IBM Enterprise Content Management System Monitor

Installation Guide

IBM Enterprise Content Management System Monitor
Version 5.5.9

Installation Guide

SC27-9241-05

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This document contains installation and configuration instructions for the IBM Enterprise Content Management System Monitor server and agent systems. The target audience for this guide are those who install or maintain ESM environments.

Preface

About this document

This document is written as plain text document and provided as html / pdf. The newest ESM related documents can be found in the help section of the console.

Who should read this guide?

The target audience for this guide are those who install or maintain ESM environments.

Every effort has been made to provide you with complete installation instructions. If information becomes available after the creation of the installation media from which you accessed this guide, we will provide an updated version of the guide on the IBM Customer Service and Support web site (https://www.ibm.com/support). As a general rule, you should refer to the IBM web site to obtain the current version of this guide.

This guide provides instructions for installing and/or upgrading IBM Enterprise Content Management System Monitor, and identifies the IBM/FileNet and 3rd Party products that are certified for the current release. Be aware that each release of IBM Enterprise Content Management System Monitor may have multiple Interim Fixes, or Fix Packs available for installation, each with potentially different dependencies and installation requirements. Therefore, before you attempt to install or upgrade IBM Enterprise Content Management System Monitor, review the list of releases and their associated dependencies on the IBM Support web site (https://www.ibm.com/support).

Before you start

Users of the guide should have knowledge about Unix and/or Microsoft Windows® operating system, web servers, database systems and middleware platforms. The configuration of managed systems (clients) requires advanced knowledge of all IBM ECM systems that should be monitored.

You should read the Upgrade Notes section below!

If you lack the requisite skill sets it is strongly recommended to have IBM Lab Services or a certified ValueNet Partner in order to install this product.

TIP

For tips and tricks regarding the configuration and maintenance of IBM Enterprise Content Management System Monitor please check the CENIT Field Guides at IBM ESM Field Guides.

The updated documentation can be downloaded from the IBM download pages.

Feedback on documentation

Send your comments by e-mail to comments@us.ibm.com. Be sure to include the name of the product, the version number of the product, and the name and part number of the book (if applicable). If you are commenting on specific text, include the location of the text (for example, a chapter and section title, a table number, a page number, or a help topic title)

Platform Support with ESM 5.5.9

Platforms and releases supported for ESM Server and ESM Agent

Table 1. Platform Support for ESM 5.5.9 - Management Infrastructure

Product/Platform	Release	Component
Windows	2016 SR4, 2019, 2022	ESM Server
AIX	7.1 TL5, 7.2 TL4	ESM Server
RHEL (x86_64)	7.8, 8.2	ESM Server
SLES (x86_64)	12 SP 5, 15 SP 3	ESM Server
Windows	2012 R2, 2016 SR4, 2019, 2022	ESM Agent
AIX	7.1 TL5, 7.2 TL4	ESM Agent
RHEL (x86_64)	6.10, 7.8, 8.2	ESM Agent
SLES (x86_64)	12 SP 5, 15 SP 3	ESM Agent
s390x / Z64	SLES, RHEL	ESM Agent

NOTE The supported platform architectures (aka hardware) are listed at https://www.ibm.com/support/pages/semeru-runtimes-support/#platforms_version_11.

Platform Support for ESM 5.5.9 - Managed Middleware & Operating Systems

Table 2. Platform Support for ESM 5.5.9 - Managed Middleware & Operating Systems

Product/Platform	Release	Component
DB2	11.1 FP3, 11.1 Express C, 11.5	ESM Server
DB2	11.0, 11.1, 11.5	ESM Agent
MSSQL	2017, 2019	ESM Server
MSSQL	2016, 2017, 2019	ESM Agent

Product/Platform	Release	Component
Oracle	12c, 18c, 19c	ESM Agent
PostgreSQL	11, 12, 13	ESM Agent
WebSphere Application Server	8.5, 8.5.5, 9.0	ESM Agent
WebLogic	11.0, 12.x, 14c	ESM Agent
TSM/Spectrum Protect	7.x, 8.x	ESM Agent

Table 3. Platform Support for ESM 5.5.9 - Managed ECM Engines

Product/Platform	Supported Release	Latest Release	Component
FileNet Image Services	4.1.x, 4.2.x	4.2.x	ESM Agent
IBM Content Navigator	3.0.x	3.0.13	ESM Agent
IBM Content Collector	4.0.x	4.0.x	ESM Agent
FileNet Content Platform Engine	5.5.x	5.5.10	ESM Agent
IBM Case Manager	5.3.x	5.3.x	ESM Agent
IBM Business Automation Workflow	19.0.x, 20.0.x, 21.0.x	21.0.x	ESM Agent
IBM Enterprise Records	5.2, 5.2.1	5.2.1	ESM Agent
IBM Content Manager (CM8)	8.6, 8.7	8.6	ESM Agent
IBM Content Manager on Demand	9.5, 10.1, 10.5	10.5	ESM Agent
IBM Datacap	9.0.x, 9.1.x	9.1.x	ESM Agent
Daeja ViewONE Virtual	5.0.x	5.0.x	ESM Agent
IBM OperationalDecisionManager	8.9.x, 8.10.x	8.10.x	ESM Agent
IBM BusinessProcessManager	8.6.x	8.6.x	ESM Agent
IBM BA Containers (CP4BA)	Corresponding Standalone Versions - see above		remote ESM Agent

Browser Support with ESM 5.5.9

- Mozilla FireFox 90+
- Google Chrome 90+
- Microsoft Edge 90+

NOTE Microsoft IE 11 no longer supported

Hardware Requirements of ESM

Table 4. Container Version of ESM

Container	CPU (min)	CPU (max)	Memory (min)	Memory (max)	Diskspace
Agent	1 core	2 cores	6 GB	8GB	1 GB
Server	1 core	2 cores	6 GB	8GB	5 GB + 20 GB shared location if internal H2 (not for production) is used as Database

Table 5. Install Version of ESM

Type	CPU (min)	CPU (recommended)	Memory (min)	Memory (recommended)	Diskspace
Agent on monitored Server (additionaly plan)	10 %	-	10 %	-	1 GB
Agent stand alone	1 core	2 cores	6 GB	8 GB	1 GB
Server	1 core	4 cores	6 GB	8GB	5 GB + 20 GB if internal H2 (not for production) is used as Database

NOTE The load on the agent always depends on the amount of running probes.

Before you start

Preposition

ESM provides an inbuilt database (H2) and an inbuilt http server (Jetty). Both are maintained within software updates and can be seen as a black box. No administration or maintenance must be done. The H2 database of the server is not supported for production.

IMPORTANT If you are updating an H2 based installation the above is only true for H2 if your database does not use the MV-Store format. Pleas read the chapter about migrating an H2 database before you are updating the product!

Consideration

There are some important things you need to think about before you start with the installation.

Windows server / agent installation user

The account that is used for the installation of a windows server or agent must have local admin rights (member of the local administrator group).

Service User

Before you install the server or agent, you should decide which account should be used to run it. On Windows the service can run as local system. Nevertheless you might want to use a service account. On Unix / Linux an user that has access / execute rights for the monitored application tools should be used.

Root rights

Root access is needed e.g. for the creation of autostart links for the agent.

HA environment (Active/Passive)

If an agent should be installed as HA resource, the virtual IP and the virtual hostname must be used for the installation. Furthermore a shared drive or filesystem must be used.
On Windows based systems the installation must be repeated on the second node. All services have to be specified in the cluster administration tool.
For Unix / Linux based systems the startup and shutdown of processes have to be specified in the cluster administration tool (e.g. HACMP). There is no need to repeat the installation on the second node.

HA environment (Active/Active)

This is only possible for an agent installation. There must be a separate agent installation on each active node. The local hostname should be used for better classification of the event.

Automatic start

Normally the software is started during start up of the server. In some cases e.g.HA on Active/Passive servers the automatic startup might not be useful. Therefore the start up procedure can be changed.

Eventforwarding

During the configuration process you can decide if you want to forward events via logfile.

Reporting

ESM offers basic reporting functions.

Firewall

The following ports are used in ESM and need to be opened in the firewall:

- 80 (Default http port for Console URL on ESM Server)
- 443 (Default https port for Console URL on ESM Server)
- 1883 (MQTT based Agent / Server communication)

SSL

The ESM console can be installed using SSL. You can decide if you want to use a self signed certificate (signed by the application) or a trusted certificate (provided by the customer).

LDAP Login

Mostly all LDAP Services are supported and can be configured within the ESM console. (See configuration guide)

SLM tag files

IBM Enterprise Content Management System Monitor (ESM) creates so called Software License Metric (SLM) tag files in the installation process for ESM Server and ESM Agent.

SLM tag files provide a standardized capability for a product to report its consumption of license metrics (resources that are related to the use of the software asset). The SLM tag files are based on the ISO/IEC 19770-4 standard draft for Resource Utilization Measurement.

The SLM tag files are stored in XML format, and new metric records are appended to the end of the file when updating an existing installation. For IBM Enterprise Content Management System Monitor, the SLM tag files (*.slmtag) are stored in the <Installation-Dir>/slm folder.

Preparation before executing the installation

Database Preparation

Installing with internal database (H2)

No preparation is needed in this case.

CAUTION Using the internal H2 database is only supported for testing purposes. Do not use it in productive environments!

Installing with external databases (MSSQL or DB2)

NOTE Only MSSQL and DB2 as external databases are supported. Oracle has some restriction which momentarily cause issue in ESM.

If ESM should be installed with external databases, such as MSSQL or DB2, that databases must be prepared in advance.

Create two databases (e.g. ESMConf and ESMMon, one for the configuration and one for the monitoring data) with the information from the "Preparing the databases" chapter below.

The configuration database will have less data and will not grow after the setup and configuration of the environment is complete. The monitoring database size depends on the amount of data that should be stored. Per default the cleanup is set to delete old entries after 1.5 million sets of samples and incidents. This is approx 5 to 8 GB of data but can vary.

Preparing the databases

MSSQL preparation

MS SQL Server General installation parameters The MS SQL Server must be configured for SQL Server Authentication or Mixed Mode Authentication. To change the authentication mode, see MS SQL Server documentation.

- Create a database to use with ESM Server. Assign the Latin1_General_CI_AS collation to the

database.

- Create a database user. Assign the just created ESM Server database as Default database and assign the db_datareader, db_datawriter, db_owner and public roles within the database role membership.

NOTE Make sure, the database schema, that you will use, is the Default Schema of your specified database user, which will be used to connect to your ESM Server database and for database initialization and import, otherwise database initialization for instance will fail.

DB2 preparation

IBM DB2 General installation parameters

- Create a ESM database (use codeset UTF-8 and database Page size 32k). Smaller Page size settings are not supported and cause installation errors.
- Create the ESM technical DB user on your operating system (select a name, e.g. webadmin).
- Create the ESM technical DB user on your previously created ESM database with at least the rights "Connect to database", "Create tables" and "Create schema implicitly"

Ports

ESM uses several ports on the systems. Please make sure to use ports that are not in use during the installation. Precheck the availability of the ESM default ports with the following command:

```
netstat -an | grep <Port> (Linux/Unix)
or
netstat -an | findstr <Port> Windows)
```

The default ports are:

```
ESM Server: 1099,1883,5555,8101,80,443,9092,44444
ESM Agent: 1180,1543,1883,2099,5556,9093,9202,55555
```

X11 enablement

For Unix / Linux x11 forwarding must be enabled. The installer can be started in silent / console mode, but Installation Anywhere sometimes still tries to address x11 libraries.

Diskspace and filesystem

Diskspace and / or file systems on Unix / Linux must be prepared. The server and agent installation take about 500MB each after installation. The server can grow more because of the internal event database then the agent.

The recommendation is 5 GB /20 GB (if H2 is used) for the server and 5 GB for the agent.

On Unix / Linux we recommend to create a separate file system for both.

Tips and Tricks

For tips and tricks regarding the configuration and maintenance of IBM ECM System Monitor please check the CENIT Field Guides at https://www.cenit.com/en_EN/products-solutions/eim/processing-file-and-document-management/software/ibm-ecm-system-monitor/ibm-esm-field-guides.html

Important information before starting any installation

All information given during the installation are stored in the file installer.properties. As long as the file exists in the same location, an IA installer will pick up the information from there. In case the agent and server installer is started from the same location, this will also happen and the settings might be incorrect.

Please avoid this by starting the server and agent installer from different locations or removing the file prior an installation.

When updating an existing installation

Before updating make sure you have made a backup of your current installation.

NOTE

If you have a scanner tool that checks the file system, it may be necessary to manually remove older log4j2 JAR files. These are no longer used by the software, but also not removed by the update process at this time. For server and agent the files are below `<installation dir>/karaf/system/org/ops4j/pax/logging/pax-logging-log4j2/`. You can remove all files and directories with the lowest version number.

NOTE

We strongly advise against changing an agent's identifier (aka name) with an update. If there is the need to rename an agent, please remove it and reinstall it again later.

If an agent's identifier is changed with an update, that agent will be handled as a new agent by the server. You must then manually switch the probe assignments to that new agent if you want to use the situations that were deployed to the agent before the update and renaming took place. Also keep in mind, the automatic base monitoring deployment will be executed for that new agent if it was not disabled in the server's settings.

NOTE

You can export your configuration and later import it again from a subtopic in the Administration view. But that import is only possible from a file exported from the same product version!

This step is necessary if you are planning to switch the storage type of the H2 database from the default MV mode to the PR mode. You must then export the configuration **after** the update and **before** switching the database type.

For details, see the section about database corruptions below.

NOTE Debug and logging settings like e.g. plusdebug directories from older versions will be removed by an update.

NOTE If you have deployed probes that are no longer available or have been renamed, e.g. for ImageServices, it may be necessary to execute the following steps for the agents these probes were deployed to after the agent has been updated:

1. Stop the agent.
2. Remove the configuration database file from the agent.
3. Restart the agent again.

The list of renamed and removed probes can be found in the readme file and the release notes document.

Before

- It is not recommended to mix GUI based and console mode based installations. This can lead to configuration settings erroneously enclosed with double quotes, e.g. "1883" instead of plain 1883.
- Check if there is an installer.properties file in the same directory where the installer binary was copied to.
  - If so, remove this file from the directory before starting the installer. If not, this will damage your installation.
- When updating from ESM 5.5.7.0-003 or older check if there are NumberOfTempFiles probes (subsystem type ContentCollector) configured.
  - If so, note down the evaluation parameters of the probe(s) as well as the parameter `Logfile Path` in the corresponding subsystem as these probes as well as the subsystem parameter will be removed during update due to internal changes.
  - After update, create instances of the new FileCount probe (subsystem type Host) with the parameters you noted down before the update.
- When updating from ESM 5.5.7.0-003 or older check if there are NumberOfFilesPercentage or NumberOfFilesReached probes (subsystem type Host) configured.
  - If so, note down `Maximum Number Of Files` parameter. The probes will be converted to the new FileCount probe that does not have this parameter due to internal changes.
  - After update, adjust the evaluation of the NumberOfFilesPercentage and NumberOfFilesReached probes that have been migrated to FileCount probes during update, using the parameters you noted down before. This can not be done automatically during update.
- When updating to ESM 5.5.9.0 check if there are FullTextSearchStatistics (subsystem type OnDemand) or ContentSearchServicesStatistics (subsystem type ObjectsStore) probes configured.
  - If so, check if there are instances that use thresholds in their `Statistic Value` field. Note down the thresholds as these will be removed during update.
  - After update, adjust the evaluation of the FullTextSearchStatistics and ContentSearchServicesStatistics probes, using the parameters you noted down before. This can not be done automatically during update.

- When updating to ESM 5.5.9.0 check if there are Db2Statistic probes configured.
  - If so, check if there are instances that use thresholds in their `Parameter To Check` field. Note down the thresholds as these will be removed during update. The probes will also be converted to the new Db2DatabaseStatistic probe.
  - After update, adjust the evaluation of the Db2DatabaseStatistic probes, using the parameters you noted down before. This can not be done automatically during update.
  - Note that the valid parameters of this probe have been changed and that some old parameters are no longer available in the new implementation or have been moved to the new Db2TransactionLogStatistic probe. If an instance of Db2Statistic cannot be converted fully to the new parameter names, it will be deactivated during update.
    These parameters have been moved to Db2TransactionlogStatistic:
    - Number of indoubt transactions → NUM_INDOUBT_TRANS
    - Log space available to the database → TOTAL_LOG_AVAILABLE
    - Log space used by the database → TOTAL_LOG_USED
    - Maximum secondary log space used → SEC_LOG_USED_TOP
    - Maximum total log space used → TOT_LOG_USED_TOP
    - Secondary logs allocated currently → SEC_LOGS_ALLOCATED
    - Log pages read → LOG_READS
    - Log read time → LOG_READ_TIME
    - Log pages written → LOG_WRITES
    - Log write time → LOG_WRITE_TIME
    - Number write log IOs → NUM_LOG_WRITE_IO
    - Number read log IOs → NUM_LOG_READ_IO
    - Number partial page log IOs → NUM_LOG_PART_PAGE_IO
    - Number log buffer full → NUM_LOG_BUFFER_FULL
    - Log data found in buffer → NUM_LOG_DATA_FOUND_IN_BUFFER
    - Appl id holding the oldest transaction → APPLID_HOLDING_OLDEST_XACT
    - Log to be redone for recovery → LOG_TO_REDO_FOR_RECOVERY
    - Log accounted for by dirty pages → LOG_HELD_BY_DIRTY_PAGES
    - File number of first active log → FIRST_ACTIVE_LOG
    - File number of last active log → LAST_ACTIVE_LOG
    - File number of current active log → CURRENT_ACTIVE_LOG
    - File number of log being archived → CURRENT_ARCHIVE_LOG

    These parameters are no longer available due to technical changes:
    - Maximum agents associated with applications
    - Exclusive lock escalations
    - Total sort time
    - Data pages copied to extended storage
    - Index pages copied to extended storage
    - Data pages copied from extended storage

- Index pages copied from extended storage
- Physical page maps
- Host execution elapsed time
- Commit statements attempted commit_sql_stmts
- Rollback statements attempted rollback_sql_stmts
- Internal rollbacks due to deadlock int_deadlock_rollbacks
- Package cache high water mark
- Catalog cache high water mark
- Shared high water mark
- Corresponding shared overflows
- Total shared section inserts
- Total shared section lookups
- Private high water mark
- Corresponding private overflows
- Total private section inserts
- Total private section lookups

Server

- We recommend to stop the ESM server.
- Proceed with the update guided by the installer.
- Due to a 3rd-party limitation whitespace in the installation path are currently not supported under Unix/Linux.

Agent

- We recommend to stop the ESM agent.
- Proceed with the update guided by the installer.
- Due to a 3rd-party limitation whitespace in the installation path are currently not supported under Unix/Linux.

After

- **Modern browsers tend to cache data to enhance the responsiveness of web-UIs. We have found this can lead to complications after updates. Sometimes the browser does not recognize or simply ignores updates of the UI and its underlying data stores. That caching will even survive a browser restart. This all depends on the specific settings of each browser. So after an update it is recommended to explicitly clear the web browser's caches to trigger a fresh update of the UI and its components. Normally pressing Ctrl and F5 when the focus is in the tab of the ESM's UI should clean the cache. But we have found this is not always**

sufficient. That is why we recommend to use the browser's settings to clear stored website data and the browser's cache.

