Upgrade from IBM MQ 9.1 to MQ 9.3, 9.4 in Windows

https://www.ibm.com/support/pages/node/6982719

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https://www.ibm.com/products/mq/support
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+++ Objective

This techdoc provides all the necessary steps to upgrade IBM MQ 9.1 in Windows to MQ 9.3 / 9.4.

The steps are applicable to both release types (LTS and CD), other version.releases, and other fix pack levels, for example:
- From MQ 9.2 to MQ 9.4
- From MQ 9.3 to MQ 9.4

The steps describe a standard upgrade path. They do not use the 'multi-version' feature in which several versions of MQ can co-exist ("side-by-side").

If you want to use 'multi-version' instead, then refer to the following techdoc:

https://www.ibm.com/support/pages/node/6982723
Installing IBM MQ 9.3 to coexist with MQ 9.1 in Windows and applying Fix Packs

- You can upgrade from MQ 9.1 to MQ 9.3, without first going through MQ 9.2.
- You can upgrade from MQ 9.0 to MQ 9.3, without first going through MQ 9.1 or MQ 9.2.
- You can upgrade from MQ 8.0 to MQ 9.3, without first going through MQ 9.1 or MQ 9.2.
  - **But you cannot upgrade directly from MQ 8.0 to 9.4. You will need to upgrade first to 9.3, then to 9.4**

Notice: You need to be prepared to reboot 2 times the computer:
- After uninstalling MQ 9.1.
- After installing MQ 9.3 / 9.4.

Starting with MQ 9.3, the MQ Explorer is NO longer included with the package file that is downloaded from IBM Passport Advantage.
For details on how to download and install the MQ Explorer see:
  https://www.ibm.com/support/pages/node/6598657
  Installing Standalone MQ Explorer 9.4 in Windows and Linux

The chapters are:

Chapter 1: Take a backup of the queue manager data and recovery log files
Chapter 2: Uninstalling MQ 9.1
Chapter 3: Installing MQ 9.3.0.2 LTS
Chapter 4: Running setmqenv to use MQ 9.3 commands
Chapter 5: Upgrading an existing queue manager to MQ 9.3

+++ CAVEAT regarding MQ activities in the Microsoft Task Scheduler +++

Please keep in mind that an active task for MQ in the Windows Task Scheduler, depending on the timing/duration of the activity, may interfere with MQ maintenance activities such as applying a fix pack or doing an upgrade. Why? Because such maintenance activities expect that there is NO activity all for MQ, otherwise if shared libraries are still in use, they cannot be replaced by the maintenance activity.

Thus, before applying a fix pack for MQ or before doing an upgrade for MQ, you must disable the MQ tasks in the Task Scheduler.

++ Overall tasks

The straight upgrade from MQ 9.1 to MQ 9.3 means that only one version of MQ will be available under MQ_INSTALLATION_PATH
The default location is:
MQ_INSTALLATION_PATH=C:\Program Files\IBM\MQ

It is necessary to:
- uninstall MQ 9.1 from MQ_INSTALLATION_PATH (the base / manufacturing refresh, all fix packs),
- and then install MQ 9.3, also in MQ_INSTALLATION_PATH.

These tasks do NOT alter the contents of MQ_DATA_PATH (which contains the data for the queue managers). That is, when you uninstall the product from /opt/mqm, the queue managers are NOT deleted.
The default location is:
MQ_DATA_PATH=C:\ProgramData\IBM\MQ

++ Multi-Instance

The following article has the recommended sequence of steps for upgrading a multi-instance queue manager.
It applies to all versions, including from MQ 9.1 to MQ 9.3 / 9.4.
https://www.ibm.com/support/pages/node/1284952
Multi-Stage migration of IBM MQ multi-instance queue managers
(from one version.release, such as 9.2 to 9.3)

The following article is relevant to fix packs within the same version.release, such as from MQ 9.3.0.0 LTS to MQ 9.3.0.4 LTS.
https://www.ibm.com/support/pages/node/6220974
Staged application of fix packs of IBM MQ multi-instance queue managers
(within the SAME version.release)

