSECOFR logged on.
ftp> cd /home/navision
250-NAMEFMT set to 1.
250 "/home/navision" is current directory.
ftp> bin
200 Representation type is binary IMAGE.
ftp> prompt
Interactive mode Off.
ftp> mput *
```

4 Run the `instserv` command to unpack the executables:

PASE shell command (qp2term):

```
cd /home/navision
ksh ./instserv
```

5 Copy (ftp) the license file to the `/home/navision` directory.

Note

The Cronus International Ltd. demonstration license (`CRONUS.FLF`) does not allow you to run on *i*Series.

Now the Navision Database Server is ready to run.

Running Navision Database Server in Daemon Mode

Navision Database Server for *i*Series can only run in daemon mode. Daemon is the equivalent of a service in Windows.

Note

Navision Database Server does not run in interactive mode on V5R2.

Starting Navision Database Server in Daemon Mode

You can start Navision Database Server by using a qp2term window and issuing the following command:

PASE shell command (qp2term):

```
cd /home/navision
./server cache=250000,commitcache=yes,servername=NavisionSrv
```

Navision Database Server has a number of additional startup parameters that you can enter in this command. These parameters include servername, cache, commitcache and so on. For more information about these parameters, see the manual "*Installation and System Management: Microsoft Business Solutions–Navision Database Server*".

However, we recommend that you use the `QSTRUP` file to start Navision Database Server because once the start command for the server has been added to `QSTRUP`, the server will be started automatically when the computer is started. `QSTRUP` is the equivalent of the `autoexec.bat` file, known from DOS/Windows. You must add a line to the `QSTRUP` file if you are going to use it to start Navision Database Server.

For more information about `QSTRUP` and how to use it to start Navision Database Server, see Using CL Programs to Facilitate Database Management on page 21.

Because you are running in daemon mode, you must use the process status command `ps -ef` from a PASE shell qp2term session to check that the server has started. This will tell you that at least two processes both named "server" are running. After you attach the clients more "server" processes will run. Furthermore, if you are using commit cache, some "slave" processes will be running.

It generally takes some time for the second server process to start because commit cache has to be initialized. This can take up to a minute.

Stopping Navision Database Server in Daemon Mode

You can stop Navision Database Server by using a PASE shell qp2term window and issuing the following command:

PASE shell command (qp2term):

```
cd /home/navision
./stopsrv NavisionSrv
```

The server is given the same name as the server name that you entered in the `./server` command. If you did not enter a server name in the command, the server is given the default name 'SERVER1'.

As mentioned in the previous section, you can use the process status command `ps -ef` from a PASE shell qp2term session to see if the server is running.

Troubleshooting Start/Stop Problems on Navision Database Server

When the server is run as a daemon, no visible output occurs in any window, the server runs in the background and logs any error messages to a file. This file is given the same name as the server name that you entered in the command line when you created the database. If you did not enter the server name in the command line, the file is given the default name 'SERVER1'.

The file name is:

```
/home/navision/NavisionSrv
```

This file can contain information about licensing, TCP/IP problems and so on.

2.2 Using CL Programs to Facilitate Database Management

You can create some CL programs (Command Language - the equivalent of the DOS command language) that make it easier to manage the database from the GreenScreen command line.

A few helper CL programs can be used to automate the process of starting Navision Database Server as part of the normal *i*Series IPL process. These helper CL command files are normally edited and compiled with the help of the PDM (Programming Development Manager) SEU (Source Entry Utility) commands, normally the `STRPDM` command.

After an IPL the user defined file systems (UDFS) are not automatically mounted again. The UDFS can be mounted manually using the GreenScreen command line. Alternatively, a small CL program can be compiled and this program can then be started manually or called from the `QSTRUP`. (`QSTRUP` is the equivalent of the `autoexec.bat` file, known from DOS/Windows.)

The following are just examples and do not contain any additional error handling. For more information, see the CL programming manuals that are available from IBM.

It is a good idea to store the CL programs that you create in a special library called `NAVISION`. Use the `CRTLIB` command to create this library from a GreenScreen.

Using PDM to Mount a UDFS

Here is an example of a program for mounting four UDFSs on four disks, one disk for each UDFS:

PDM/SEU in GreenScreen:

```
PGM
/* THIS EXAMPLE SHOWS HOW TO MOUNT THE UDFS FILE SYSTEMS */
/* ON THEIR RESPECTIVE DIRECTORIES                       */

MOUNT TYPE(*UDFS) MFS('/DEV/QASP02/ASP02.UDFS') MNTOVRDIR('/M1')
MONMSG CPFA09E
MOUNT TYPE(*UDFS) MFS('/DEV/QASP03/ASP03.UDFS') MNTOVRDIR('/M2')
MONMSG CPFA09E
MOUNT TYPE(*UDFS) MFS('/DEV/QASP04/ASP04.UDFS') MNTOVRDIR('/M3')
MONMSG CPFA09E
MOUNT TYPE(*UDFS) MFS('/DEV/QASP05/ASP05.UDFS') MNTOVRDIR('/M4')
MONMSG CPFA09E
ENDPGM
```

Using PDM to Start the Server

The following is an example of a program that you can use to start the server. This program uses a cache size of 250 megabytes and commit cache.

PDM/SEU in GreenScreen:

```
PGM
call qp2shell parm('/qopensys/usr/bin/ksh' '-t' '-c' -
'/home/navision/server -
cache=250000,commitcache=yes,servername=NavisionSrv,-
database=/M1/PART1+/M2/PART2+/M3/PART3+/M4/PART4')
ENDPGM
```

(Notice that the '-' character (hyphen) at the end of the lines in this command is a line continuation character that has to be entered as the command exceeds the maximum line length in the PDM/SEU environment. The command should be regarded as a single line statement.)

You can compile this program and call it `NAVISTART`. You can then add the following line to `QSTRUP` and use it to start Navision Database Server:

```
SBMJOB CMD(CALL PGM(NAVISTART)) JOB(NAVISTART) JOBQ(QINTER)
MONSG MSGID (CPF0000)
```

This is a two line command where:

- `CMD` is the command that will be run.
- `PGM` is the program name.
- `JOB` is the job name.
- `JOBQ` is the parameter that determines which subsystem (shared pool and so on) the server uses.
- `NAVISTART` is the program we compiled earlier.
- `MONMSGID` is the monitor for message or error handling.

Using PDM to Stop the Server

The following is an example of a program that you can use to shut down the server:

PDM/SEU in GreenScreen:

```
PGM
call qp2shell parm('/qopensys/usr/bin/ksh' '-t' '-c' -
'/home/navision/stopsrv NavisionSrv')
ENDPGM
```

Connecting Clients and Creating Databases

You must create a new database because Navision for *i*Series does not come with a ready-to-use database.

To connect from a client and create a database:

1. Start the server on the *i*Series.
2. Open the Navision client and click File, Database, New.
3. In the New Database window, enter the server name (the name of the *i*Series computer on which the Navision Database Server is running), as well as the complete path to the first database part and the size of the first database part.

For more information about creating a Navision database, see the manual "*Installation & System Management: Microsoft Business Solutions–Navision Database Server*."

Changing the Attributes

After the database has been created (and if necessary expanded to include more database parts on additional UDFS's), you must run the attribute command to make the most of the optimizations in V5R2 that improve performance for Navision Database Server.

To update the attributes of the database files:

1. Close the database from within a Navision client.
2. Close the Navision client.
3. Shut down the Navision Database Server on the *i*Series computer.
4. Enter the following GreenScreen command for each database part:

   CL command (GreenScreen):

   ```
   CHGATR OBJ('/XX/YY') ATR(*MAINSTGOPT) VALUE(*MINIMIZE)
   ```

   where `XX` is the path to each individually mounted UDFS directory, and `YY` is the name of each database part.

   Here is an example of an ASP setup with four disks:

   CL command (GreenScreen):

   ```
   CHGATR OBJ('/M1/PART1') ATR(*MAINSTGOPT) VALUE(*MINIMIZE)
   CHGATR OBJ('/M2/PART2') ATR(*MAINSTGOPT) VALUE(*MINIMIZE)
   CHGATR OBJ('/M3/PART3') ATR(*MAINSTGOPT) VALUE(*MINIMIZE)
   CHGATR OBJ('/M4/PART4') ATR(*MAINSTGOPT) VALUE(*MINIMIZE)
   ```

These commands return the number of objects whose attributes were changed – each of the previous commands returns 1. If at a later stage you want to check whether or not the attributes of these objects are set correctly, you can reissue the same commands. If these commands return zeros, the attributes of the objects have been set correctly.

You must then restart the *i*Series database server, start the Navision client and open the database from within Navision. This allows the server to rebuild its list of free blocks as well as ensuring that the database files themselves are committed to the

*i*Series file system. If this is not done, a power failure could cause the database files to be lost. If this happens, the database files can only be recovered with the help of the GreenScreen `RCLSTG` command.

2.3 MAKING BACKUPS

There are two ways of making backups on Navision Database Server:

1. HotCopy – a server based backup program.
2. Navision backup and restore – a client based feature that is available within Navision.

We recommend that you use HotCopy to make backups when you are running Navision Database Server on an *i*Series computer.

For more information about HotCopy and these parameters, see the manual "*Installation and System Management: Microsoft Business Solutions–Navision Database Server*".

HotCopy must be run from the server. However, there are a couple of HotCopy parameters that cannot be used on an *i*Series computer:

- There is no E-mail facility.
- You cannot use OS authentication.

2.4 TROUBLESHOOTING

This section contains some pointers about how to troubleshoot some simple problems.

TCP/IP

If there is no connection to the Navision Database Server, you should:

- Ping the server from the client.
- Ping the client from the server.

If you get the error `ECONREFUSED` when the first client tries to connect to the server, you can either:

1 Stop Navision Database Server by entering the `STOPSRV` command.

2 Restart Navision Database Server.

or you can:

1 Enter the following command in the OS/400 command line:

CL command (GreenScreen):