- ISP (formerly known as TSM) CustomQuery probes that are using shell commands have to be adopted to the new Java implementation. The new implementation does not allow and though does not execute custom shell commands anymore. Instead it supports direct calculations. Read the probe's documentation for details.
- There is now only one ISP (formerly known as TSM) CustomQuery probe regardless if the result is numeric or alphanumeric. Existing configurations are automatically converted. But you should check these after the update.
- The ObjectStoreNewObjects probe was rewritten to use direct SQL commands instead of the FileNet P8 Java-API, which improves the performance of the probe. This has the following implications when updating to ESM 5.5.7.0-002:
  - Objectstores that are monitored by an ObjectStoreNewObjects probe have to be added to the CPE subsystem referenced in the probe's configuration. All these objectstores must also reference the correct database/RDBMS subsystem configurations.
  - Now only the objectstores with objectstore subsystem configurations associated to the CPE referenced in the probe's configuration are monitored by the probe.
  - If a Custom Type is defined in a probe's configuration, that type and the selected object type is used in the SQL query.
- When updating from ESM 5.5.7.0-001 or older, a new option `Interval In Seconds` is added to all Listener subsystems. This will initially set the Listener interval to 15 minutes for all active Listener probes. See documentation for the Listener subsystem for further details.
- When updating from ESM 5.5.7.0-001 or older, adjust the evaluation for Rmi4liceStatus probes. The probe now returns the number of reachable connector URLs instead of simply returning `0` (ok) or `1` (not ok).
- When updating to ESM 5.5.9.0, add instances of the FileCount probe as replacement for the NumberOfTempFiles probe as described in the Before section above.
- When updating to ESM 5.5.9.0, the `Search Pattern` in all instances of the FileCount probe that have been converted from BatchItErrors probes must be changed from globbing pattern to regex.
- When updating to ESM 5.5.9.0, check the `Directory` field in all instances of the FileCount probe that have been converted from NumberOfFiles, NumberOfFilesPercentage and NumberOfFilesReached probes.
  - If the `Directory` contains a wildcard, that part of the directory name must be moved to the `Search Pattern` field and be converted from globbing pattern to regex.
  - In addition, the evaluation for converted NumberOfFilesPercentage and NumberOfFilesReached probes must be adjusted as described in the Before section above.
- When updating to ESM 5.5.9.0 it is necessary to change all relative paths in logfile subsystems to absolute paths. Relative paths are no longer supported. The entry must always be a valid regexp, see documentation for details.

Virus Scanners

We strongly advise to exclude the karaf folder of the server from virus scans and from access by other external programs that potentially can lead to file locks. This can lead to database corruption.

Microsoft Windows Server Core

ESM does not support an installation on Microsoft Windows Server Core, neither for the server nor for the agent component. You have to use an installation with the so called Desktop Experience. For details see the Microsoft webpages.

Database Corruption with H2

The following is only for the server not the agent.

IMPORTANT

Keep in mind that H2 is not supported in productive environments. See the chapter about platform support in this document for a list of databases supported in production.

NOTE

We have reports that under some circumstances the embedded database of the server has gone corrupt beyond repair. It looks that especially the configuration database is affected by this issue.

Follow the instructions below to avoid this risk. Read them carefully and if in doubt ask your support representative for help.

IMPORTANT

Before switching the database mode of the H2 database you should export the configuration to a file, from which you can later re-import it. Changing the storage mode will wipe-out the complete content of the database. So you will need the export to be able to restore your configuration after the change was applied.

The export is made through a function in the Administration view, see the documentation for details.

Only imports from the same product version are possible!

The migration of the monitoring data is not described here. Changing the storage mode of the monitoring database without a proper migration will wipe-out all monitoring data from the database.

Changing the storage mode is done by changing the JDBC-URL of the datasources defined in the server's configuration `org.ops4j.datasource-phoenix.cfg` which can be found below `<server install dir>/karaf/etc/`.

Procedure

1. Login as admin user and export the configuration.
2. Stop the ESM server.
3. Open the file `org.ops4j.datasource-phoenix.cfg` with a text editor.
4. Search for the line defining the JDBC URL. It should start with `url=jdbc:h2:`.
5. Add `;MV_STORE=FALSE` to the end of the URL.
6. The result should look like the following for the configuration database:
   `url=jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE`

7. Save the changed file.
8. Restart the server.
9. Login as admin user and import the exported configuration.

NOTE Keep in mind: The database is created anew with standard settings by the first server start after the JDBC-URL has been changed. So you have to use the default password for the admin user before importing your configuration.

How to migrate an H2 to MV_STORE=FALSE

IMPORTANT

- Keep in mind that H2 is not supported in productive environments.
- See the chapter about platform support in the Install Guide for a list of databases supported in production.
- Also keep in mind that you can always ask your support representative for help.

NOTE As always when migrating data or applications: Make a backup before you start.

Preparation

Check if it is necessary to migrate the database at all by looking at the JDBC URL in `<install dir>/karaf/etc/org.ops4j.datasource-phoenix.cfg` and `<install dir>/karaf/etc/org.ops4j.datasource-monitoring.cfg`. If `MV_STORE=FALSE` is missing in the JDBC URL (property named `url`), then a migration is necessary. If it is not necessary obviously you can stop here. If not sure ask your support representative for help.

If a migration is necessary

- Stop a running ESM server.
- Copy the current database from `<install dir>/karaf/` to a different directory. The configuration database is named `configuration.mv.db` and the monitoring database is named `monitoring.mv.db`.
- Copy the H2 Jar file from `<install dir>/karaf/system/com/h2database/h2/1.4.200/h2-1.4.200.jar` to the directory you have copied the database files into.

For the migration execute the following in the directory you have copied the database files into.

Be sure at least a Java 8 executable can be called from the command line.

NOTE In the following example the migration is shown for the monitoring database. The schema will work for the configuration database as well.

Dump the original database

A database dump is created by executing the following from the command line:

```
java -cp h2-1.4.200.jar org.h2.tools.Script -url jdbc:h2:./monitoring -user db
-password Database1! -script backup.zip -options compression zip
```

This should create a file named `backup.zip` that contains a SQL script with all the statements needed to re-create the database and its content. How large that file will be depends on your database.

NOTE User and password shown in this example are the defaults used for an H2 installation. If you have changed these in the installation process you have to use your values here of course.

Prepare the target database

You have to create the initial and empty database and a database user. This is done in an interactive session like the following:

```
java -cp h2-1.4.200.jar org.h2.tools.Shell
```

A welcome message should be shown and H2 asks you about the initial settings for the new database. At first the JDBC-URL has to be entered. It is important to use the `MV_STORE=FALSE` here. In the example session the new database is named `newmonitoring`.

```
Welcome to H2 Shell 1.4.200 (2019-10-14)
Exit with Ctrl+C
[Enter]   <suggested jdbc url from shell>
URL
jdbc:h2:./newmonitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
[Enter]   org.h2.Driver
Driver
[Enter]   <default database user>
User      <use the same user name as for the old database>
Password  <use the same password as for the old database>
```

There is no need to enter the `Driver` explicitly. Simply press enter in that line. After you have entered the password you can exit the session by pressing `Ctrl+C`.

Migrate the data

Now you can start to import the dump created before into the new database.

```
java -cp h2-1.4.200.jar org.h2.tools.RunScript -url jdbc:h2:./newmonitoring -user
db -password Database1! -script backup.zip -options compression zip
```

Like before replace the database user and password with the correct values for your database.

Use the new database in the product

The new database has to copied to `<install dir>/karaf/monitoring.h2.db`. Beware in this step the new database is not only copied but also renamed.

Now you have to edit the JDBC-URL used in the product at runtime. In the file `<install dir>/karaf/etc/org.ops4j.datasource-monitoring.cfg` (use `org.ops4j.datasource-phoenix.cfg` for the configuration database) add `MV_STORE\=FALSE` to the end of the JDBC-URL parameter `url`. It should look like this:

```
url=jdbc\:h2\:./monitoring;AUTO_SERVER\=TRUE;AUTO_RECONNECT\=TRUE;MV_STORE\=FALSE
```

To persist the change when updating the product you should also change the JDBC-URLs in the file `<install dir>/installvariables.properties`. Edit that file with a text editor and search for `JDBC_URL` and `MONITORING_JDBC_URL`. Also add `MV_STORE\=FALSE` to the end of the entries. Do not instert line breaks. For the monitoring database it should then look like:

```
MONITORING_JDBC_URL=jdbc\:h2\:./monitoring;AUTO_SERVER\=TRUE;AUTO_RECONNECT\=TRUE;M
V_STORE\=FALSE
```

After that delete the old database file, e.g. `<install dir>/karaf/monitoring.mv.db`.

The migration is now completed. You can now start the ESM server again.

Maintenance (if needed)

After the ESM server has started you should check the file size of the database file(s). If the size has doubled compared to the original ones, the database has to be defragmented/compacted as it is called.

Stop the ESM server again and follow these steps:

- On the command line go to the `<install dir>/karaf` folder.
- Execute `../jre/bin/java -cp ./system/com/h2database/h2/1.4.200/h2-1.4.200.jar org.h2.tools.Shell`
- You will be prompted with the welcome message of H2 as seen before.
- Enter `jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE` for the JDBC-URL. Again, this example is for the monitoring database.

- Simply press enter when asked for the JDBC driver.
- Enter user and password appropriate for you database.
- At the H2 shell prompt enter `SHUTDOWN COMPACT;`. That command can take a few seconds to be executed. The command will log you out from the H2 shell at the end. It is possible you will see an error message saying `Database is already closed`. This can be ignored.
- The file size of the database file should be smaller than before.

You can start the ESM again.

Installation using GUI mode

For the installation an InstallAnywhere package is provided. The installation offers 3 different modes: GUI, console and silent mode (See chapter Installation using silent mode for examples).
This chapter shows the installation in GUI mode. The console mode is equivalent to the GUI mode, the only difference is that the input must be provided in the console and not in a GUI interface.

Windows based server

- Start the installation by executing the file "ESM_Server_Installer.exe" as administrator
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

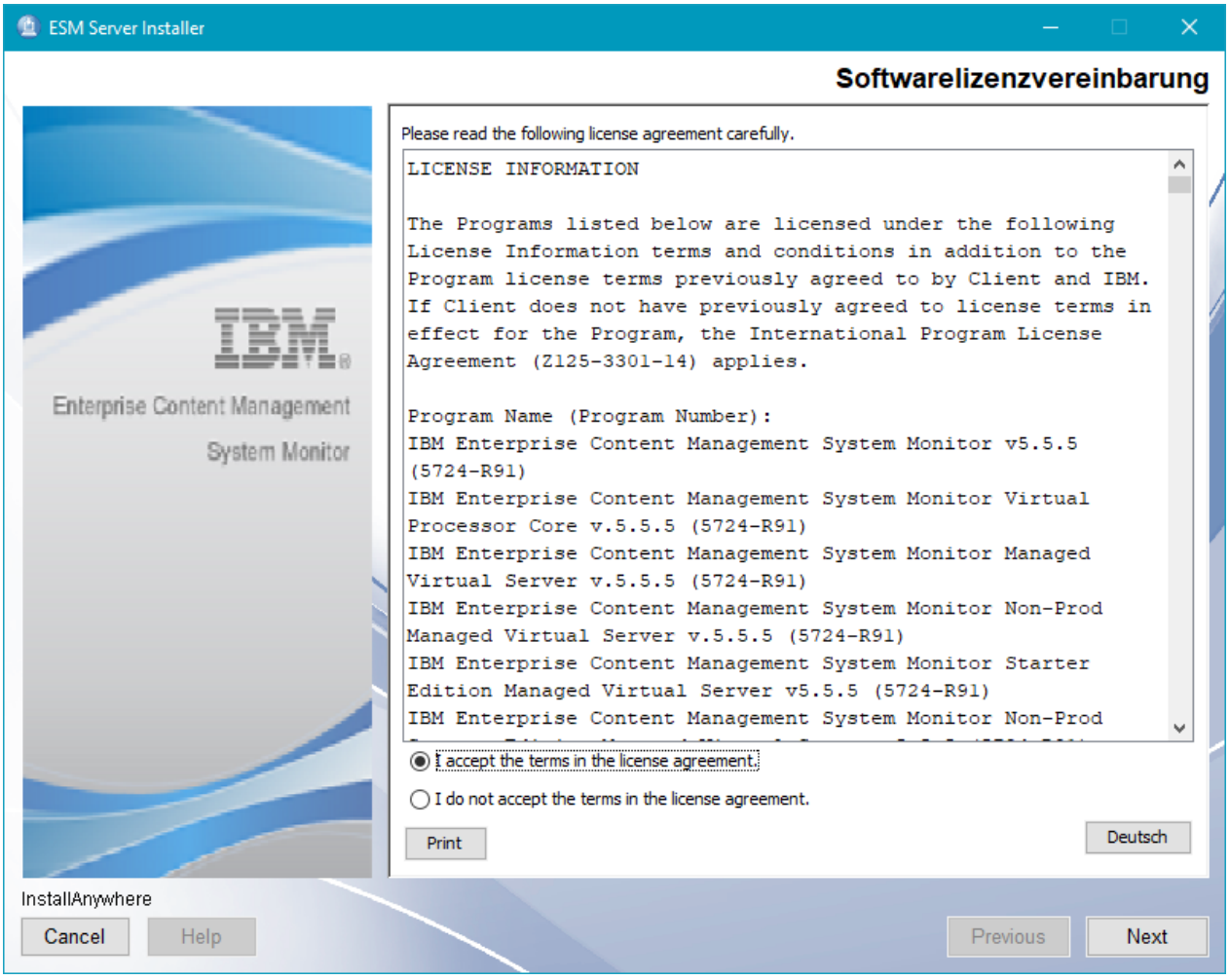

Image of Software License Agreement

- The next window is "Welcome to ESM Server". It shows some information about the installation. Click "Next" to proceed.

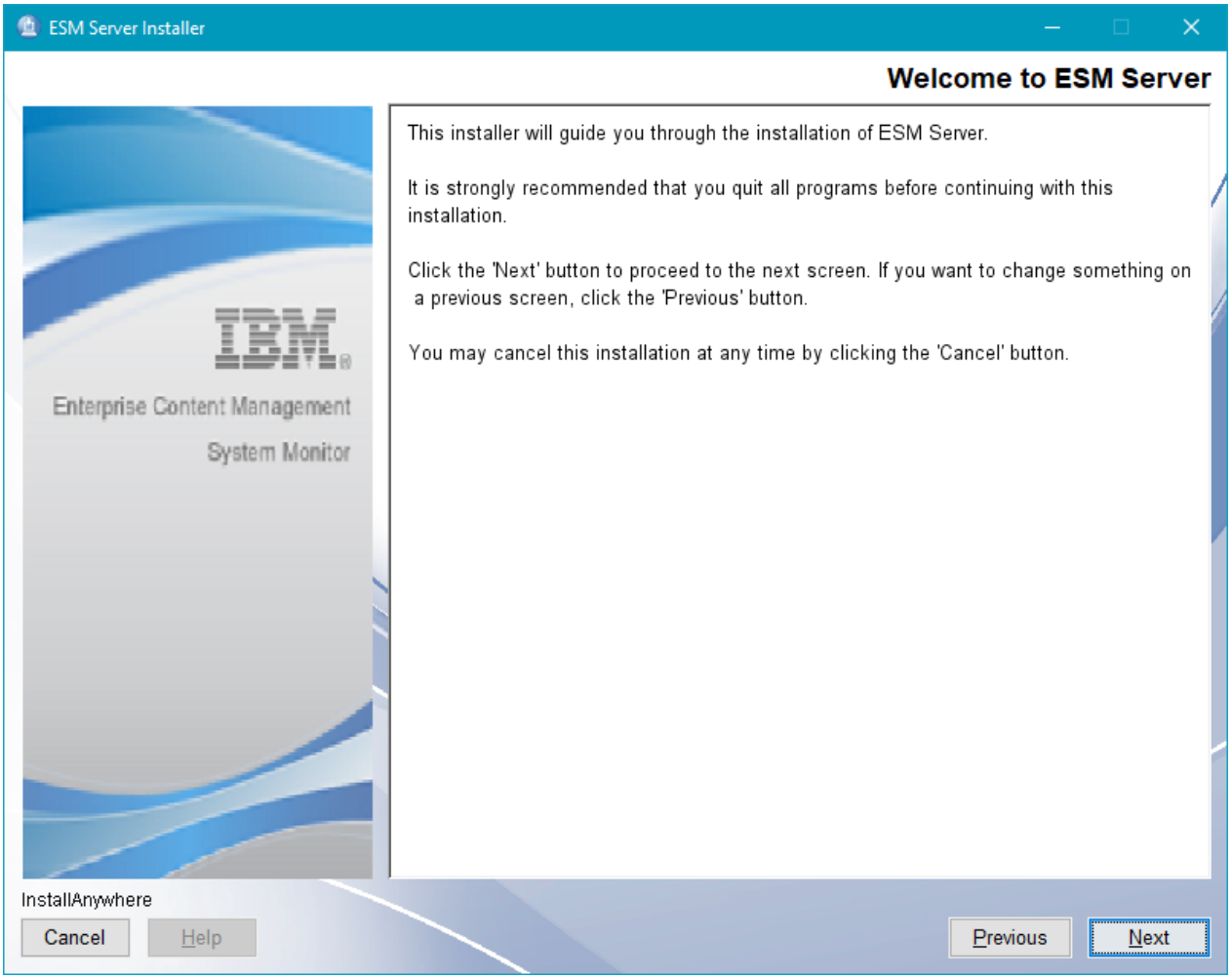

Image of Welcome to ESM Server

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `C:\Program Files\IBM\ESM\Server`. Click "Next" to proceed.

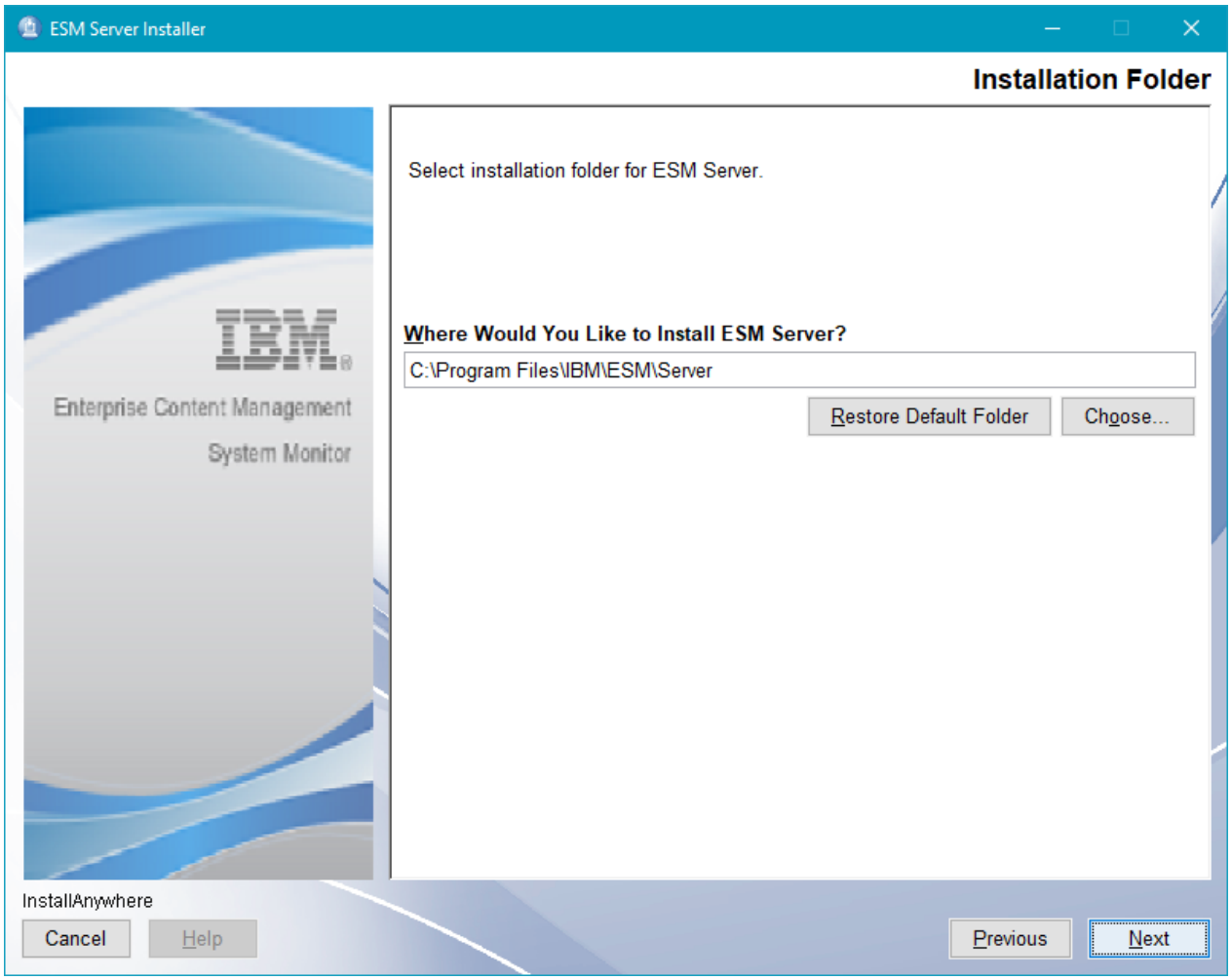

Image of Choose Installation Folder

- The next window is "Server Settings". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Hostname