++ Configuration used in this tutorial

IBM MQ 9.1 already installed in Windows 10

Queue Managers:
  QM91 => Already created with MQ 9.1. To be migrated to MQ 9.3
  QM93 => To be created with MQ 9.3

++ For more information on what new attributes, queues and system objects were introduced after MQ 9.1, see the following technotes:

https://www.ibm.com/support/pages/node/487355
New objects and new attributes for objects in IBM MQ 7.1, 7.5, 8.0, 9.0, 9.1, 9.2, 9.3 and 9.4 LTS

https://www.ibm.com/support/pages/node/198031
New IBM MQ 7.1, 7.5, 8.0, 9.0, 9.1, 9.2, 9.3 and 9.4 LTS attributes in DISPLAY QMGR for new or migrated queue managers

https://www.ibm.com/support/pages/node/213019
New SYSTEM queues added in IBM MQ 7.1, 7.5, 8.0, 9.0, 9.1, 9.2, 9.3 and 9.4 LTS

++ For more information on what is new and what has changed after MQ 9.1, see:

https://www.ibm.com/docs/en/ibm-mq/9.4?topic=mq-whats-new-changed-in-940
IBM MQ / 9.4 / What's new and changed in IBM MQ 9.4.0

https://www.ibm.com/docs/en/ibm-mq/9.3?topic=mq-whats-new-changed-in-930
IBM MQ / 9.3 / What's new and changed in IBM MQ 9.3.0

https://www.ibm.com/docs/en/ibm-mq/9.2?topic=mq-whats-new-changed-in-920
IBM MQ / 9.2 / What's new and changed in IBM MQ 9.2.0

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+++ Chapter 1: Take a backup of the queue manager data and recovery log files
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Prior to the upgrade, you need to take a full backup of your MQ 9.1 queue managers.
Why? Because the upgrade to MQ 9.3 is NOT reversible.

If you need to back out and revert back to MQ 9.1, you will need to delete the upgraded MQ 9.3 queue managers and restore the MQ 9.1 queue managers from backup.

Take a backup of MQ_DATA_PATH any other file system that is used for the storage of the MQ recovery logs and the MQ data for the queue managers.

If the queue manager is created in a non-default directory (such as Multi-Instance), ensure that all queue manager data and logs are included in the backup based on the configuration in mqs.ini and qm.ini files.

Note:
When an MQ 9.1 queue manager is upgraded to MQ 9.3, it goes through some migration steps that are NOT reversible.
If for some reason you want to back out later on your upgraded MQ queue manager (now at 9.3) back to the old level of 9.1, you will NOT be able to use the current data in MQ_DATA_PATH.
The workaround is that you will need to delete the current queue manager and restore it from the backup taken when the MQ queue manager was at 9.1.

For more information on doing a backup of your queue managers, please see:
https://www.ibm.com/docs/en/ibm-mq/9.3?topic=restart-backing-up-restoring-mq-queue-manager-data
IBM MQ 9.3.x
Backing up and restoring IBM MQ queue manager data

The following tutorials provide in depth steps for taking a backup.
If you are only interested in doing a backup, then you can skip the rest of the instructions regarding moving the queue manager to another host.

https://www.ibm.com/support/pages/node/6114094
Taking a backup for moving files of an MQ queue manager from one Windows host to another Windows host
The quick description of the procedure is to take a backup of the files from host-1 and restore them in host-2.
It provides also details on how to restore the backup data.
The procedure is for all the data, messages and recovery logs.

+ Partial backup (not suitable for a complete revert back)

The following is a a type of "light" backup and the following items are NOT backed up:
Recovery Logs and Queue Files with messages.
This is helpful when the operating systems in both hosts are different.
Or when you want to create a new queue manager, based on the object definitions from an existing queue manager.

https://www.ibm.com/support/pages/node/738087
Steps to export the object definitions and messages from one MQ queue manager in host-1 and import them in another queue manager in host-2? (dmpmqcfg, saveqmgr)
Using MQ utility dmpmqcfg and dmpmqmsg.