```
ADDSRVTBLE SERVICE('NavisionSrv') PORT(2407) PROTOCOL('tcp') +
TEXT('Navision')
```

2 Restart Navision Database Server.

This is the equivalent of editing the services file in Windows.

Database Not Found

If the *i*Series computer restarted and you have not yet mounted the UDFS, Navision Database Server will not be able to find the database that you last used. You get an error telling you that the database cannot be found. You must remember to mount the UDFS. The *i*Series doesn't remount the file systems automatically. You must therefore check that the ASPs are mounted. For about mounting the ASPs, see Using CL Programs to Facilitate Database Management on page 21.

Appendix A
Optimizations and Terminology

This appendix contains the following sections:

- Suggested Optimizations for Running Navision
- CUM Packages
- Recommended Reading
- Terminology

A.1 Suggested Optimizations for Running Navision

The following table lists some of the optimizations:

System values (WRKSYSVAL):	Optimization
QACTJOB	should be changed from 20 to 500
QADLACTJ	should be changed from 10 to 20
QADLTOTJ	should be changed from 10 to 30
QPFRADJ	should be changed from 2 to 3
QTOTJOB	should be changed from 30 to 1500
QTSEPOOL	should be changed from *NONE to *BASE
QRCLSPLSTG	is 8
QMAXACTLVL	*NOMAX

These optimizations will improve the performance of Navision Database Server. However, you should be aware that they may have an adverse affect on the performance other applications that are running on the same computer.

The following optimizations are all performed with CL commands (GreenScreen).

System Status (WRKSYSSTS):

The paging option for the SHRPOOL where Navision Database Server resides should be changed from *FIXED to *CALC. This activates Expert Cache for the Memory Pool.

To change the paging option:

1 Open the WRKSYSSTS display.

2 Press F11 three times until ’Paging Option’ is displayed.

Shared Pools (WRKSHRPOOL):

Faults per Second for *MACHINE

Min should be changed from 10 to 2.

Max should be changed from 10 to 5.

*SHRPOOL1 priority should be changed from 2 to 1.

Ethernet (WRKLIND):

If you have a fully switched network, you must change Duplex from Half Duplex to Full Duplex.

Link Speed should be changed to 100M.

TCP configuration from CFGTCP:

Type 'CFGTCP', press Enter.

1. Select option 1 'Work with TCP/IP interfaces' and ensure that Maximum transmission unit for <IP address> is set to *LIND. (Option 2=Change and 5= Display)
2. Select option 2 'Work with TCP/IP routes' and ensure that Maximum transmission unit for <IP address> is set to *IFC. (Option 2=Change and 5= Display)
3. Select option 3 'Change TCP/IP attributes' and ensure parameters for 'TCP receive buffer' and 'TCP send buffer' are set to 120000.

A.2 CUM PACKAGES

We generally recommend that you apply the latest CUM packs when you install Navision Database Server.

We specifically recommend that you apply the PTF MF29332 or its replacement unless it is included in one of the new CUM packs that you apply. MF29332 solves a disk performance problem.

For more information about installing OS/400 version V5R2, the latest cumulative PTF package and the HIPER group PTF, see:

http://www-912.ibm.com/supporthome.nsf/document/10000031

http://www-912.ibm.com/supporthome.nsf/document/26665743

and

http://www-912.ibm.com/s_dir/sline003.NSF/3a8f58452f9800bc862562900059e09e/7fc2699258b8a7c586256c2f000f7410?OpenDocument

This last site contains information about PTFs.

A.3 Recommended Reading

For more information about PASE and IBM's *i*Series, see IBM's documentation.

To download IBM’s documentation in pdf format, go to www.IBM.com/redbooks.

We recommend that you read ’Porting UNIX Applications Using AS/400 PASE’ (SG29-5970-00). This book was written in July 2000 and applies to V4R5. It has not been updated since then but it does contain a good explanation of the terms, concepts and tools used in PASE.

For more information about Navision Database Server, see the manual "*Installation & System Management: Microsoft Business Solutions–Navision Database Server*."

For general information about all iSeries products and OS/400 service and support, see:

http://as400service.rochester.ibm.com/

A.4 TERMINOLOGY

The following table contains the full names of the acronyms used in this document:

ASP	Auxiliary Storage Pool: A collection of physical disks that appear as one disk. This collection of disks can be protected by RAID or not protected at all.
IFS	Integrated File Systems
PTF	Program Temporary Fix: The equivalent to a Microsoft service pack (or hot fix).
UDFS	User-Defined File System
PASE	Portable Application Solutions Environment
CUM Pack	Cumulative package of PTFs
DST	Dedicated Service Tool
IPL	Initial Program Load, startup or reboot
LPP	Licensed Program Product
SEU	Source Entry Utility
PDM	Programming Development Manager
CL	Command Language: The equivalent of the DOS command language.

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