  Default: *<server name>*

  Server IP

  Default: *0.0.0.0*

  MQTT Port

  Default: *1883*

  HTTP Port

  Default: *80*

  HTTPS

  Default: *Enabled*

  HTTPS Port

  Default: *443*

RMI Registry Port

Default: *1099*

RMI Server Port

Default: *44444*

SSH Port

Default: *8101*

Image of Server Settings

- The next window is "Configuration Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation. In addition if the connection is established with an LDAP account. The service needs to be started with this account and for MSSQL the matching auth.dll must be copied to <Installation-Dir>/karaf/lib/wrapper. Start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

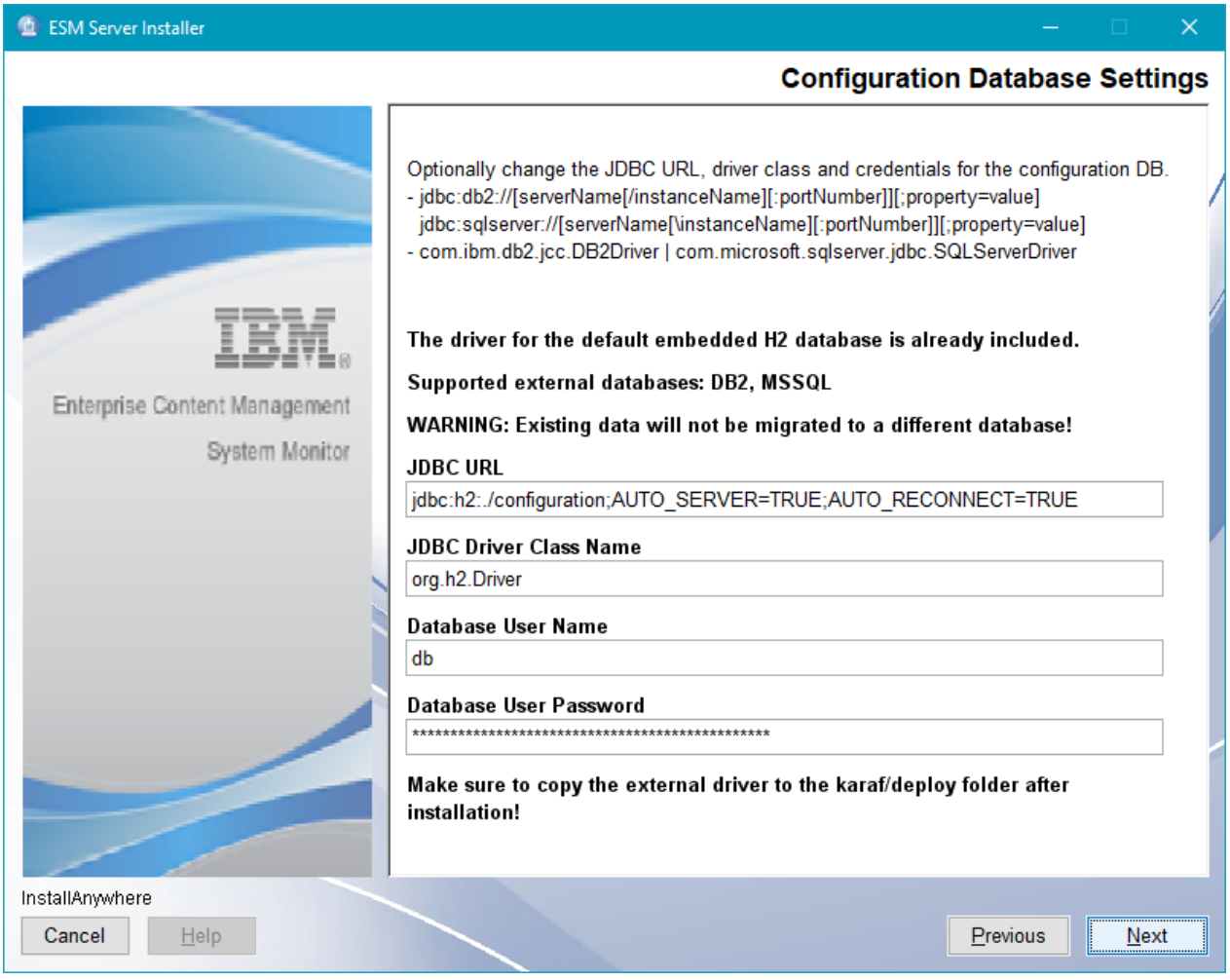

Image of Configuration Database Settings

- The next window is "Monitoring Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation. In addition if the connection is established with an LDAP account. The service needs to be started with this account and for MSSQL the matching auth.dll must be copied to <Installation-Dir>/karaf/lib/wrapper. Start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

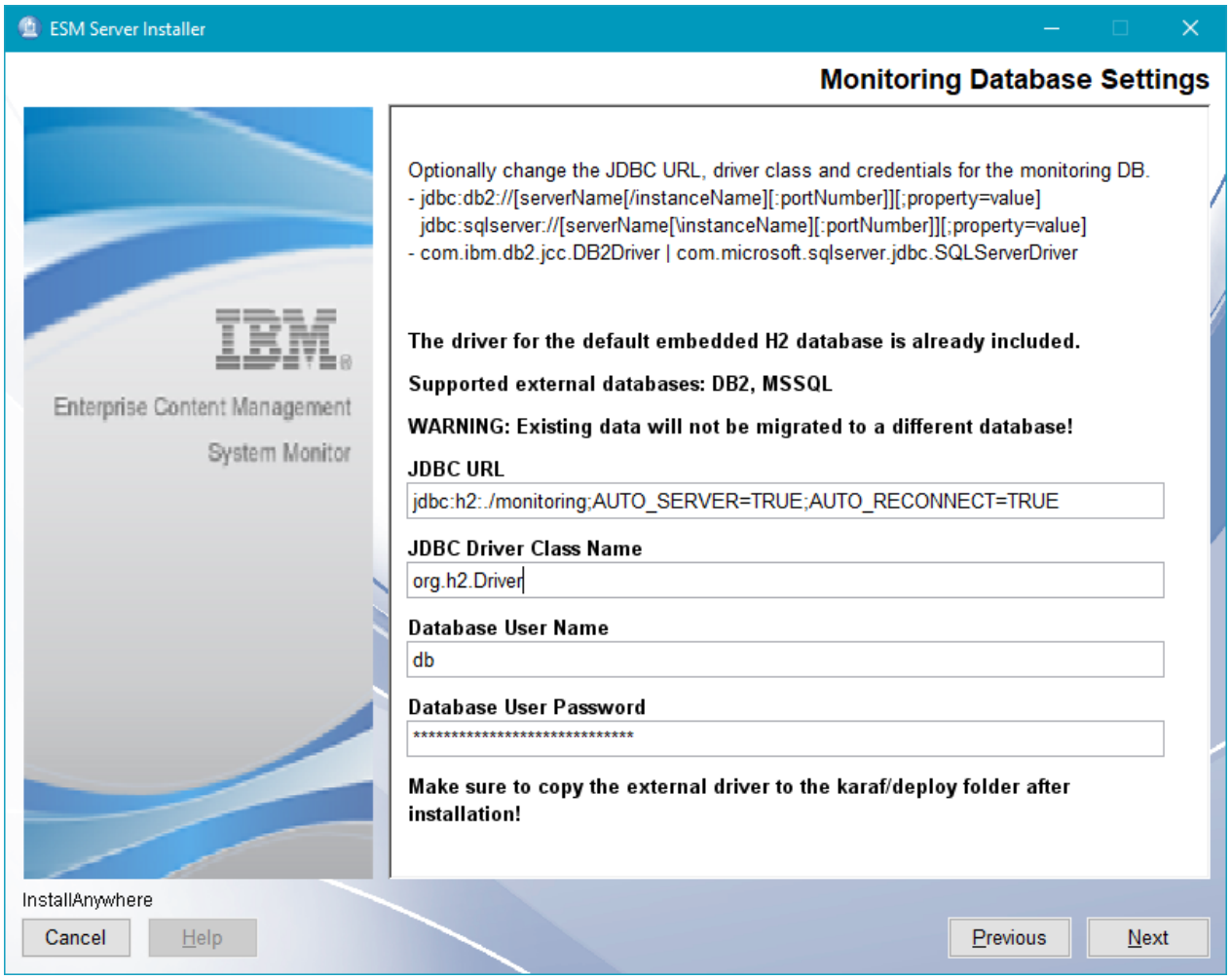

Image of Monitoring Database Settings

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Server after Installation

  Default: Yes = checked

NOTE For DB2 based installation, do not choose the start after installation. Additional steps need to be performed before the software can be started correct. See more at the end of this chapter.

Start ESM Server at OS Start

Default: Yes = unchecked

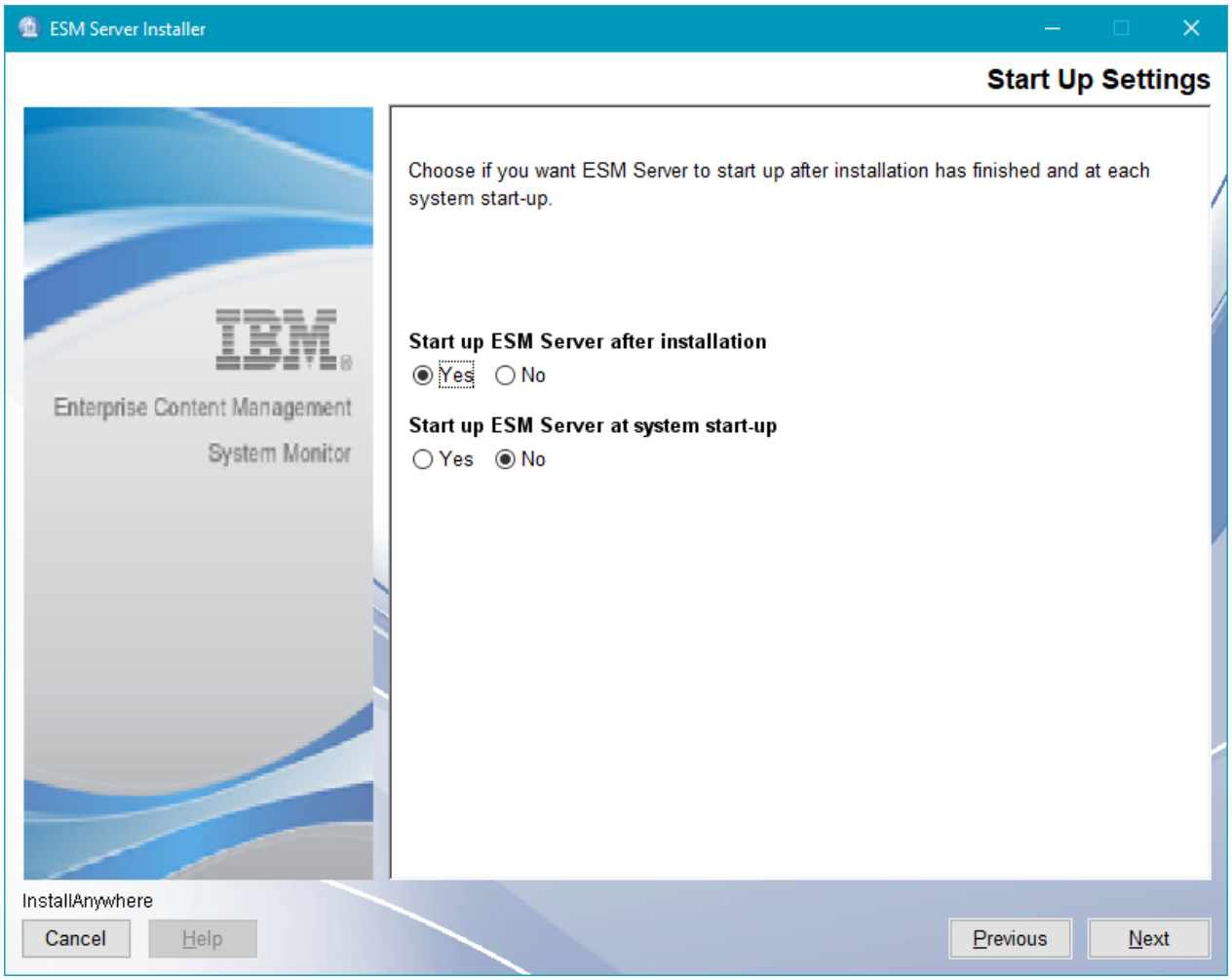

Image of Autostart and Systemstart

- The next window is "Service Installation". The following parameters can be specified. Click "Next" to proceed.

  Re-Install ESM Server Service

  Default: No = checked

NOTE This Window will only be shown if the OS is Windows, the installation is a update installation and a service is used in the previous installation already.