+ Disclaimer:

The MQ Support teams do not recommend or support the action to revert to an earlier version of the product.
If any problem were to occur after upgrading to MQ 9.3, the best way to address the situation is to contact MQ Support and get that fixed, rather than by reverting to version MQ 9.1.

Given the above disclaimer, please review the following technotes which explain more details on the topic.
https://www.ibm.com/support/pages/node/88035
After upgrading to new version of MQ, you want to revert back to previous level

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+++ Chapter 2: Uninstalling MQ 9.1
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+++ Review the uninstallation steps from the online manual

https://www.ibm.com/docs/en/ibm-mq/9.1?topic=windows-uninstalling-mq
IBM MQ / 9.1
Uninstalling IBM MQ on Windows

+++ The uninstallation process does NOT delete the data for the MQ queue managers!

Even though it is possible in Windows to keep the existing MQ 9.1 and then install MQ 9.3, it is not recommended because the installer will make a backup of MQ 9.1 in the disk, and this takes a long time (that is, you will not save time nor disk space by keeping the old MQ 9.1 around).

++ Review of configuration BEFORE the uninstallation of MQ 9.1

Let's review the directories used by MQ 9.1:

a) Location of the code:
        MQ_INSTALLATION_PATH=C:\Program Files\IBM\MQ

b) Top-Folder for the data for the queue managers (this is the default folder that is specified during the installation of MQ 9.1 and it is the one that needs to be specified during the installation of MQ 9.3):
        MQ_DATA_PATH=C:\ProgramData\IBM\MQ

c) The location of the data for the queue managers is under the subdirectory:
        C:\ProgramData\IBM\MQ\qmgrs

For example, for the queue manager QM91, it is:
        C:\ProgramData\IBM\MQ\qmgrs\QM91

d) Location of the recovery logs for the queue managers:
        C:\ProgramData\IBM\MQ\log

For example, for the queue manager QM91, it is:
        C:\ProgramData\IBM\MQ\log\QM91

e) Version information

C:\> **dspmqver**
Name: IBM MQ
Version: 9.1.0.13
Level: p910-013-230105
BuildType: IKAP - (Production)
Platform: IBM MQ for Windows (x64 platform)
Mode: 64-bit
O/S: Windows 10 Enterprise x64 Edition, Build 19045
InstName: Installation1
InstDesc:
Primary: Yes
InstPath: C:\Program Files\IBM\MQ
DataPath: C:\ProgramData\IBM\MQ
MaxCmdLevel: 910
LicenseType: Production

+ Note for dspmqver in MQ 9.4:

There is a new line at the bottom of the output, to indicate the Release Type.
..
ReleaseType: Long Term Support (LTS) and Continuous Delivery (CD)

C:\> **setmqenv -n Installation1**

C:\> **set MQ**
MQ_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_ENV_MODE=64
MQ_FILE_PATH=C:\Program Files\IBM\MQ
MQ_INSTALLATION_NAME=Installation1
MQ_INSTALLATION_PATH=C:\Program Files\IBM\MQ
MQ_JAVA_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_JAVA_INSTALL_PATH=C:\Program Files\IBM\MQ\java
MQ_JAVA_LIB_PATH=C:\Program Files\IBM\MQ\java\lib64
MQ_JRE_PATH=C:\Program Files\IBM\MQ\java\jre

f) Header of the error log for the queue manager.

AMQ6287I: IBM MQ V9.1.0.7 (p910-007-201126).

EXPLANATION:
IBM MQ system information:
Host Info   :- Windows 10 Enterprise x64 Edition, Build 19045 (MQ Windows (x64 platform) 64-bit)
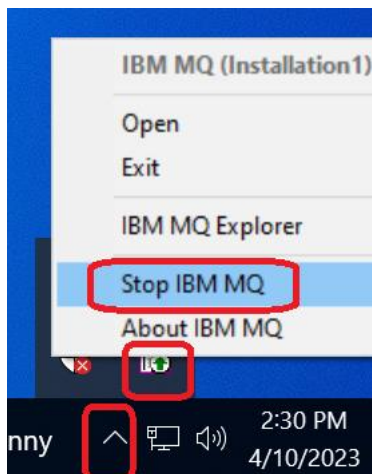Installation   :- C:\Program Files\IBM\MQ (Installation1)
Version   :- 9.1.0.7 (p910-007-201126)

++ Stop all MQ activity

Stop the MQ Explorer 9.1.