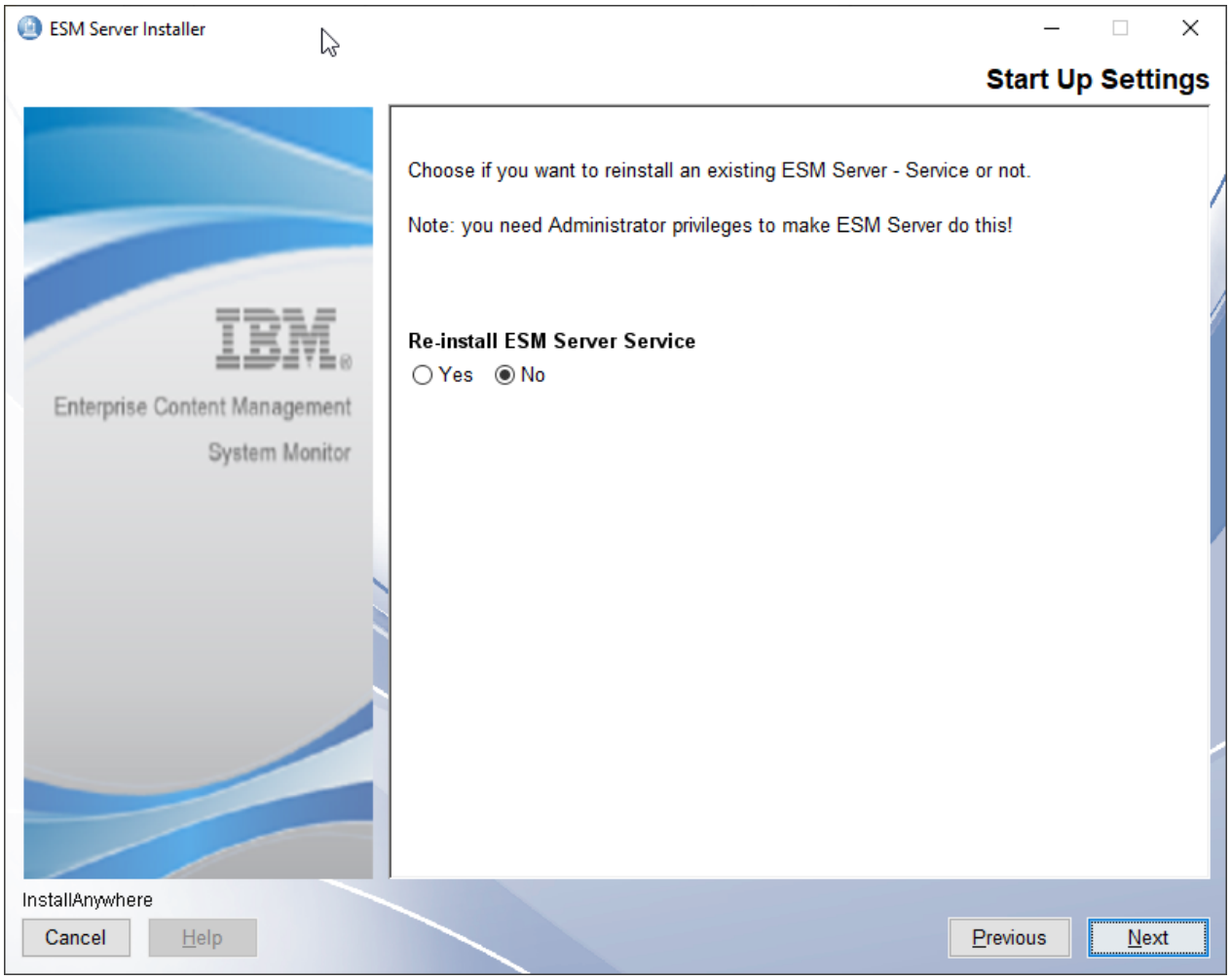

Image of Service Installation

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

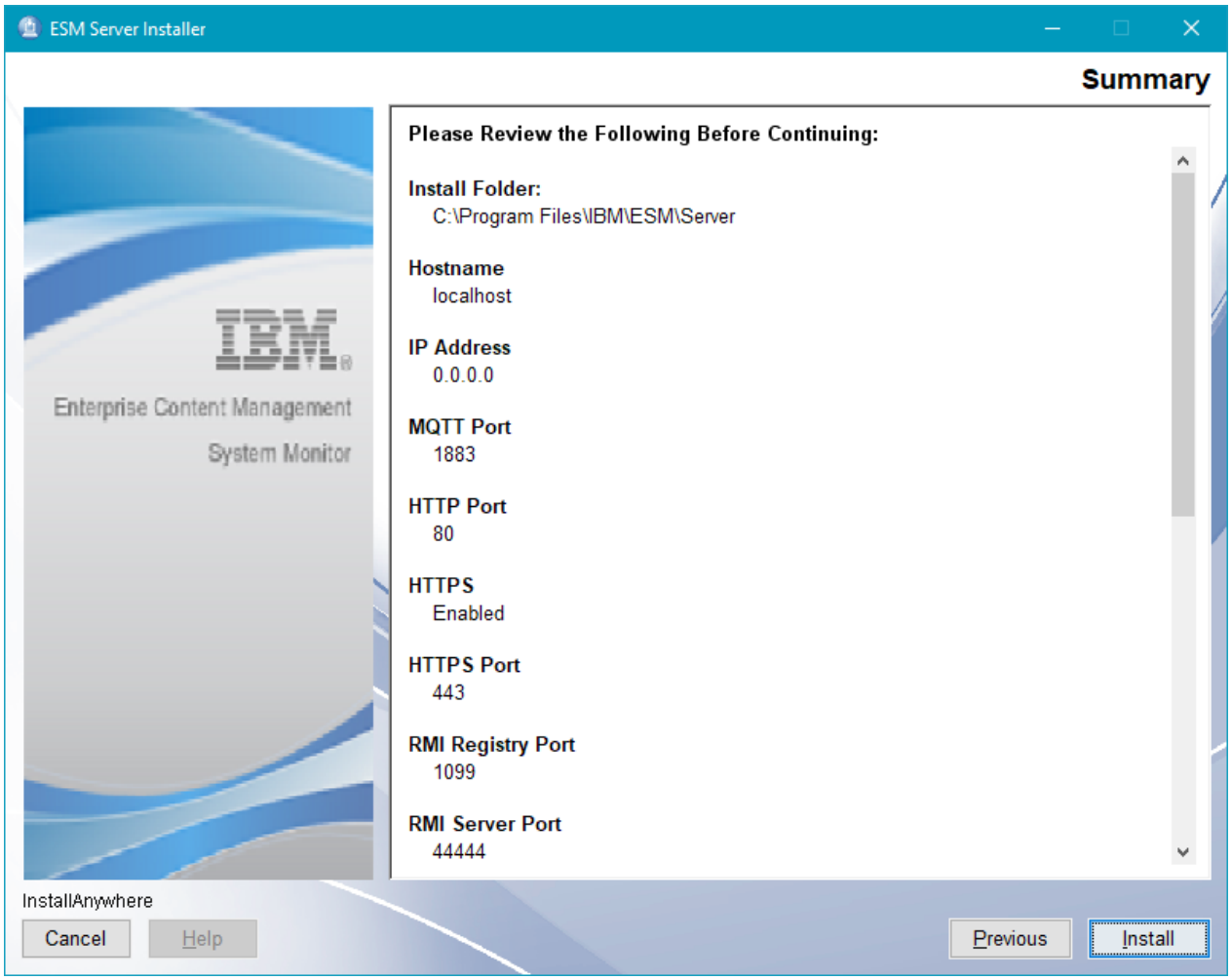

Image of Pre-Installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

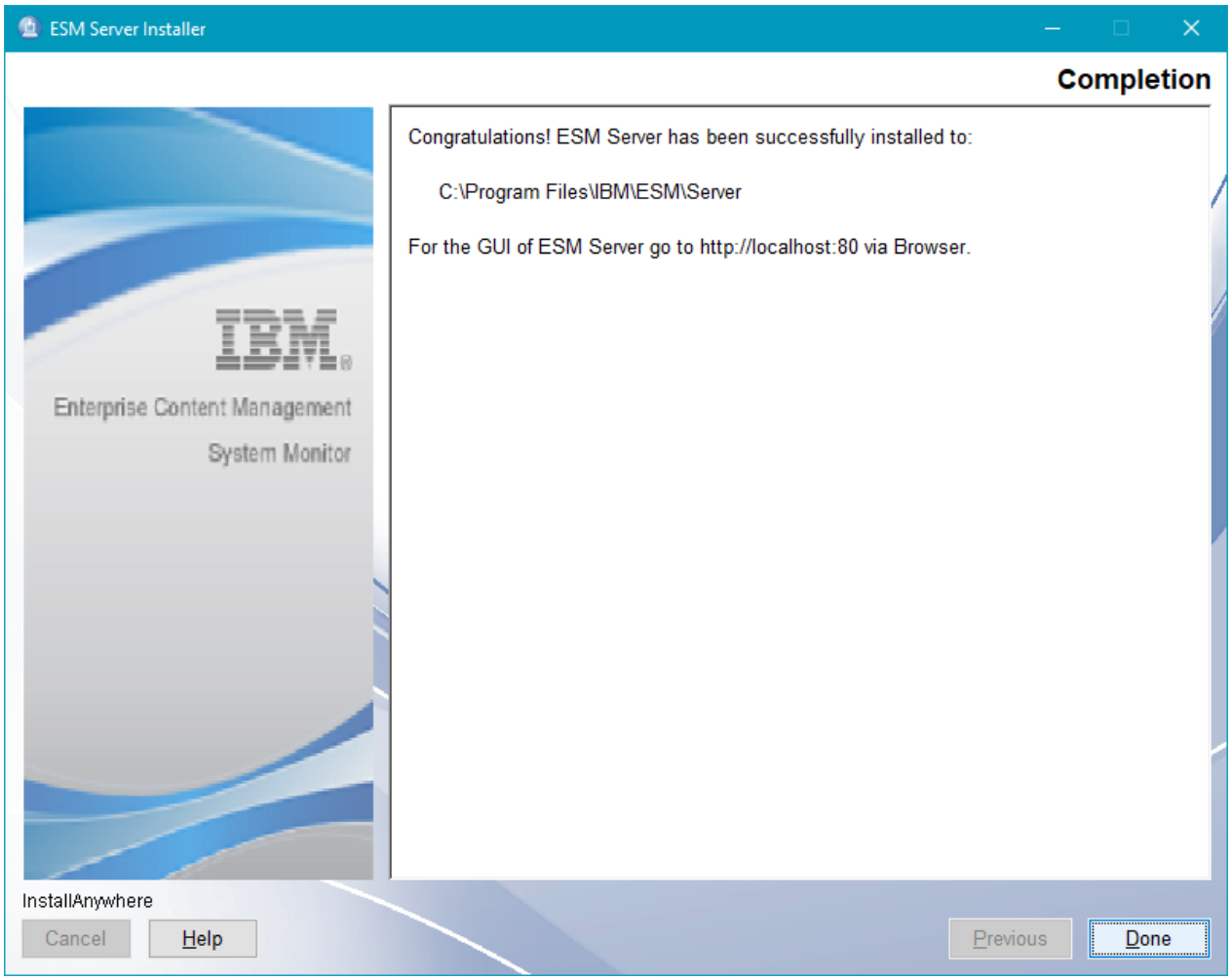

Image of Installation Complete

Linux based server

IMPORTANT Ports < 1000 will only work for root based installations

- Start the installation by executing the file "ESM_Server_Installer.bin"
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

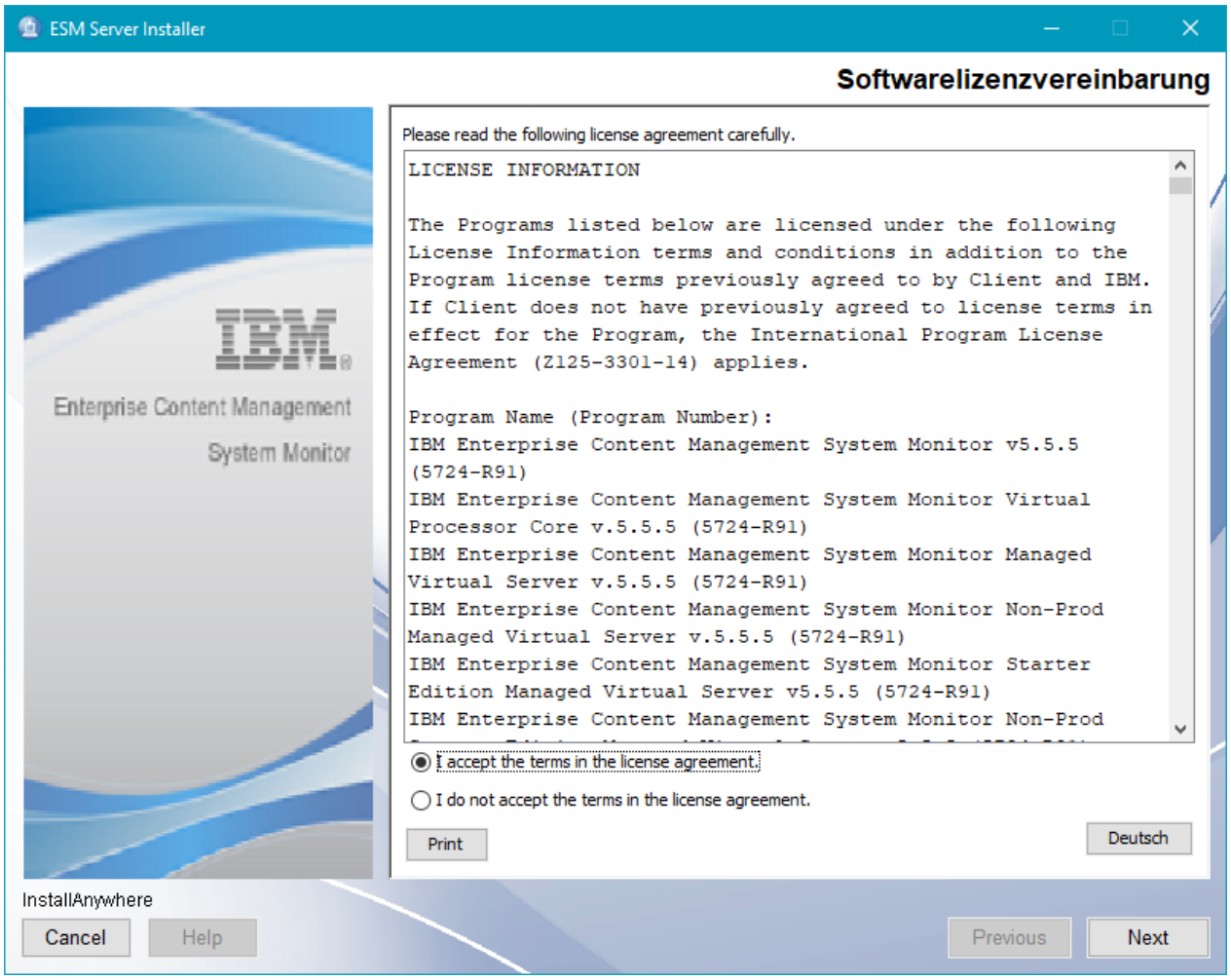

Image of Software License Agreement

- The next window is "Welcome to ESM Server". It shows some information about the installation. Click "Next" to proceed.

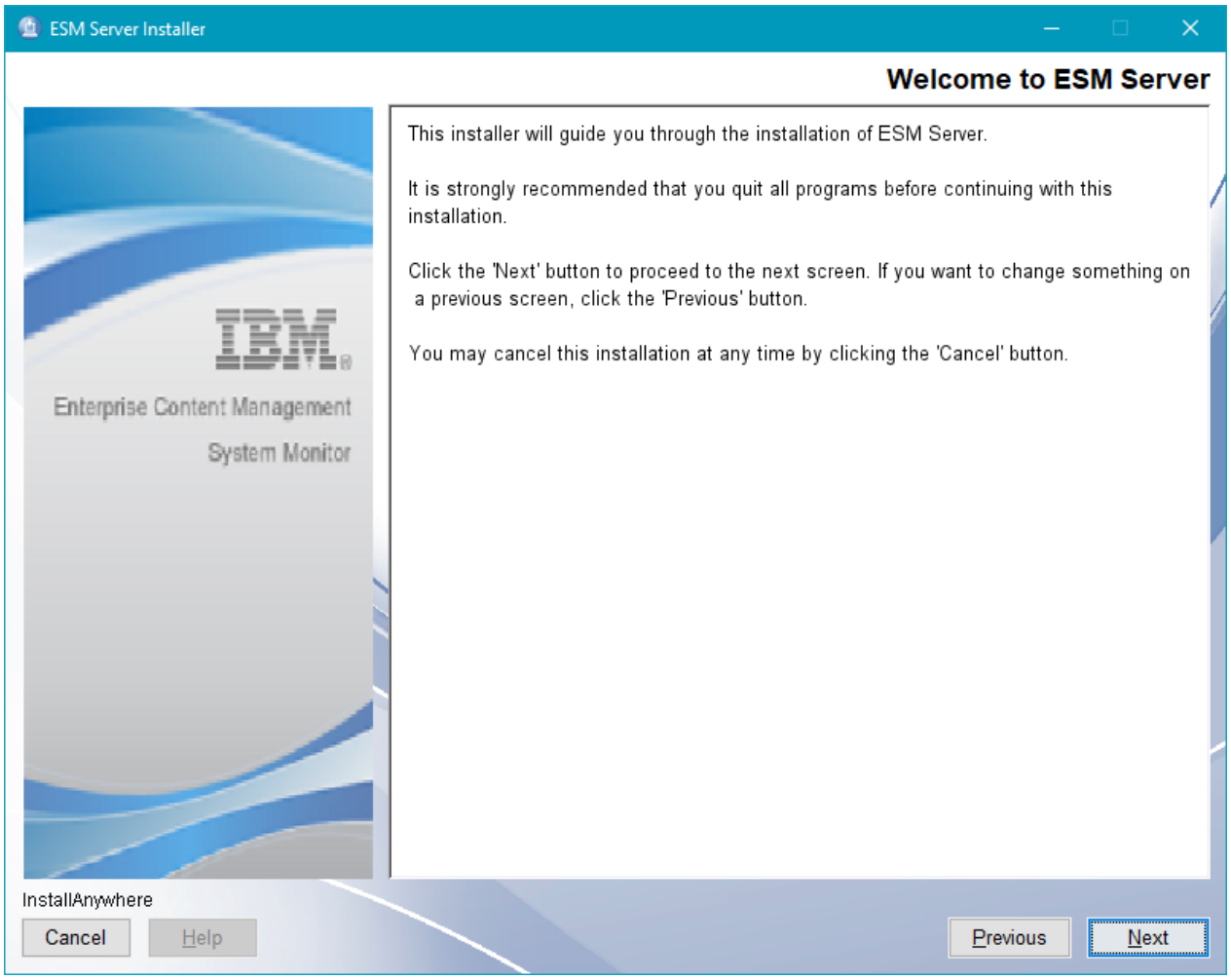

Image of Welcome to ESM Server

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `/opt/IBM/ESM/Server`. Click "Next" to proceed.

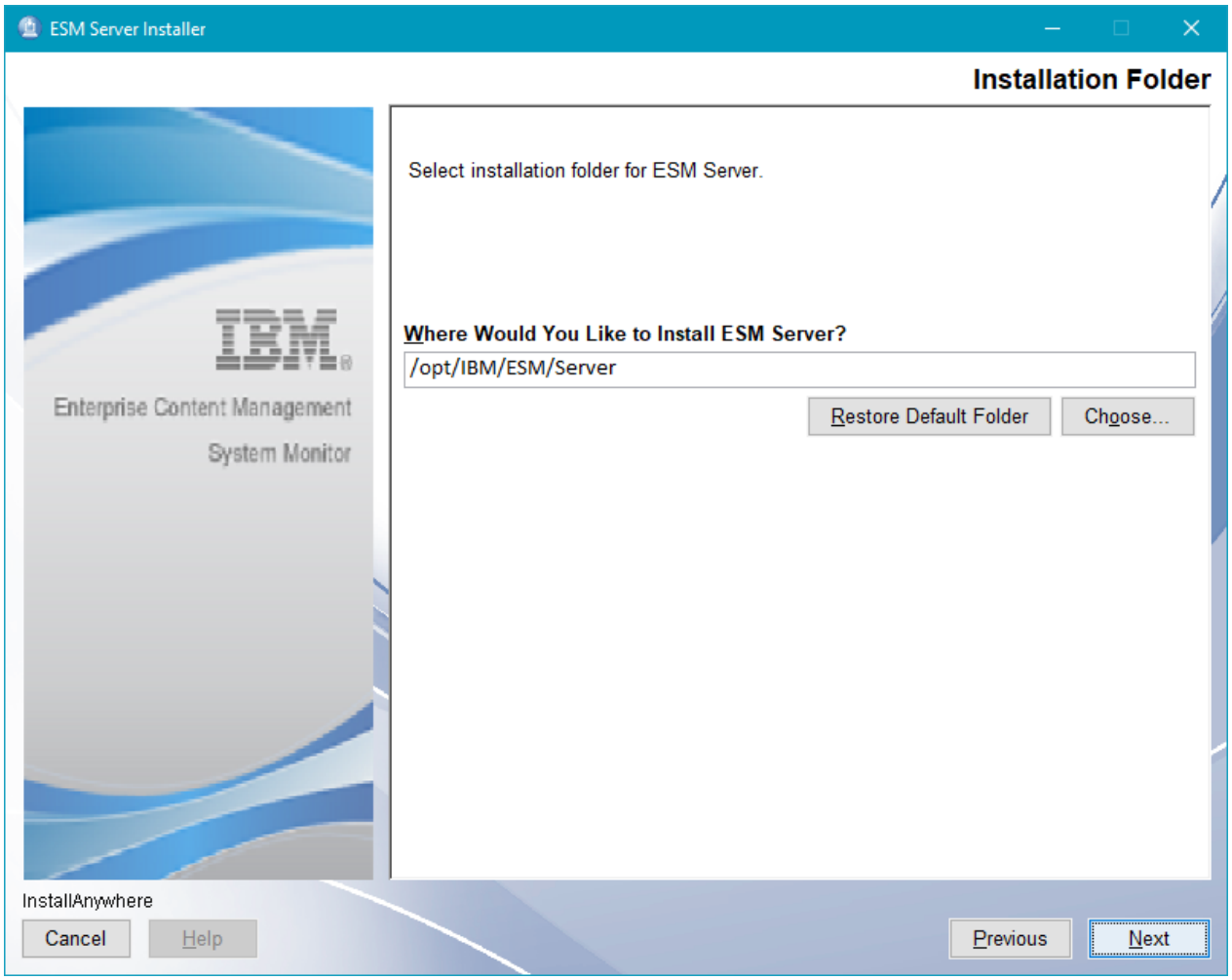

Image of Choose Installation Folder

- The next window is "Server Settings". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Hostname

  Default: *<server name>*

  Server IP

  Default: *0.0.0.0*

  MQTT Port

  Default: *1883*

  HTTP Port

  Default: *80*

  HTTPS

  Default: *Enabled*

  HTTPS Port

  Default: *443*

RMI Registry Port

Default: *1099*

RMI Server Port

Default: *44444*

SSH Port

Default: *8101*

Image of Server Settings

- The next window is "Configuration Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation and start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

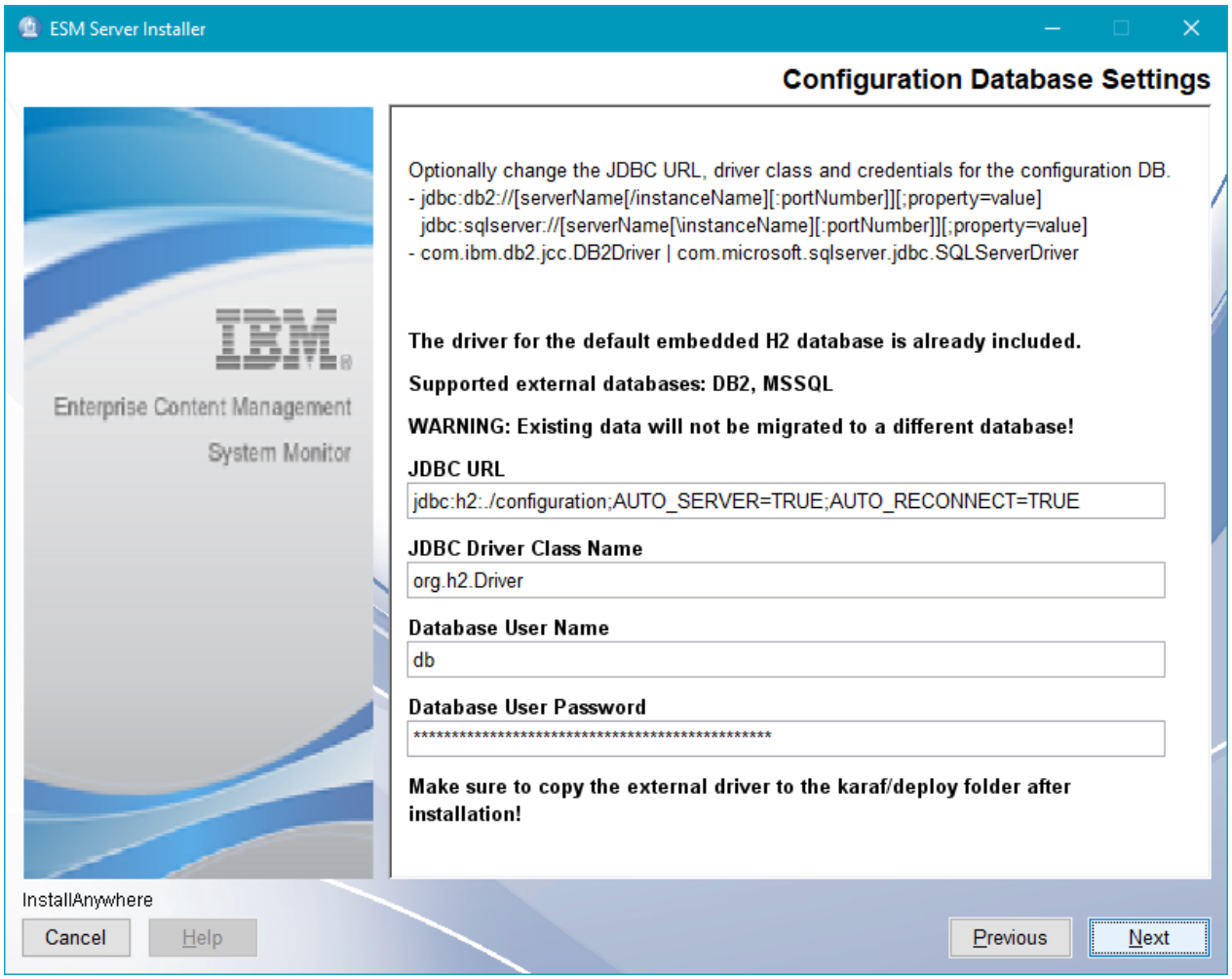

Image of Configuration Database Settings

- The next window is "Monitoring Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation and start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

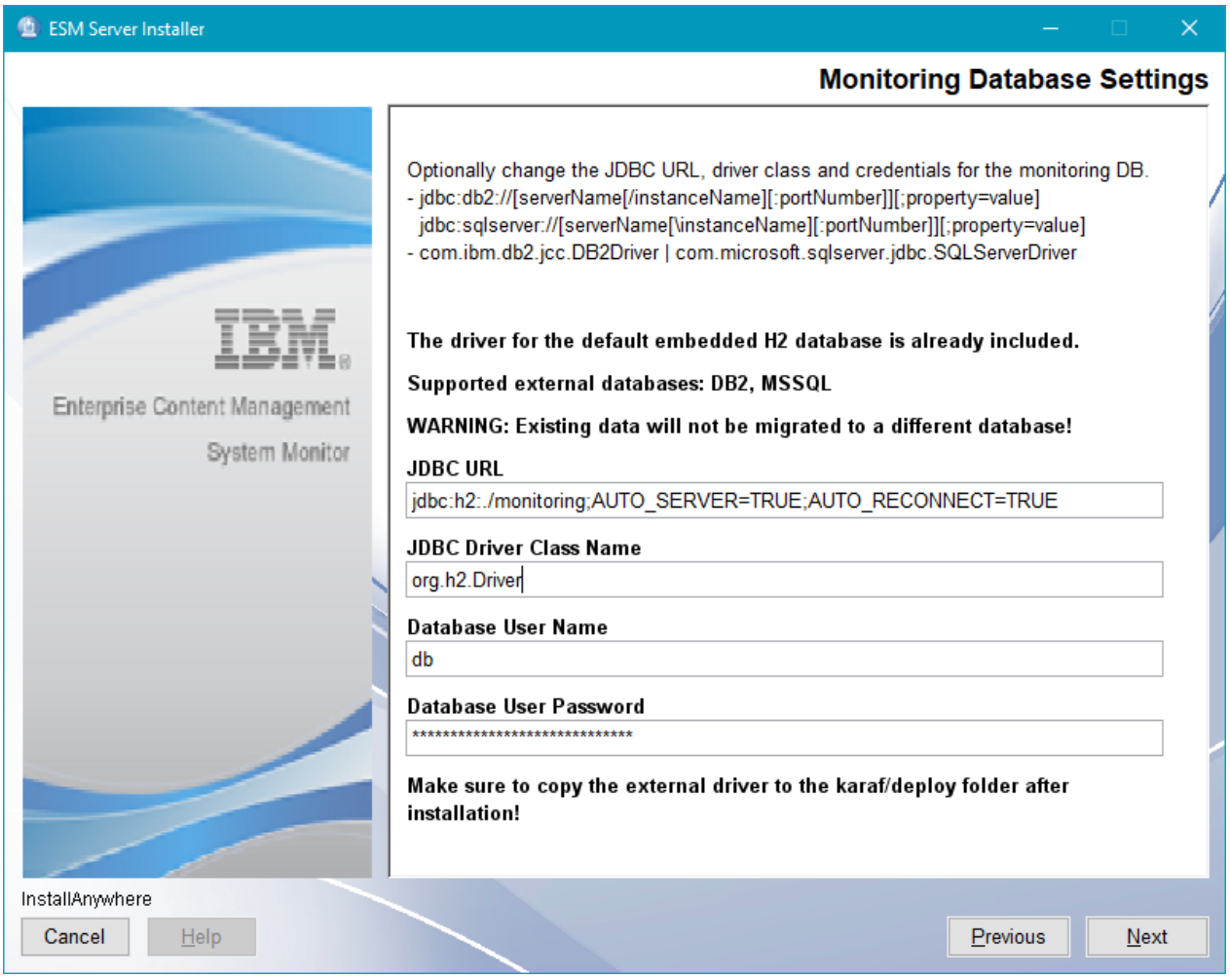

Image of Monitoring Database Settings

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Server after Installation

  Default: Yes = checked

NOTE

For DB2 based installation, do not choose the start after installation. Additional steps need to be performed before the software can be started correct. See more at the end of this chapter.

Start ESM Server at OS Start

Default: Yes = unchecked

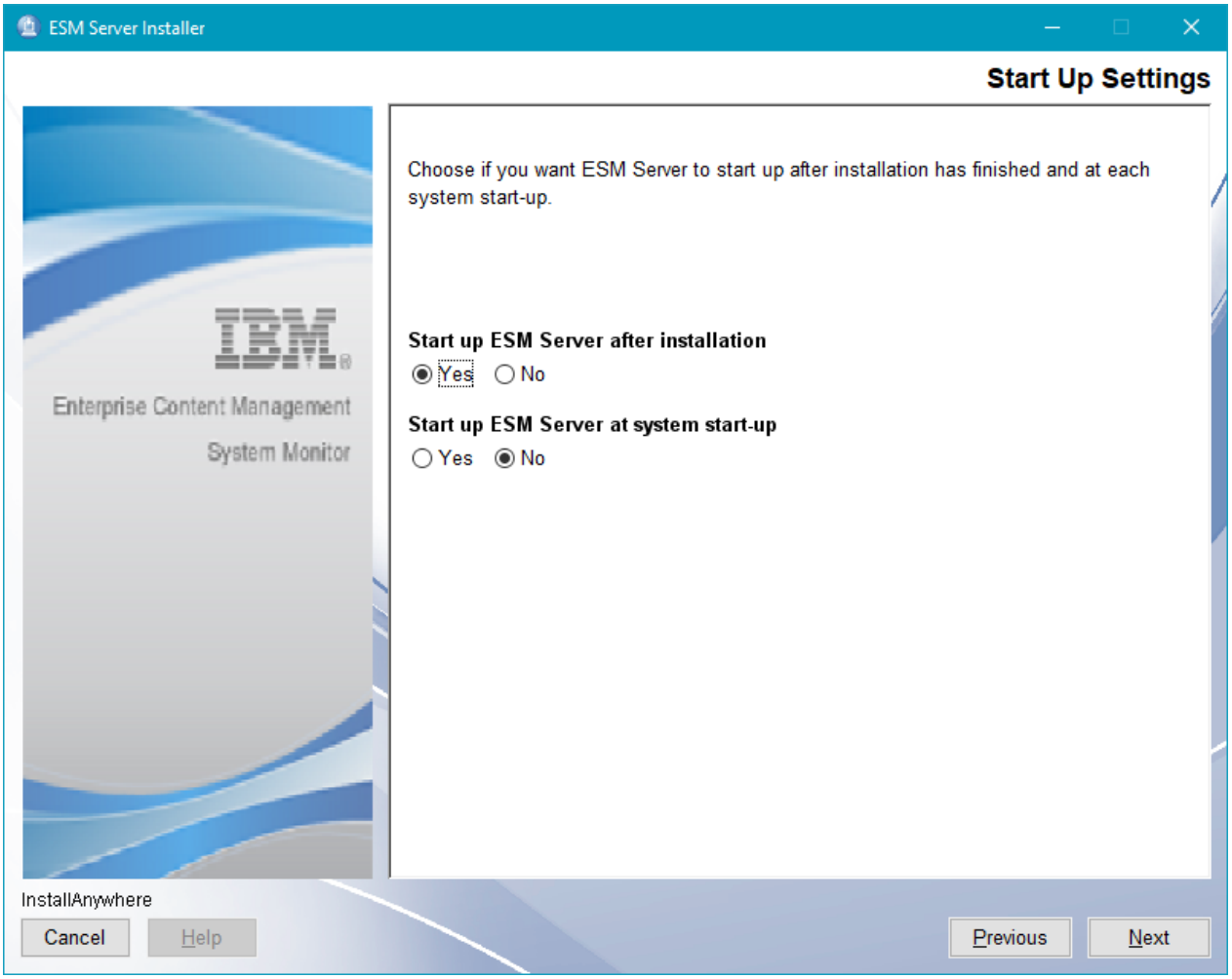

Image of Autostart and Systemstart

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

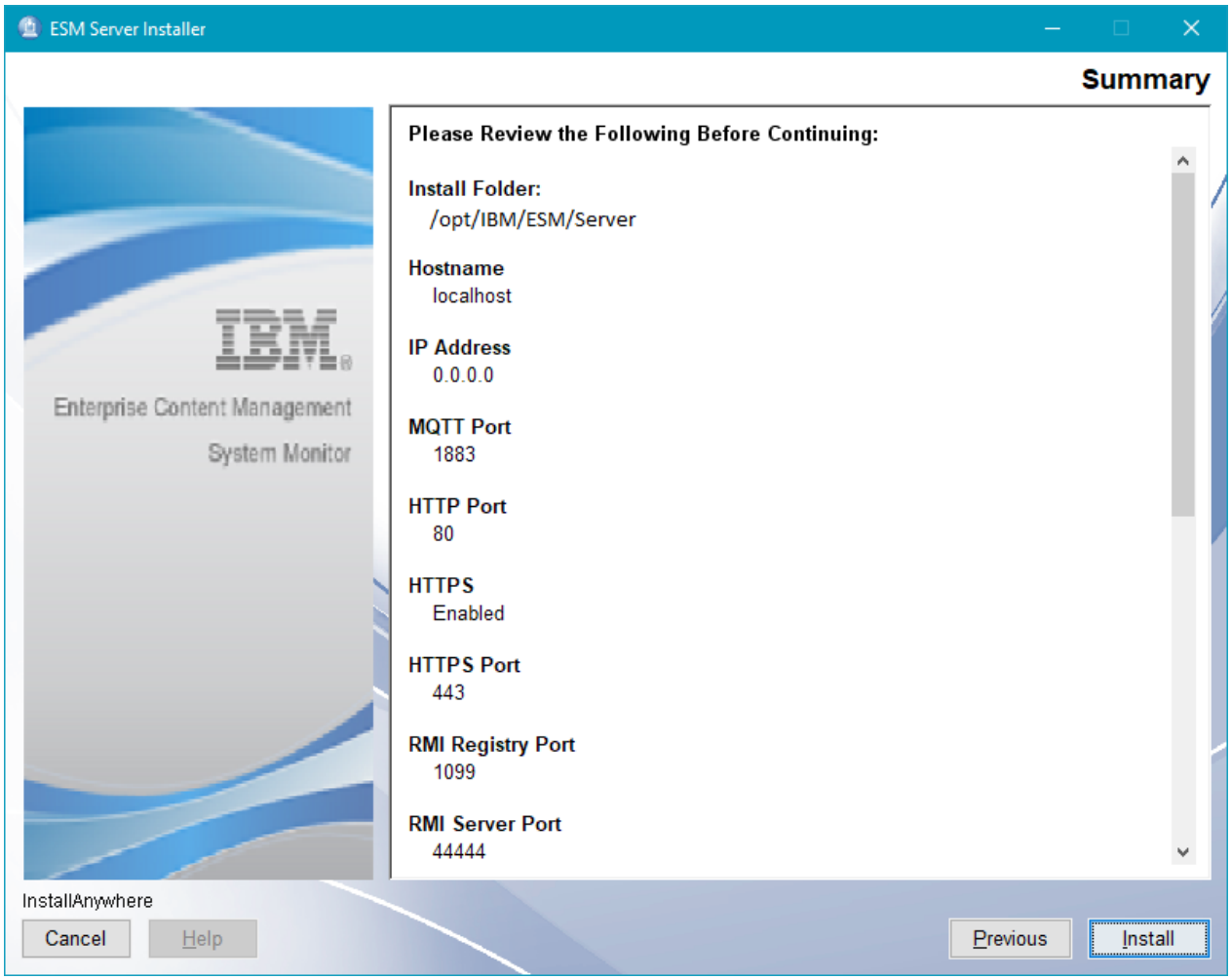

Image of Pre-Installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

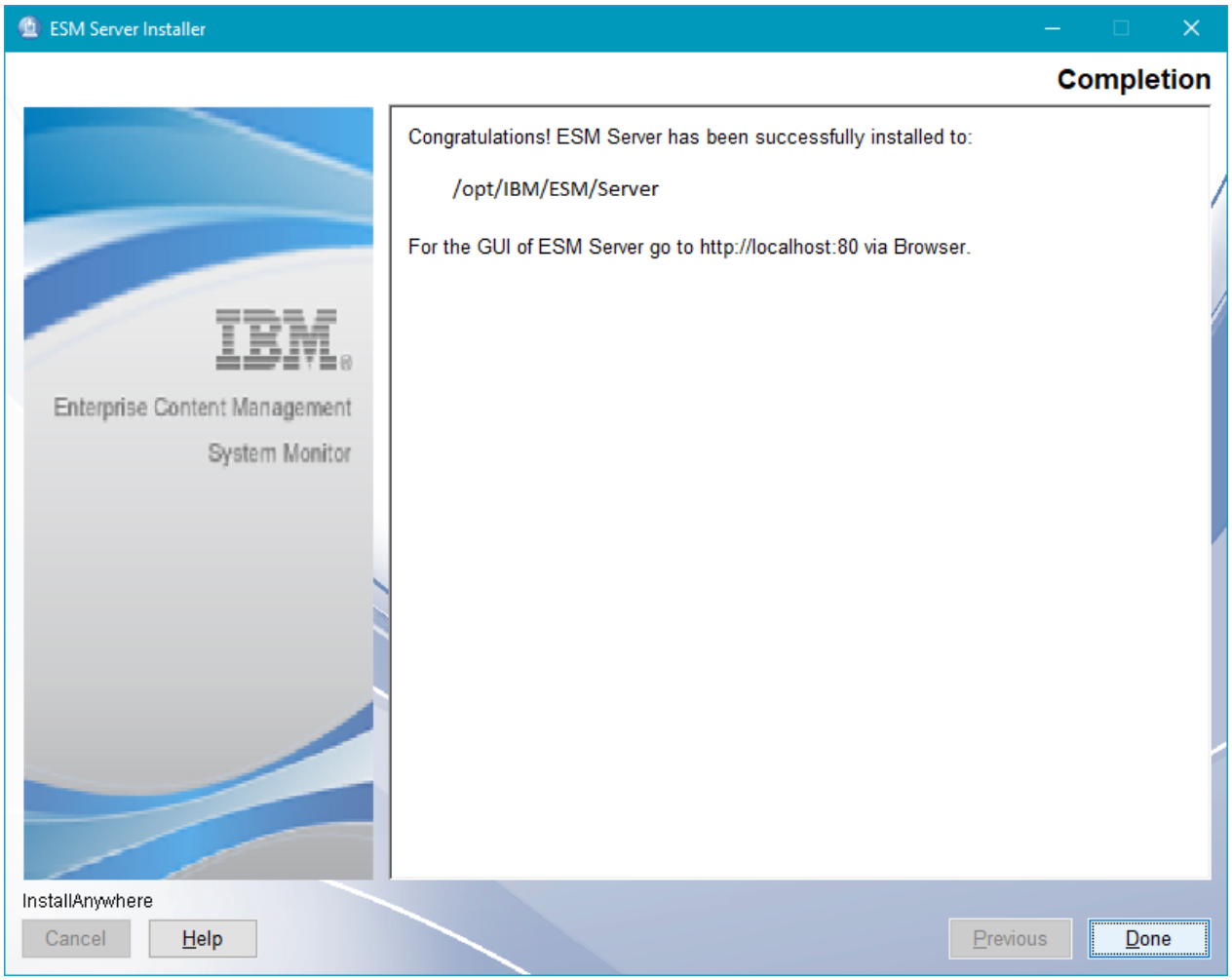

Image of Installation Complete

IMPORTANT If the installation was done with DB2, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy and start the software afterwards.

AIX based server

IMPORTANT Ports < 1000 will only work for root based installations

IMPORTANT Large page support must be activated before the product can be installed.

NOTE

In some cases we have seen issues when installing on AIX. Typically you can see an error message that "Graphical Installers are not supported by th VM". This is often combined with the context "User interface mode not supported" and "Unable to load and to prepare the installer in console or silent mode."

If that happens, try to unset the LIBPATH and DISPLAY variable and run the installer in silent or console mode. A typical cause is that the LIBPATH is set to /opt/freeware/lib as first entry.

- Start the installation by executing the file "ESM_Server_Installer.bin"
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

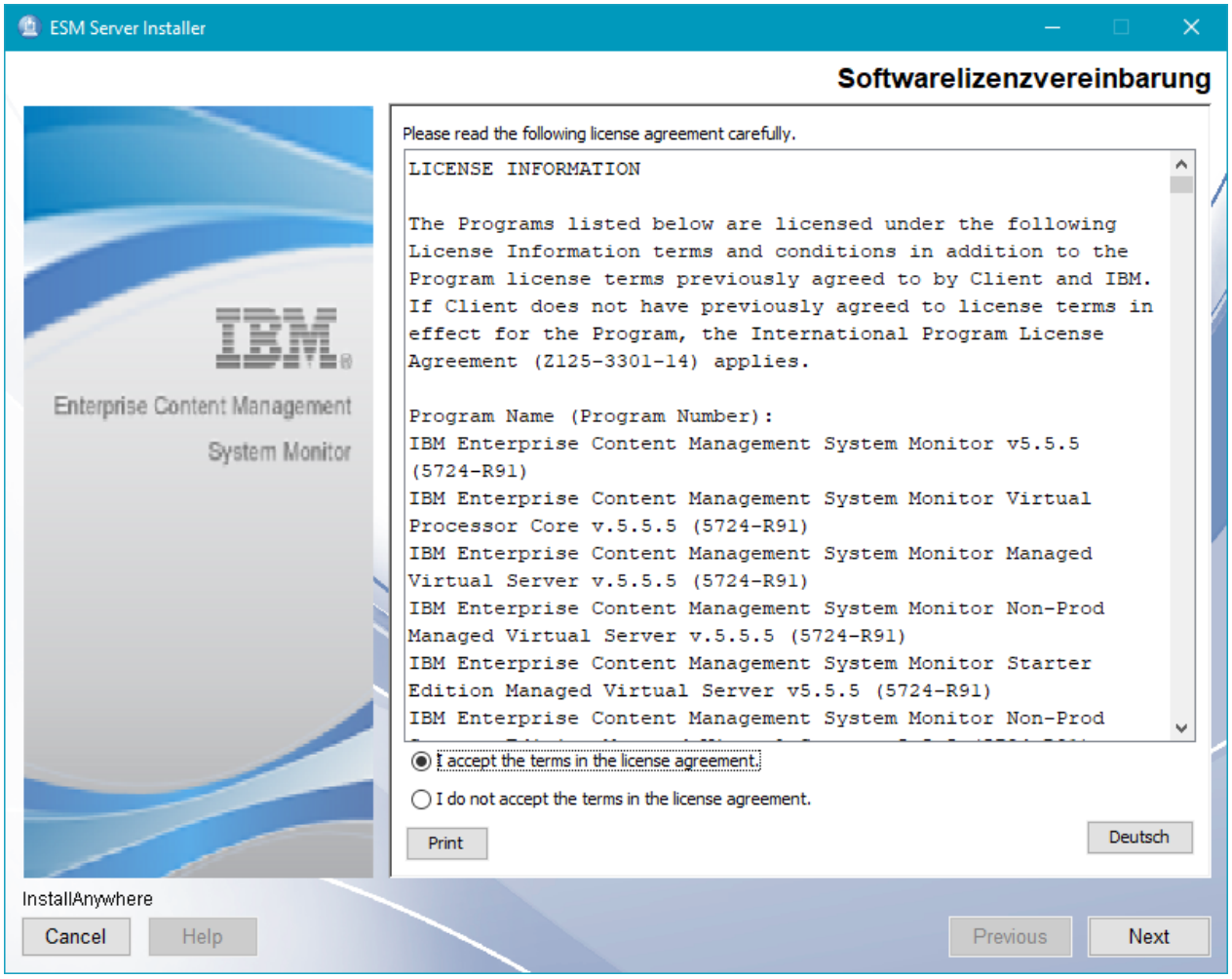

Image of Software License Agreement

- The next window is "Installation of ESM Server". It shows some information about the installation. Click "Next" to proceed.