Stop the queue managers using MQ 9.1
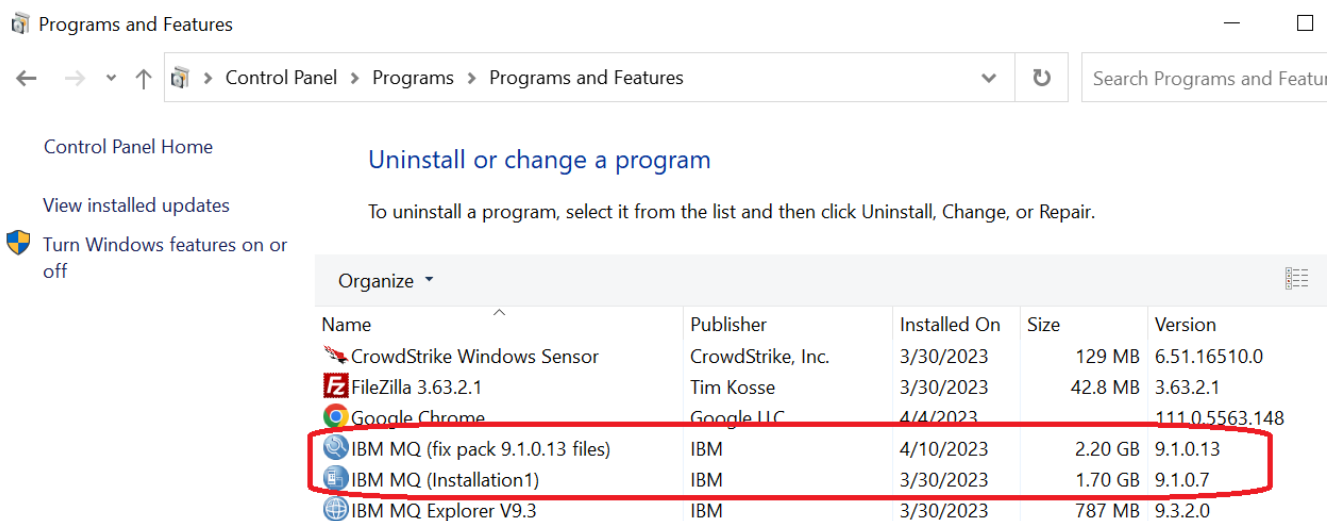
Stop the MQ Service: from the icon, right click on "Stop IBM MQ"

++ Uninstall MQ 9.1

To uninstall MQ 9.1 do the following:

Login as a Windows administrator

Launch "Program and Features"
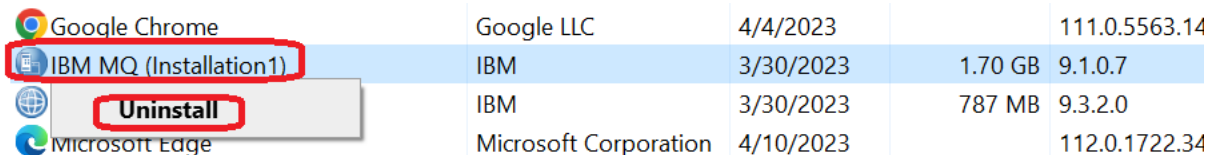 Start > Control Panel > Programs > Programs and Features

You need to uninstall the following first:

The Fix Packs, such as:
  IBM MQ (fix pack 9.1.0.13 files)

After the Fix Packs are uninstalled, then uninstall the base or manufacturing refresh, such as:
  IBM MQ (Installation 1) => 9.1.0.7

Follow the prompts to uninstall the components.

The "Programs and Features" should not show anymore the above components for MQ.

+ NOTE +

Because the Windows registry was changed, it is recommended that you stop the Windows server and reboot it.