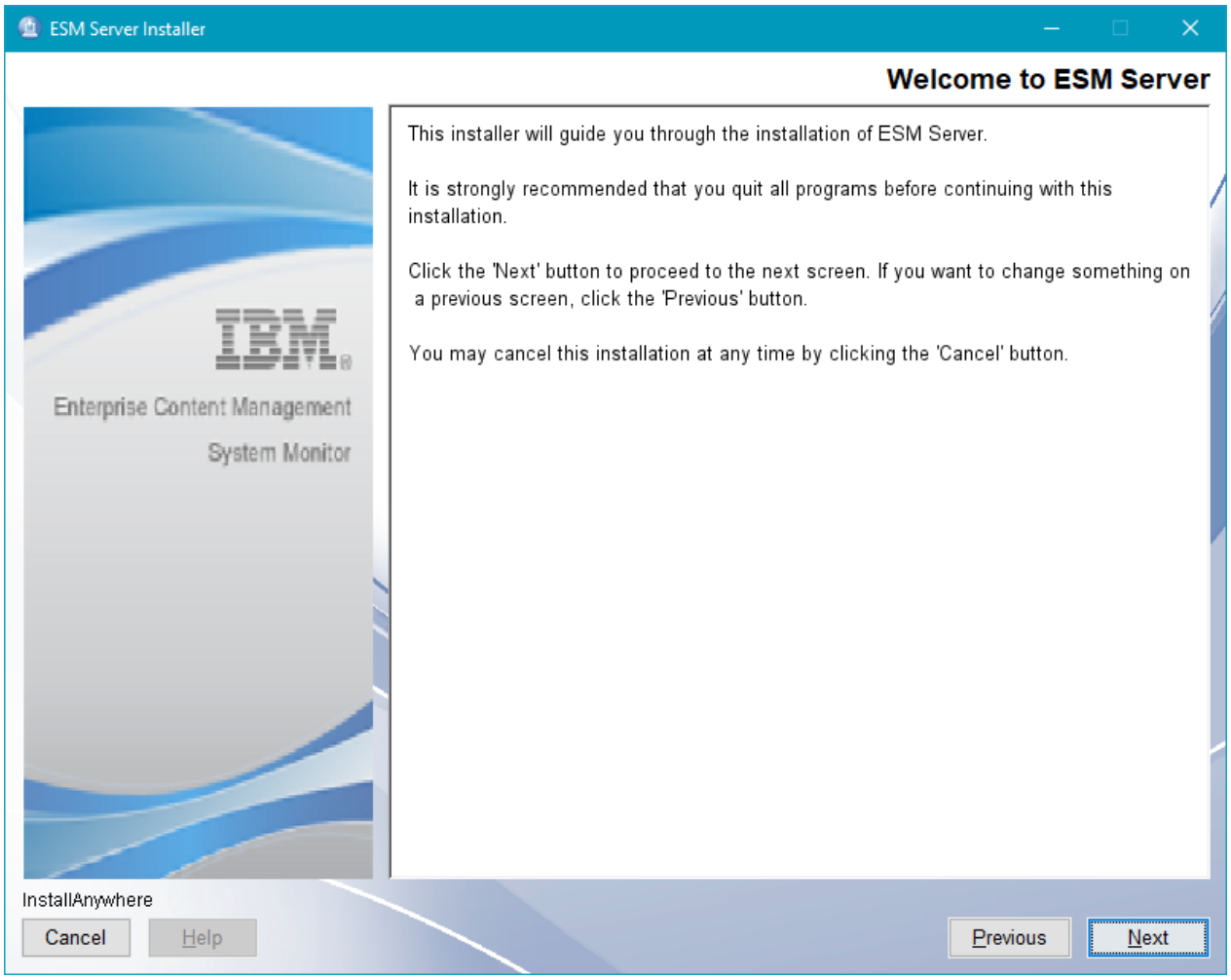

Image of Installation of ESM Server

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `/opt/IBM/ESM/Server`. Click "Next" to proceed.

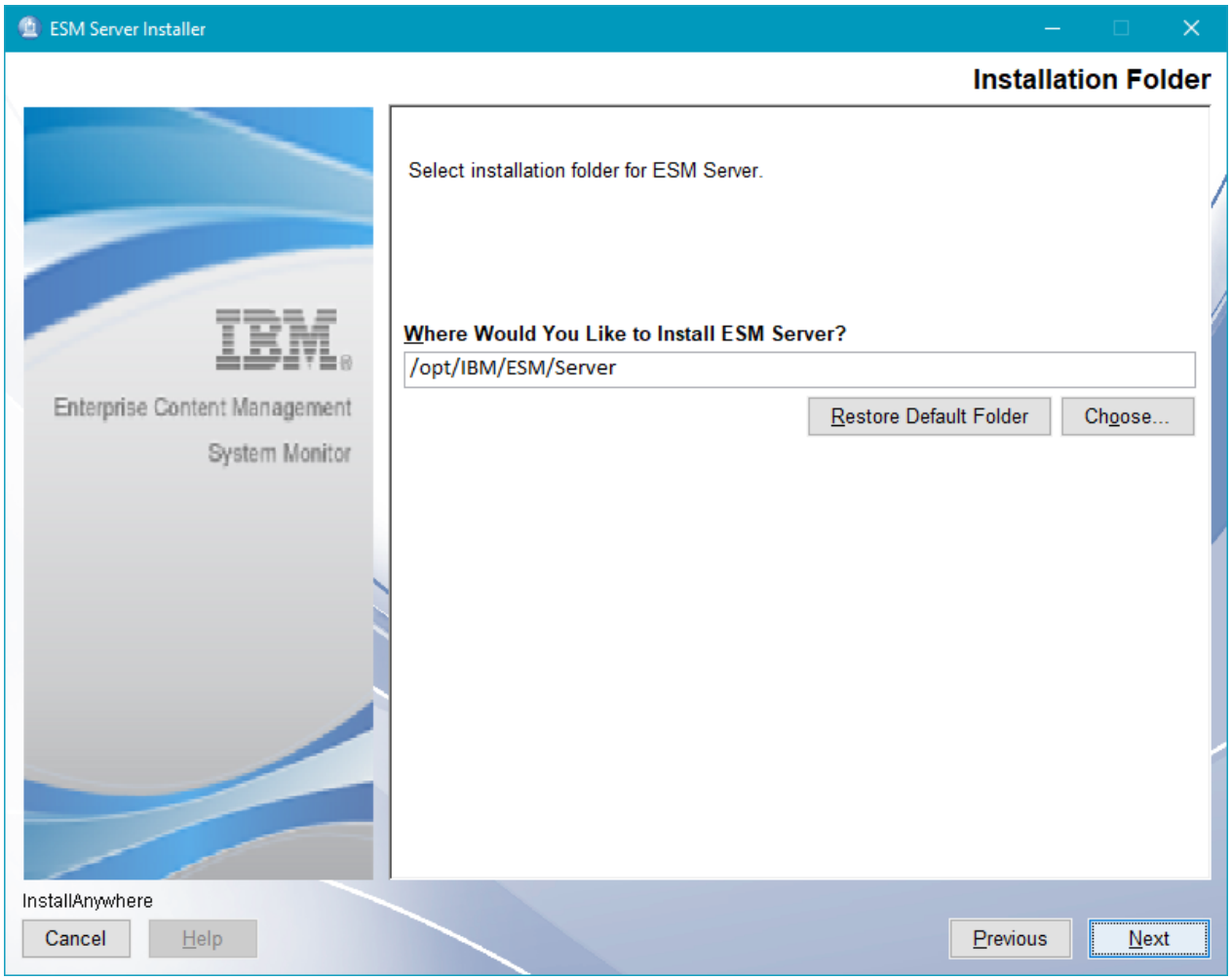

Image of Choose Installation Folder

- The next window is "Server Settings". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Hostname

  Default: *<server name>*

  Server IP

  Default: *0.0.0.0*

  MQTT Port

  Default: *1883*

  HTTP Port

  Default: *80*

  HTTPS

  Default: *Enabled*

  HTTPS Port

  Default: *443*

RMI Registry Port

Default: *1099*

RMI Server Port

Default: *44444*

SSH Port

Default: *8101*

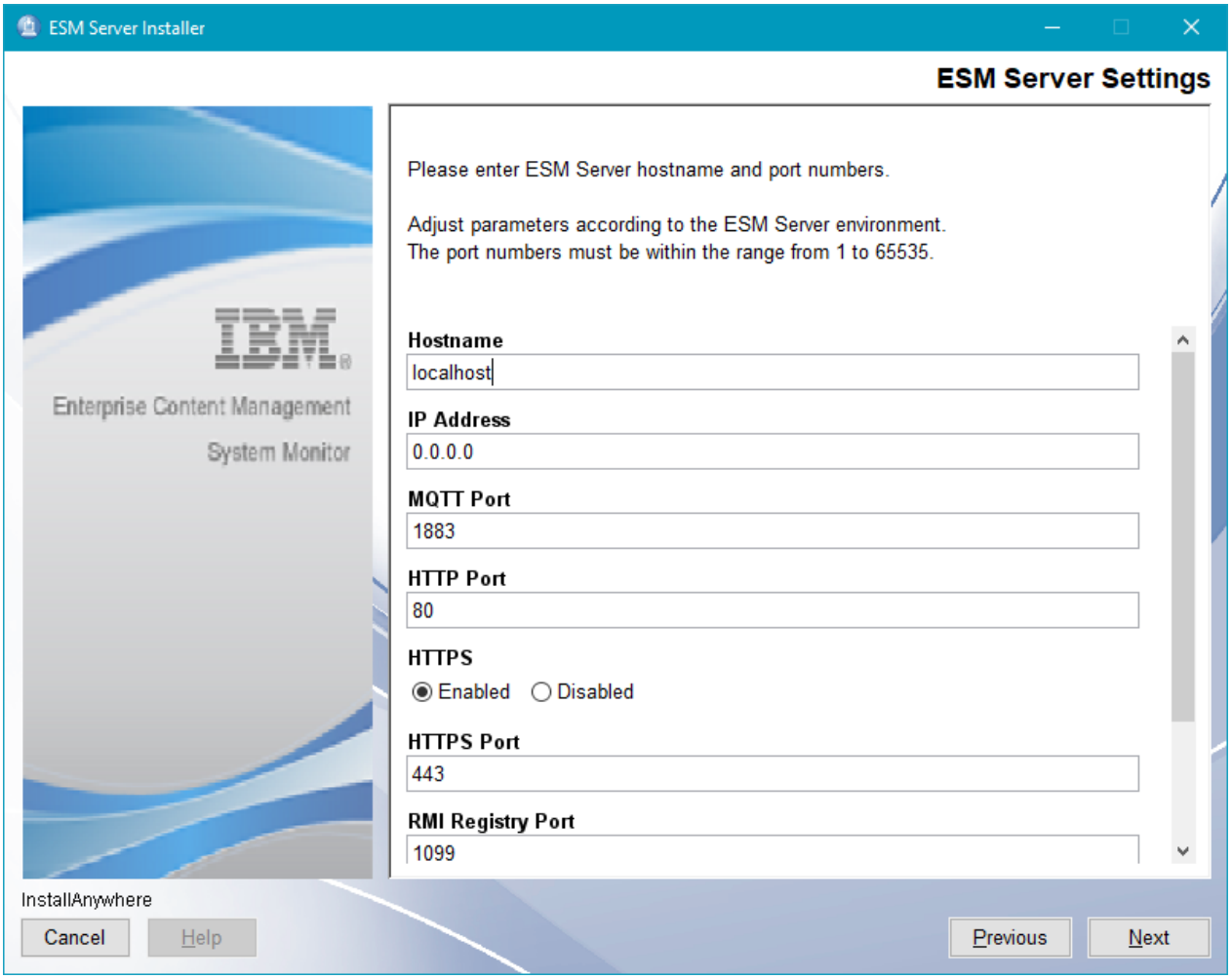

Image of Server Settings

- The next window is "Configuration Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation and start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

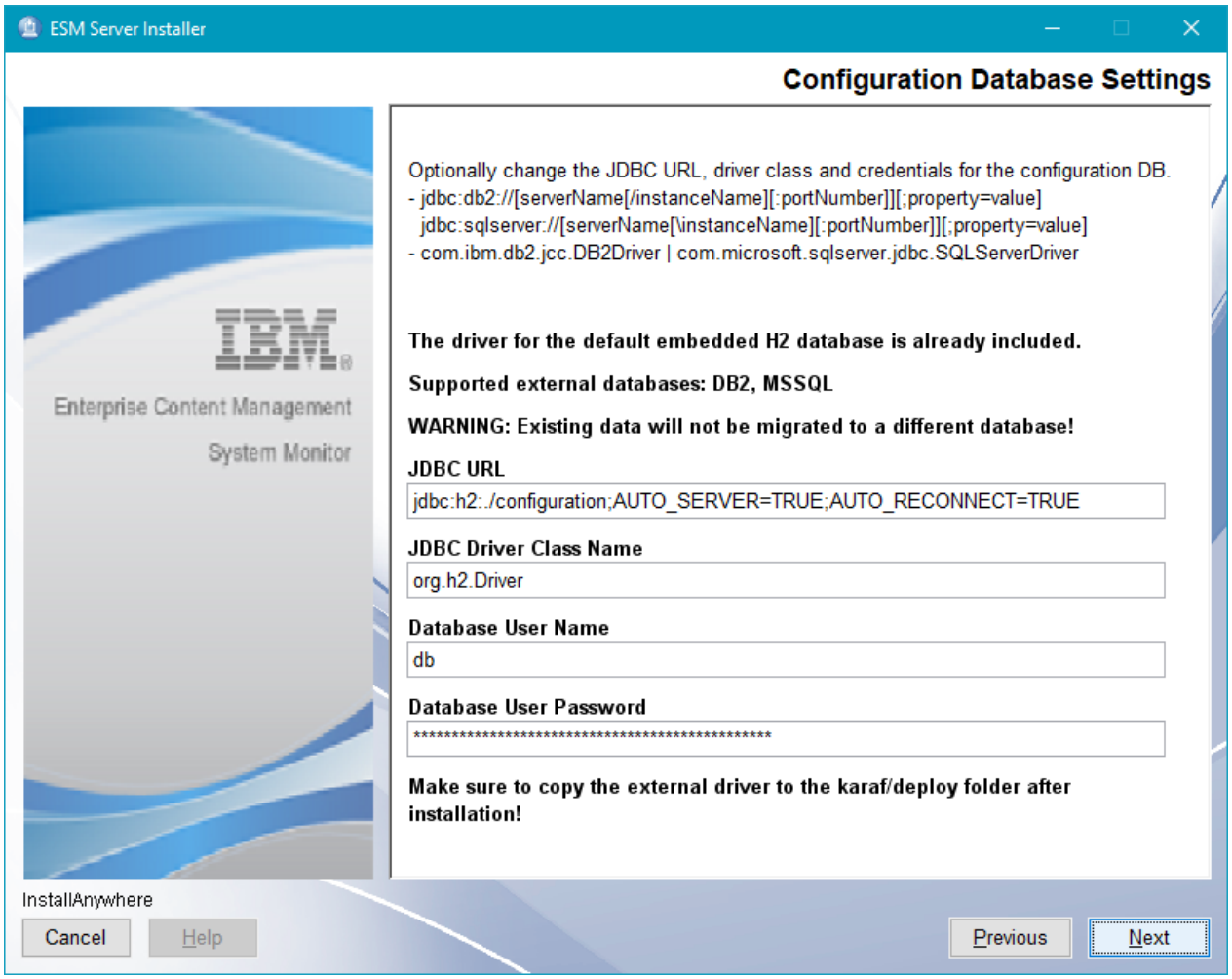

Image of Configuration Database Settings

- The next window is "Monitoring Database Settings". The default settings are for usage with the internal H2 DB. DB2 and MSSQL is possible as well.

IMPORTANT

If the installation is done with DB2 or MSSQL, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy after a successful installation and start the software afterwards. The default settings must be changed to fit your MSSQL or DB2 database.

JDBC Url

Default: *jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE*

Database Driver Class Name

Default: *org.h2.Driver*

Database Username

Default: *db*

Database Password

Default: *pw is hidden*

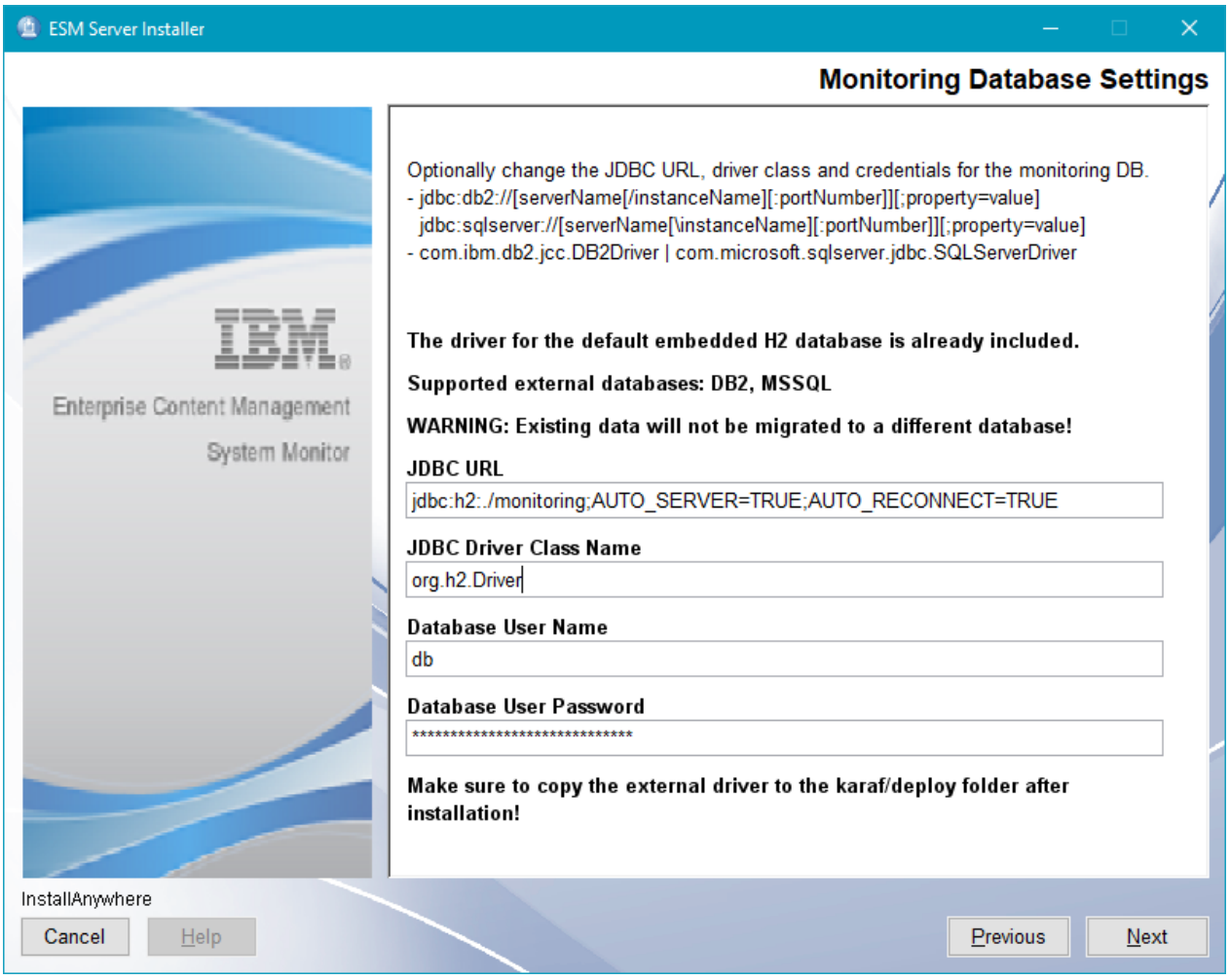

Image of Monitoring Database Settings

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Server after Installation

  Default: Yes = checked

NOTE

For DB2 based installation, do not choose the start after installation. Additional steps need to be performed before the software can be started correct. See more at the end of this chapter.