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+++ Chapter 3: Installing MQ 9.3.0.2 LTS
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+ Downloading MQ 9.4

For MQ 9.4: From IBM Passport Advantage you can download
MQ 9.4.0.0 LTS = 9.4.0 CD
Visit IBM Passport Advantage:
https://www.ibm.com/software/passportadvantage/pao_customer.html
... search for Part Number for the single package that includes the queue manager, client
and the rest of the components (except the MQ Explorer).
M0H51ML   IBM MQ 9.4 Long Term Support Release for Windows 64-bit Multilingual eImage

You will need around 2 GB of disk space to store the downloaded tar.gz file for the
manufacturing refresh, and for the extracted rpm files.
.
Notes:
- MQ 9.4.0.0 LTS = MQ 9.4.0 CD
- Starting with MQ 9.3: MQ Explorer is NO longer included with the download from Passport
Advantage.
For details on how to download the MQ Explorer from IBM Fix Central and install it, see:
  https://www.ibm.com/support/pages/node/6598657
  Installing Standalone MQ Explorer 9.4 in Windows and Linux

+ Downloading the MQ 9.3.0.2 LTS code:

For MQ 9.3: From IBM Passport Advantage you can download the manufacturing refresh:
MQ 9.3.0.2 LTS that includes 9.3.0.0 + 9.3.0.1 + 9.3.0.2

For MQ 9.3.0.2: Visit IBM Passport Advantage:
https://www.ibm.com/software/passportadvantage/pao_customer.html

... search for Part Number for the single package that includes the queue manager, client
and the rest of the components (except the MQ Explorer).
M07K5ML   IBM MQ 9.3.0.2 Long Term Support release for Windows 64-bit eImage
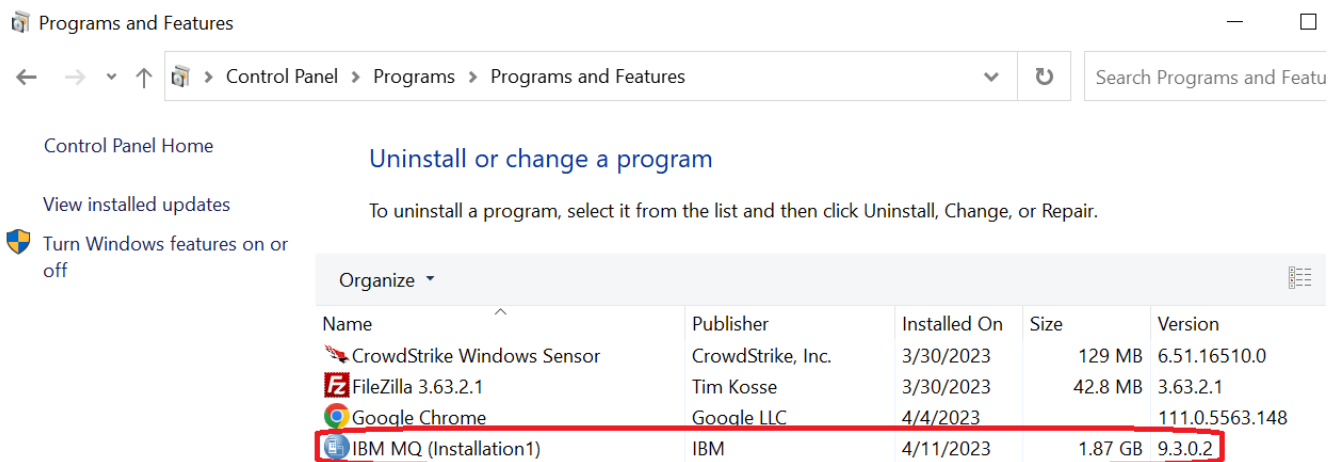
\+ Install MQ 9.3.0.2

Use the steps described in the following tutorial:

https://www.ibm.com/support/pages/node/6600017
Installing IBM MQ 9.3, installing and uninstalling Fix Pack 9.3.0.1 in Windows

After completing the installation of MQ 9.3, you need to reboot.

After the reboot, confirm that MQ 9.3.0.2 is installed.

\+ NOTE +

Because the Windows registry was changed, it is recommended that you stop the Windows server and reboot it.

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+++ Chapter 4: Running setmqenv to use MQ 9.3 commands
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When you open a Windows command prompt, you will see that automatically some MQ environment variables and some MQ folders in the PATH are being shown.

There are 5 entries in the output:

C:\> **set mq**
MQ_FILE_PATH=C:\Program Files\IBM\MQ
MQ_JAVA_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_JAVA_INSTALL_PATH=C:\Program Files\IBM\MQ\java
MQ_JAVA_LIB_PATH=C:\Program Files\IBM\MQ\java\lib64;C:\Program Files\IBM\MQ\java\lib
MQ_JRE_PATH=C:\Program Files\IBM\MQ\java\jre

However, there are more MQ related environment variables that are set by the MQ utility "setmqenv". In this case, you could issue:

"C:\Program Files\IBM\MQ\bin\setmqenv" -n Installation1

Now you will see 4 more entries:

C:\Users\Administrator>set MQ
MQ_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_ENV_MODE=64
MQ_FILE_PATH=C:\Program Files\IBM\MQ
MQ_INSTALLATION_NAME=Installation1
MQ_INSTALLATION_PATH=C:\Program Files\IBM\MQ
MQ_JAVA_DATA_PATH=C:\ProgramData\IBM\MQ
MQ_JAVA_INSTALL_PATH=C:\Program Files\IBM\MQ\java
MQ_JAVA_LIB_PATH=C:\Program Files\IBM\MQ\java\lib64
MQ_JRE_PATH=C:\Program Files\IBM\MQ\java\jre

And the PATH will have entries for MQ.

+++ Hint:

You can create a batch file that will run the setmqenv command with the specified syntax. Ensure to have this batch file in a directory in your PATH, such as c:\wintools (or whatever directory you already have in the PATH for the purpose of having local batch files/tools).

For example, the batch file set-mq-93.bat can be created with the contents.
Also, you could create another more generic batch file with same contents:
   set-mq-inst1.bat
Notice that the line for SET PATH is a single physical line, but in this techdoc is shown in 2 lines.

============= begin batch file (do NOT include this line!)
```
REM Setup the environment to run MQ 9.3
CALL "C:\Program Files\IBM\MQ\bin\setmqenv" -n Installation1
REM Adding Samples to the path
SET
PATH=%PATH%;%MQ_FILE_PATH%\tools\c\Samples\Bin;%MQ_FILE_PATH%\tools\c\Samples\Bin64
dspmqver -f 2
```
============= end batch file (do NOT include this line!)

Notice the following points:

1) Need to use the "CALL" argument when invoking setmqenv. Without this argument, the execution of setmqenv will terminate the batch and will not allow following statements to execute. That is, with the CALL, you allow other statements in the batch file to be executed.

2) The folder with the C-based executables under Samples\Bin64 was not automatically added to the PATH during the installation. Because it is a good idea to have it in the PATH, then this batch file adds the folders with the samples.

3) The option "-f 2" for dspmqver displays only the line that has the version information of MQ. For example:
Version: 9.3.0.2