Start ESM Server at OS Start

Default: Yes = unchecked

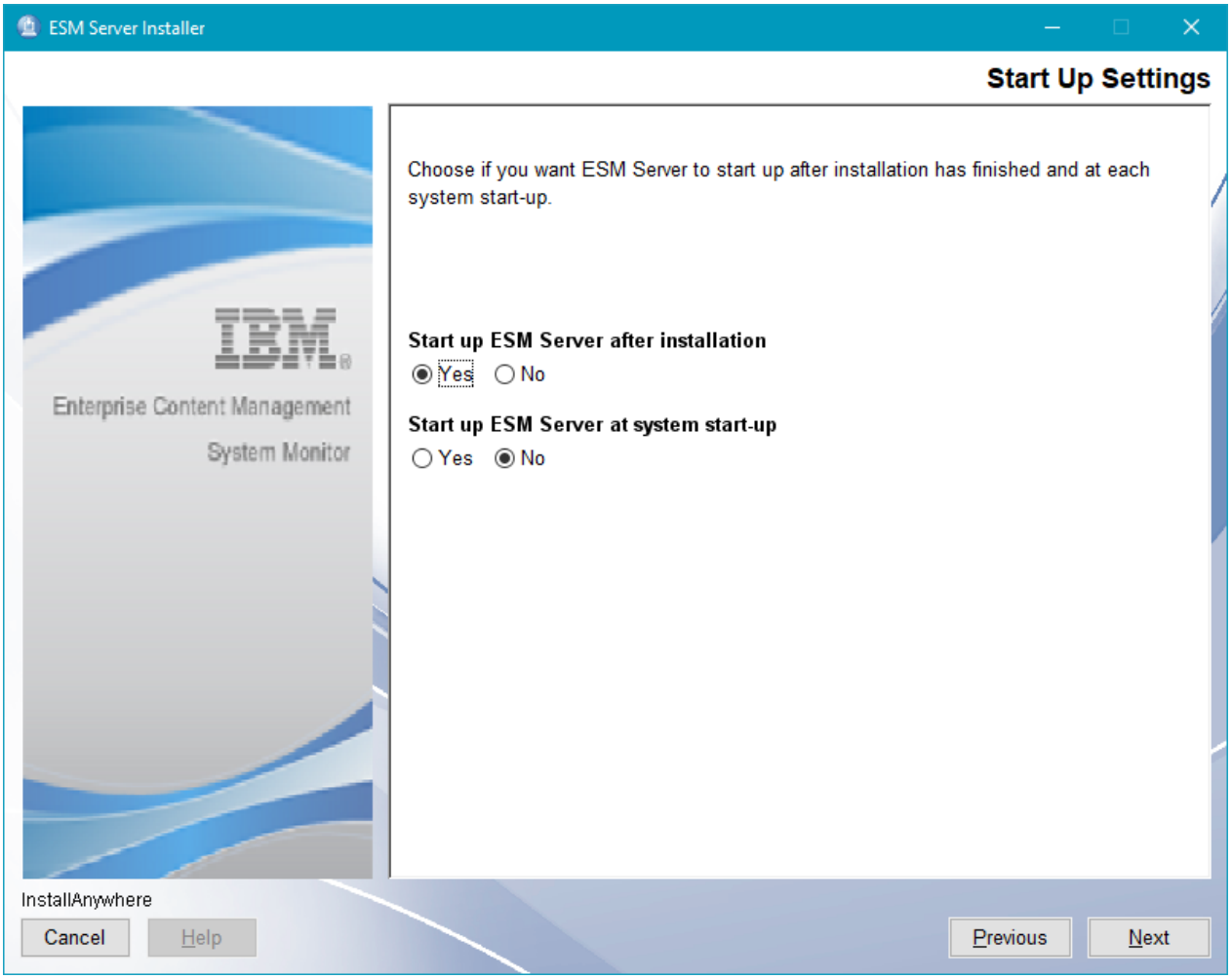

Image of Autostart and Systemstart

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

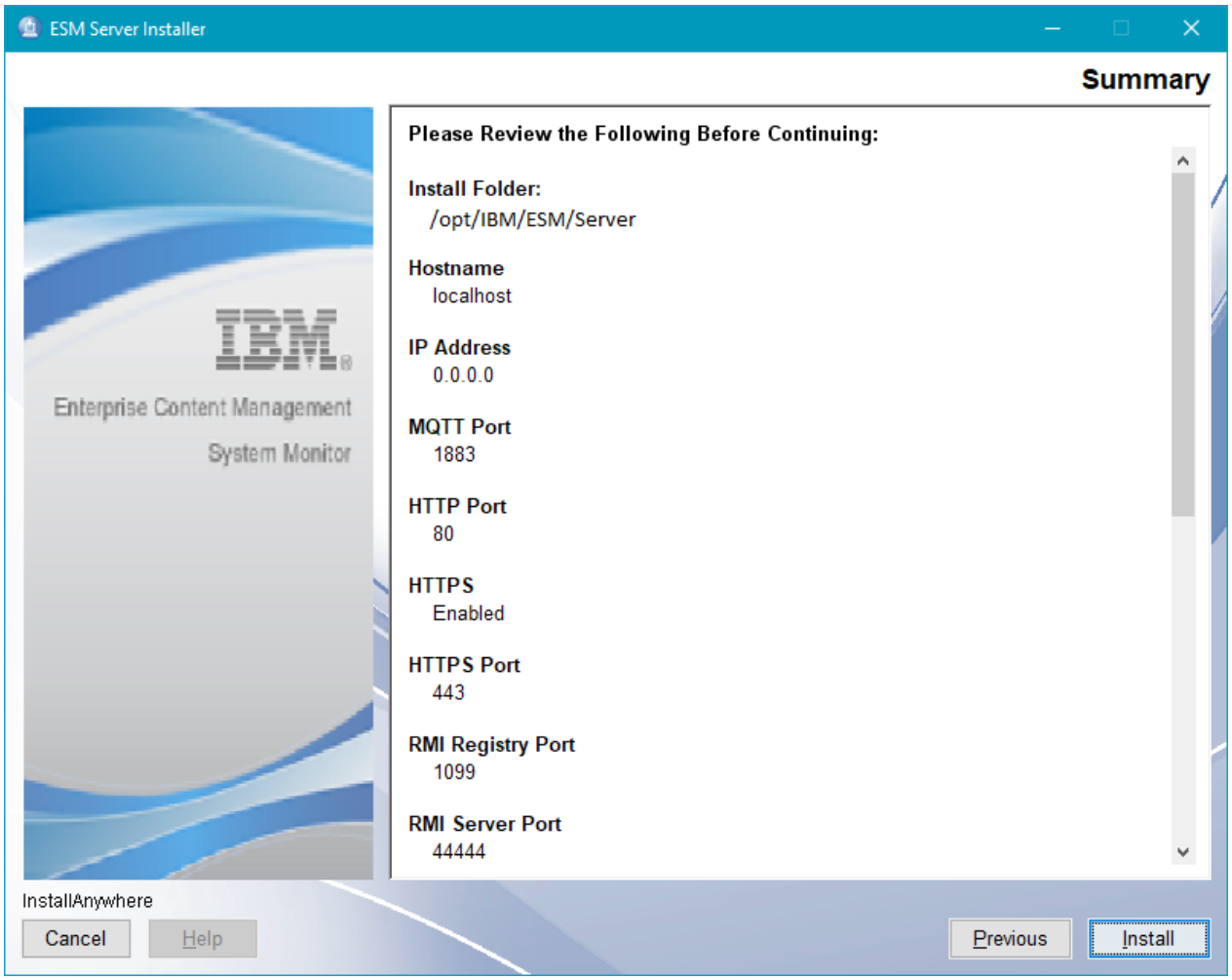

Image of Pre-Installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

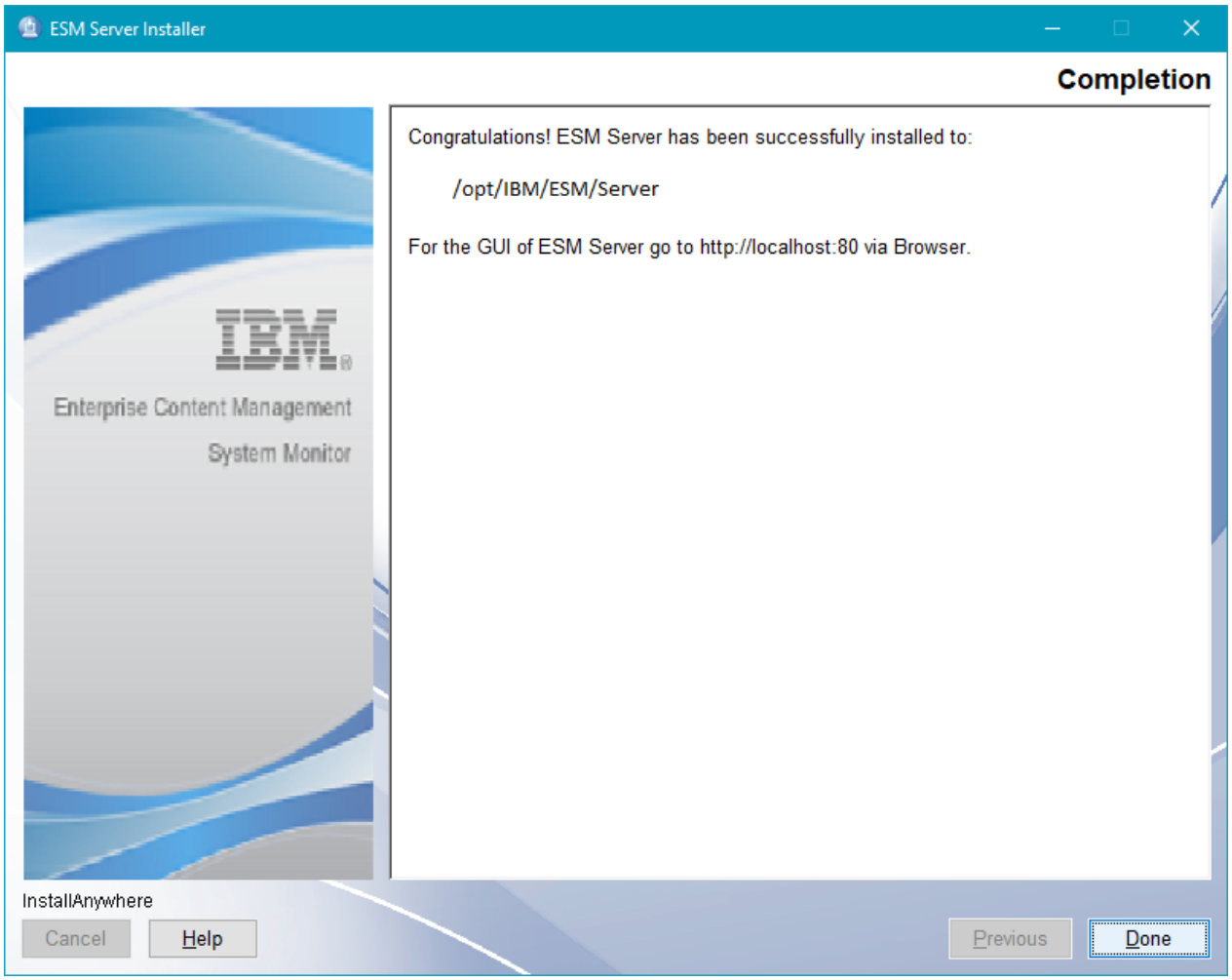

Image of Installation Complete

IMPORTANT If the installation was done with DB2, copy a suitable jdbc driver to <Installation-Dir>/karaf/deploy and start the software afterwards.

Windows based agent

- Start the installation by executing the file "ESM_Agent_Installer.exe" as administrator.
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

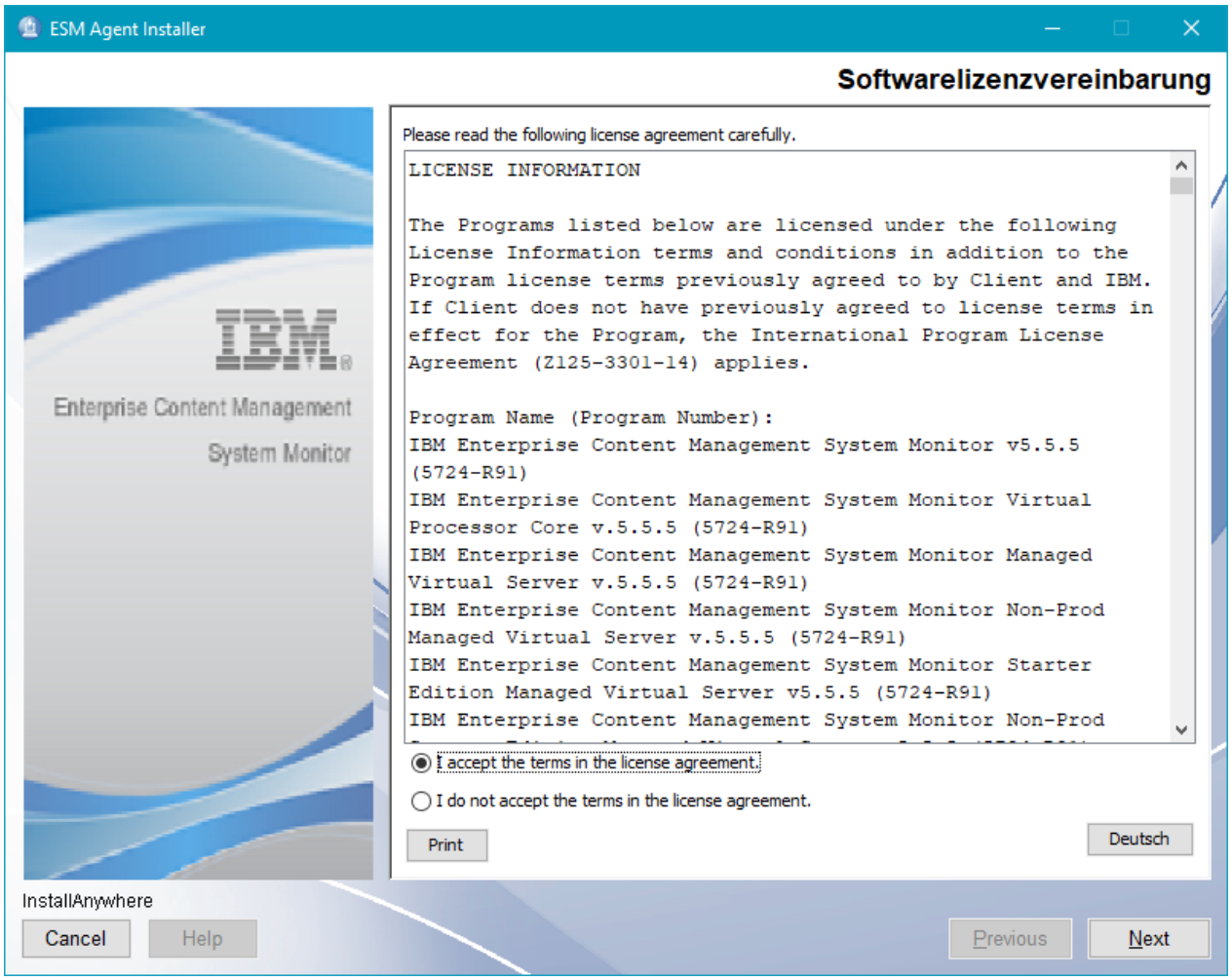

Image of Software License Agreement

- The next window is "Welcome to ESM Agent". It shows some information about the installation. Click "Next" to proceed.

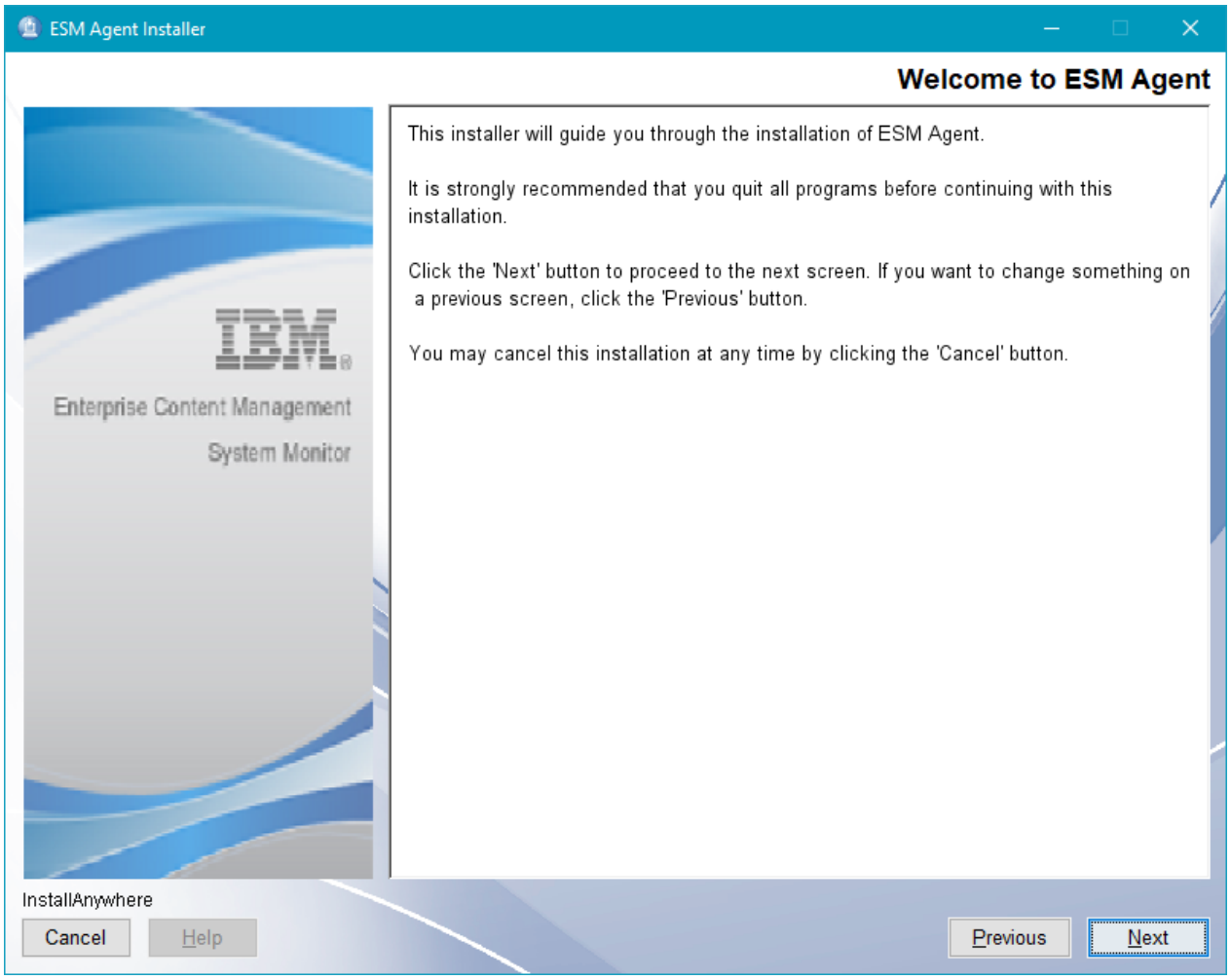

Image of Welcome to ESM Agent

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `C:\Program Files\IBM\ESM\Agent`. Click "Next" to proceed.

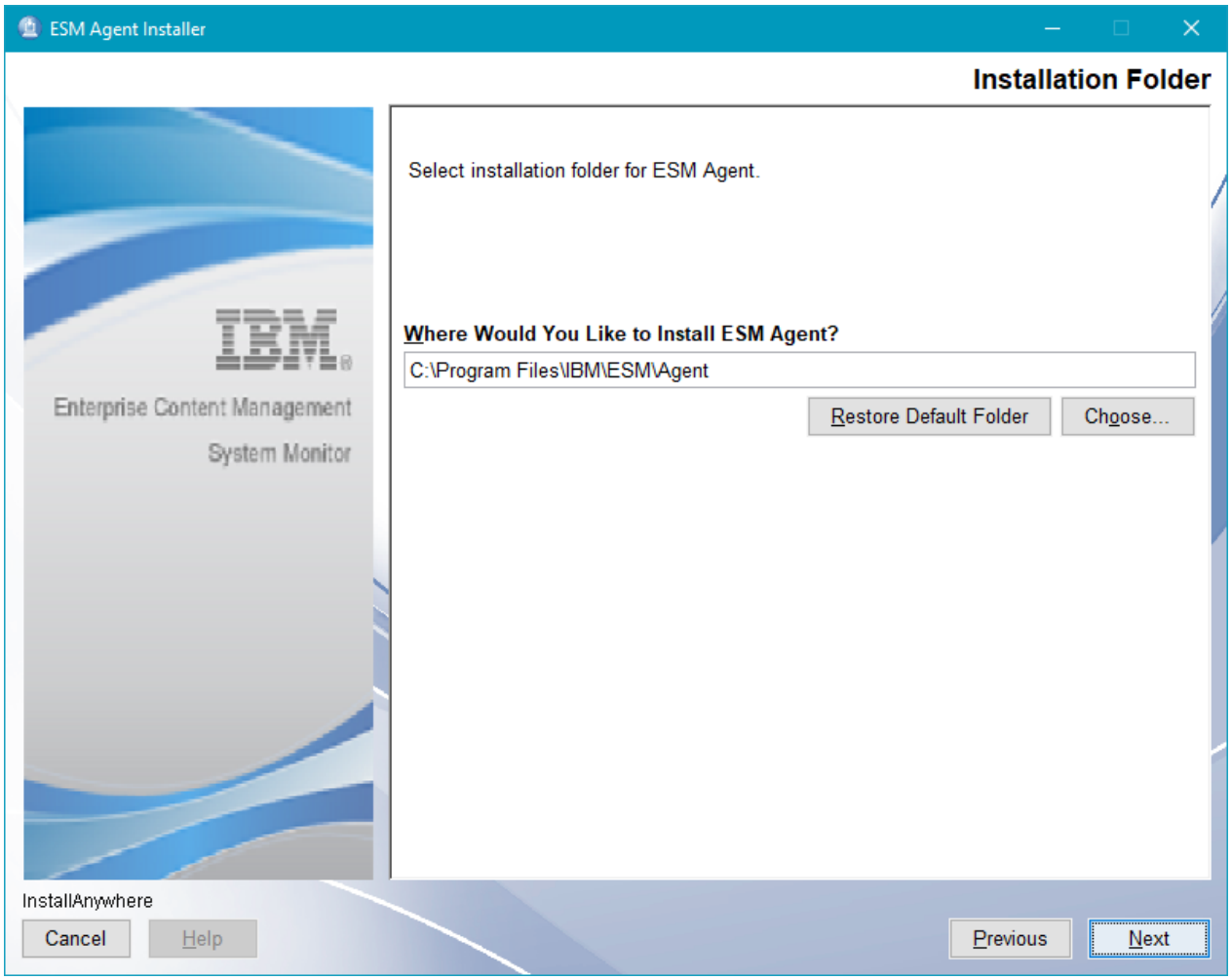

Image of Choose Installation Folder

- The next window is "Enter Agent Name, Hostname and Ports". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Unique Agent Name