++ How to add a folder into the PATH

Notes:
After you modify any of the environment variables or add a new one or delete an existing one, you will need to exit any prior command prompt windows because they will NOT recognize the new/modified environment variables.
Open a new command prompt window and verify that the new/modified environment variable is working as expected.
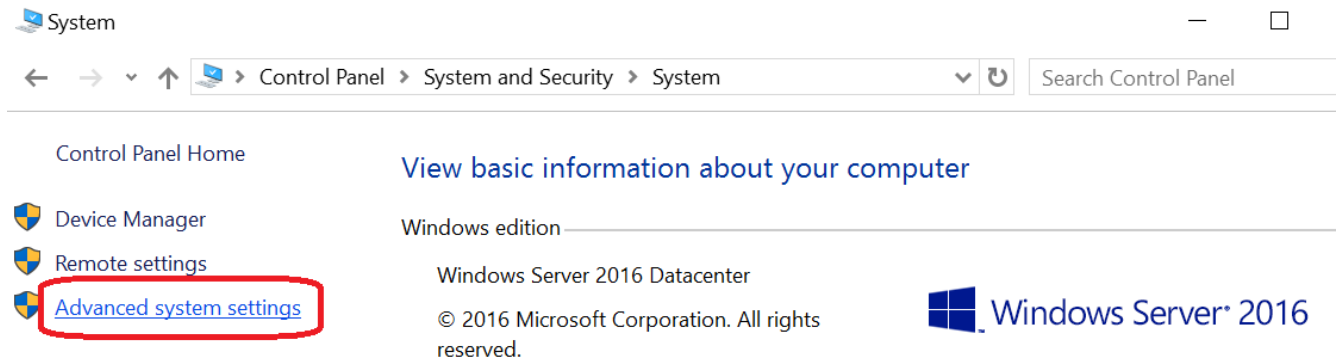
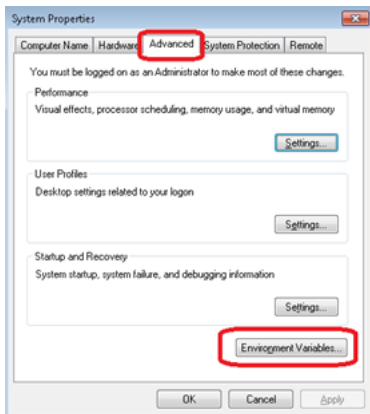Click on Start > Windows System > This PC
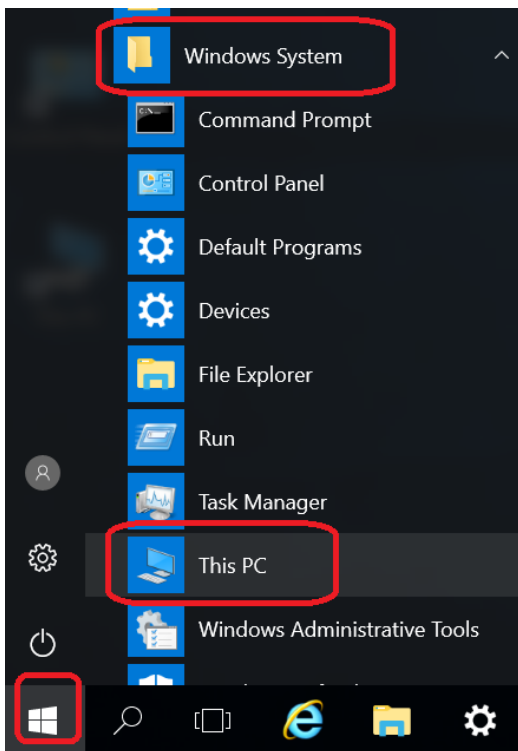
In the tab "Computer" select "System Properties":
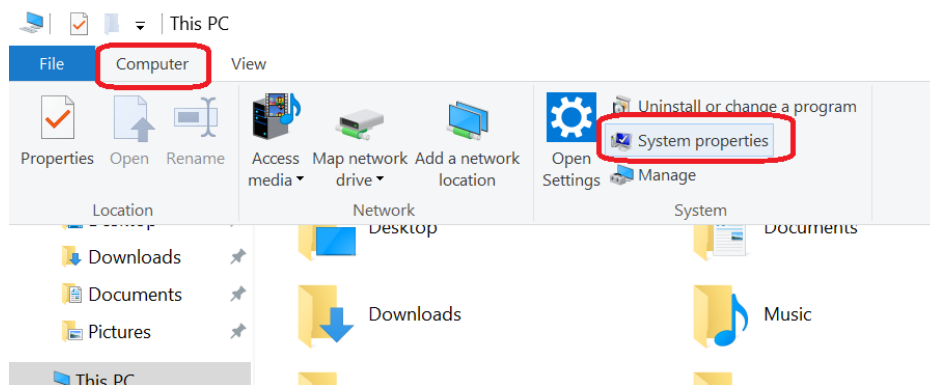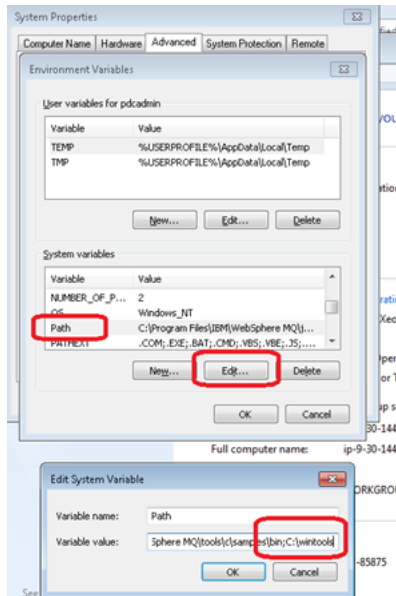
Then "Advanced system settings"

Then in the "System Properties" notebook, click on the tab "Advanced" and then on the button "Environment Variables..."

Modify the desired environment variable or add new ones.
In this case is to add at the end of the PATH the directory:
   C:\wintools

Select "Path" then "Edit..."

Add the desired folder at the end of the value for Path. Ensure to specify a semicolon:
  ;C:\wintools

Click on OK to save and proceed to exit the dialog.

Open a new Windows command prompt and enter "set path" to show the value.
Notice that at the end, you see:
  ;C:\wintools

C:\Users\Administrator> **set path**
Path=C:\Program Files\IBM\MQ\java\lib;C:\Program
Files\IBM\MQ\java\lib64;C:\Windows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\
Windows\System32\WindowsPowerShell\v1.0\;C:\Program Files\IBM\MQ\bin64;C:\Program
Files\IBM\MQ\bin;C:\Program Files\IBM\MQ\tools\c\samples\bin64;C:\Program
Files\IBM\MQ\tools\c\samples\bin;C:\tools;C:\Users\Administrator\AppData\Local\Microsoft\
WindowsApps;C:\wintools

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+++ Chapter 5: Upgrading an existing queue manager to MQ 9.3
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```

The uninstallation and installation tasks do NOT affect the data for the queue managers.

You need to keep in mind that the FIRST start of an existing queue manager after installing the new version of MQ, will UPGRADE the data for the queue manager in a manner that is NOT REVERSIBLE!

In this tutorial, the queue manager QM1 was created under MQ 9.1.
Even after the code for MQ 9.1 was uninstalled, the data for this queue manager remains at MQ 9.1.
Furthermore, even after the code for MQ 9.3 was installed, the data for this queue manager remains at MQ 9.1.
HOWEVER, as mentioned earlier, during the first start under MQ 9.3, the data will be upgraded from MQ 9.1 to MQ 9.3.

Let's start the existing queue manager QM1:

C:\> **"C:\Program Files\IBM\MQ\bin\setmqenv" -n Installation1**

C:\> **strmqm QM91**
C:\>strmqm QM91
IBM MQ queue manager 'QM91' starting.
The queue manager is associated with installation 'Installation1'.
5 log records accessed on queue manager 'QM91' during the log replay phase.
Log replay for queue manager 'QM91' complete.
Transaction manager state recovered for queue manager 'QM91'.
Migrating objects for queue manager 'QM91'.
Default objects statistics : 0 created. 1 replaced. 0 failed.
Plain text communication is enabled.
IBM MQ queue manager 'QM91' started using V9.3.0.2.

Notice that the MQ 9.3 code has determined that this queue manager worked with MQ 9.1 the last time, and thus, the MQ 9.3 code will upgrade/migrate the data from 9.1 to 9.3.
The following 2 extra lines are displayed to indicate the migration (copied from above)

Migrating objects for queue manager 'QM91'.
Default objects statistics : 0 created. 1 replaced. 0 failed.

Let's see the VERSION attribute for the queue manager:

C:\Users\Administrator> **runmqsc QM91**

display qmgr cmdlevel version
AMQ8408I: Display Queue Manager details.
  QMNAME(QM91)   CMDLEVEL(930)
  VERSION(09030002)

+++ end +++