  Default: *EsmAgent*

  ESM Server Name

  Default: *localhost*

  Server Port

  Default: *1883*

  Http Port

  Default: *1180*

  Https Port

  Default: *1543*

  RMI Registry Port

  Default: *2099*

RMI Server Port

Default: *55555*

SSH Port

Default: *9202*

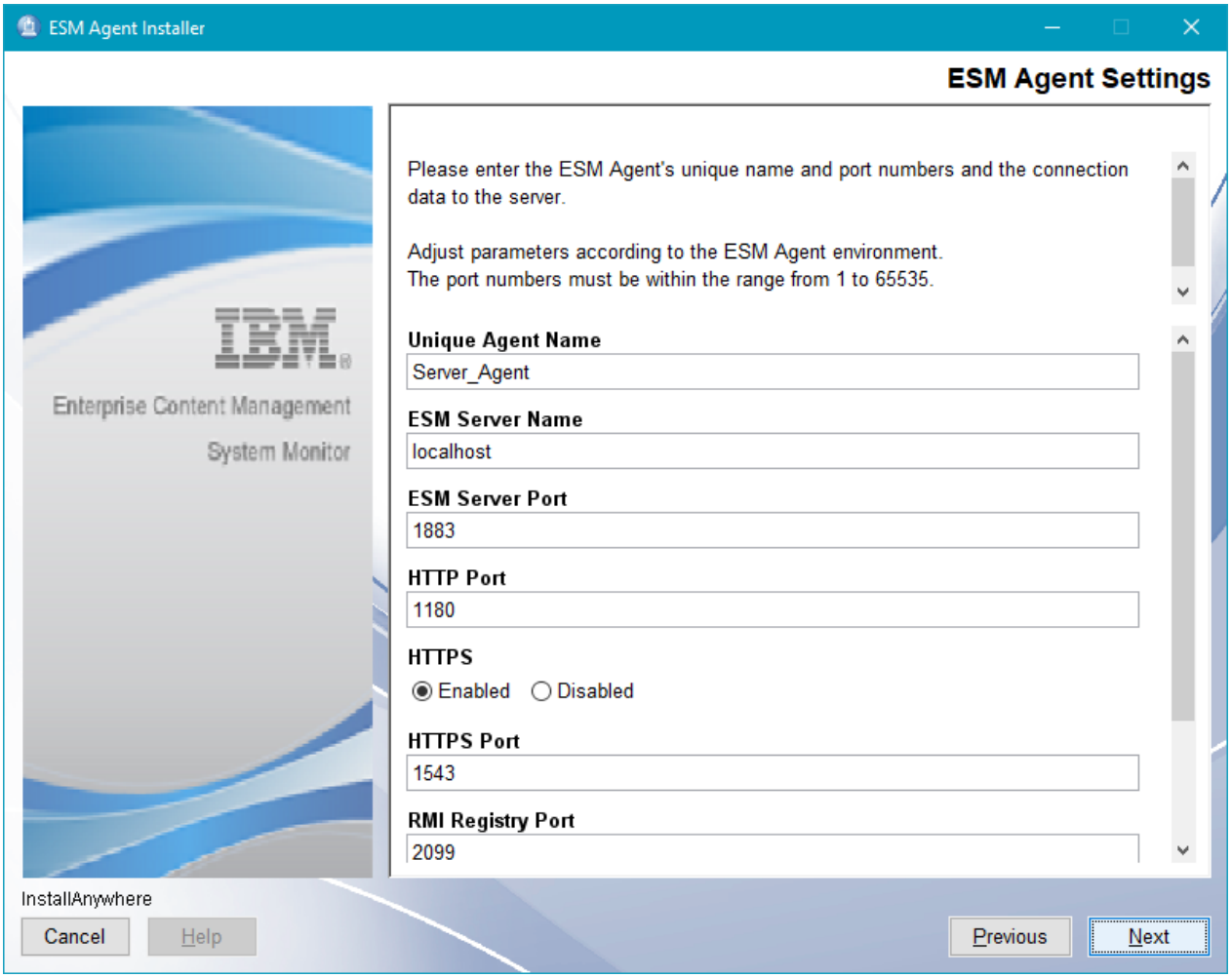

Image of Agent Settings (1)

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Agent after Installation

  Default: Yes = checked

  Start at OS Start

  Default: Yes = unchecked

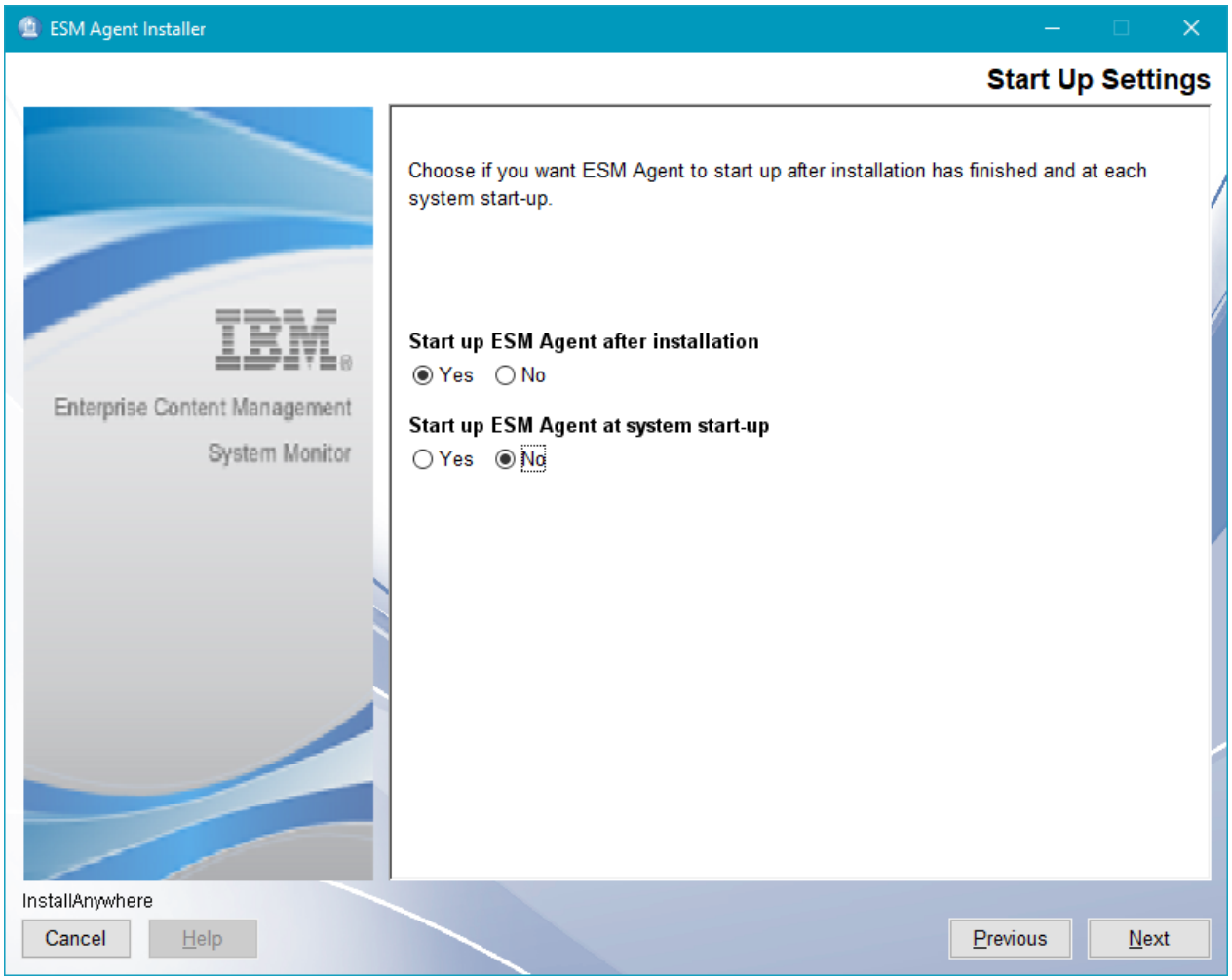

Image of Autotstart and Systemstart

- The next window is "Service Installation". The following parameters can be specified. Click "Next" to proceed.

  Re-Install ESM Agent Service

  Default: No = checked

NOTE This Window will only be shown if the OS is Windows, the installation is a update installation and a service is used in the previous installation already.

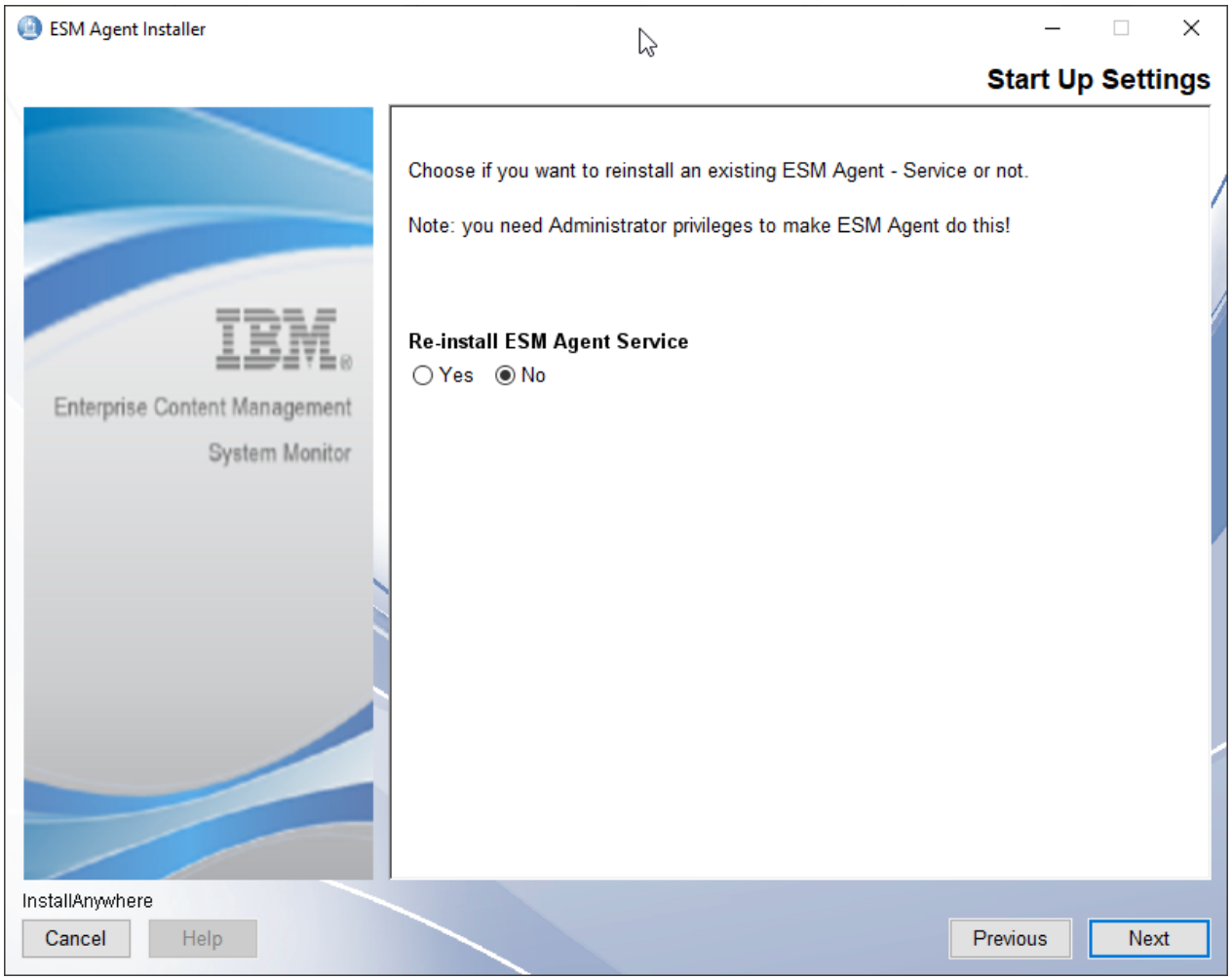

Image of Service Installation

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

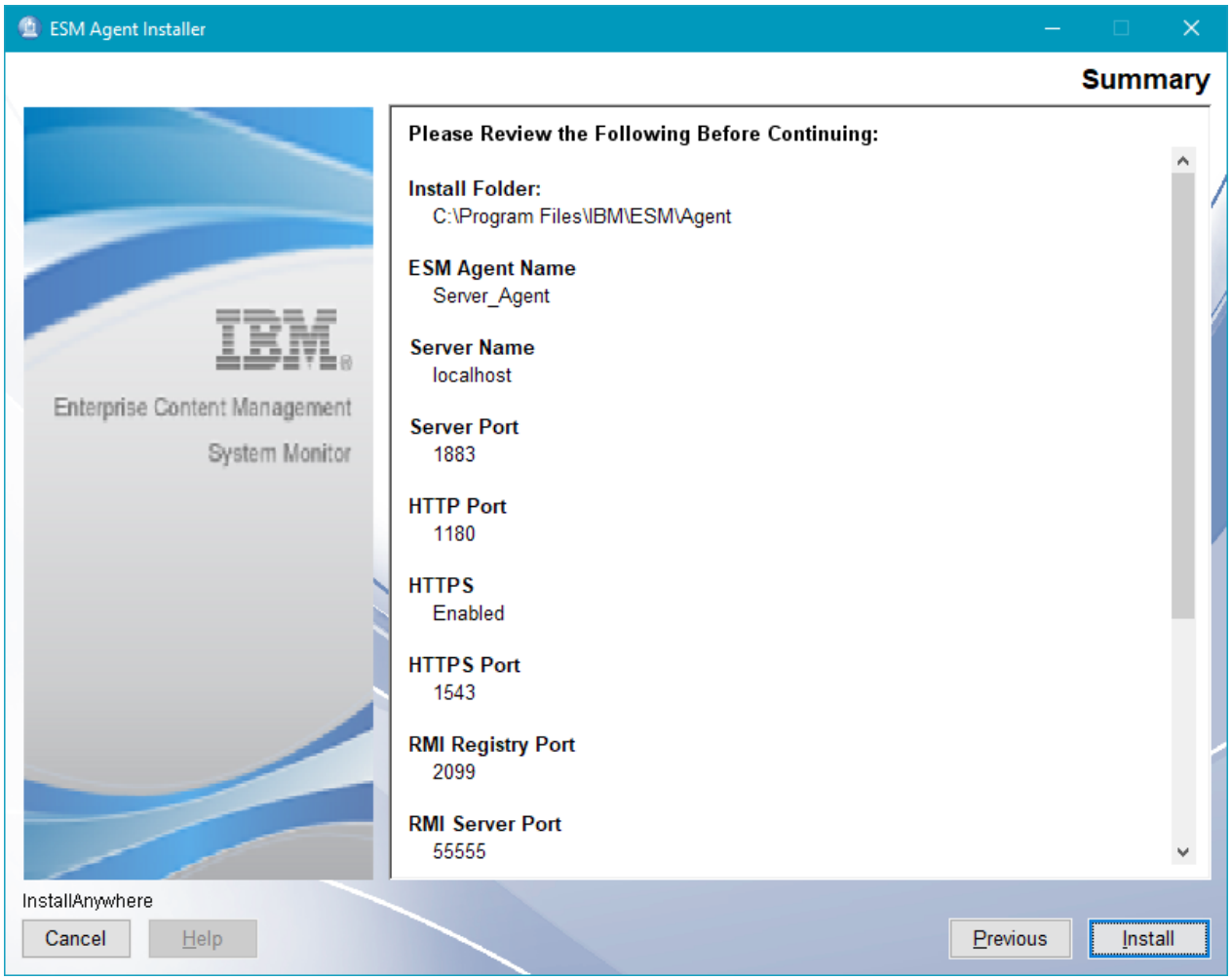

Image of Pre-installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

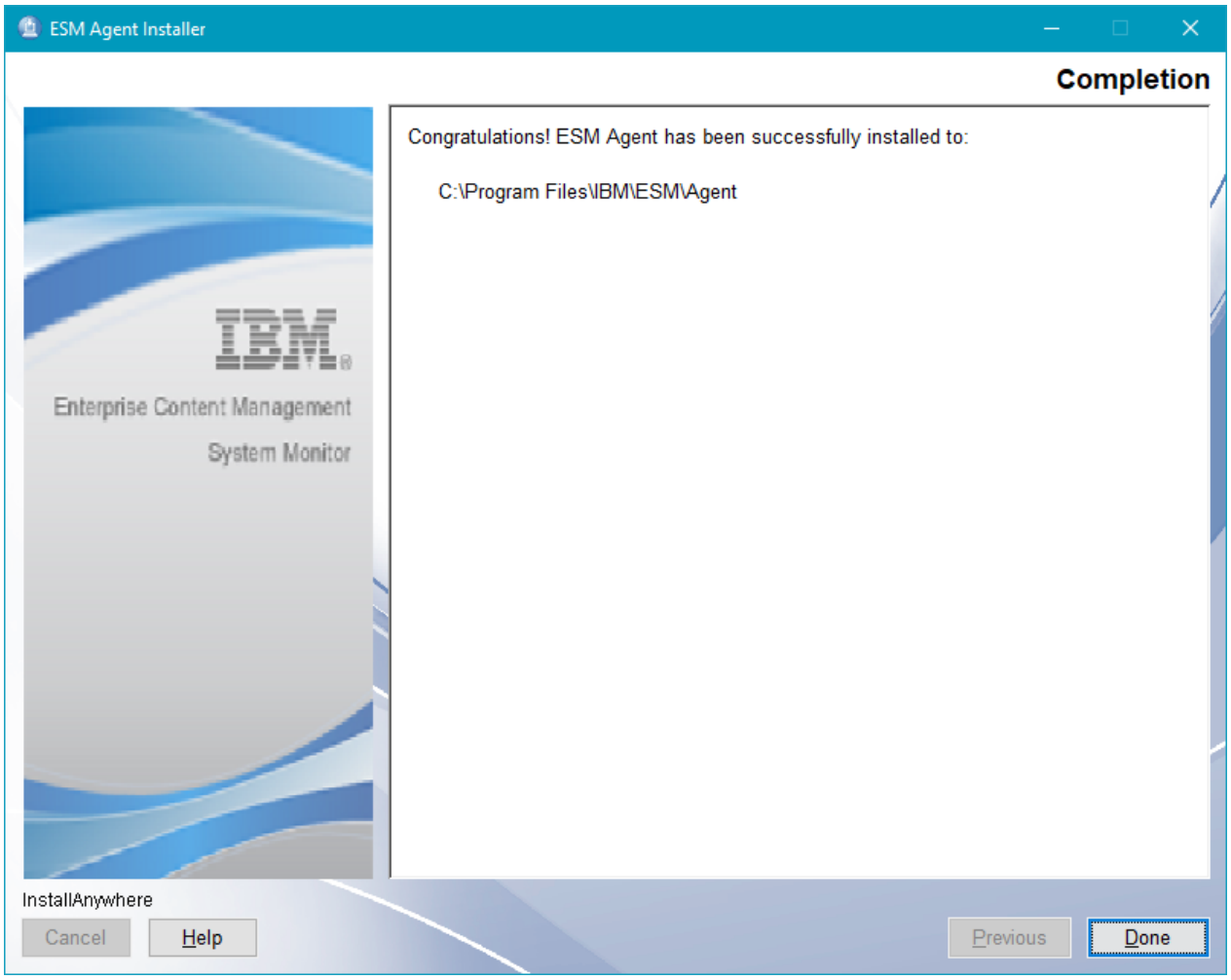

Image of Installation Complete

NOTE

Every Agent that connects to an ESM server for the first time, will automatically have basic montioring activated. Per default 3 probes (cpu, memory and diskspace) will run. For more details see the Probes and Situation Guide chapter "Default (standard) base probes for all agent".

Linux based agent

- Start the installation by executing the file "ESM_Agent_Installer.bin"
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

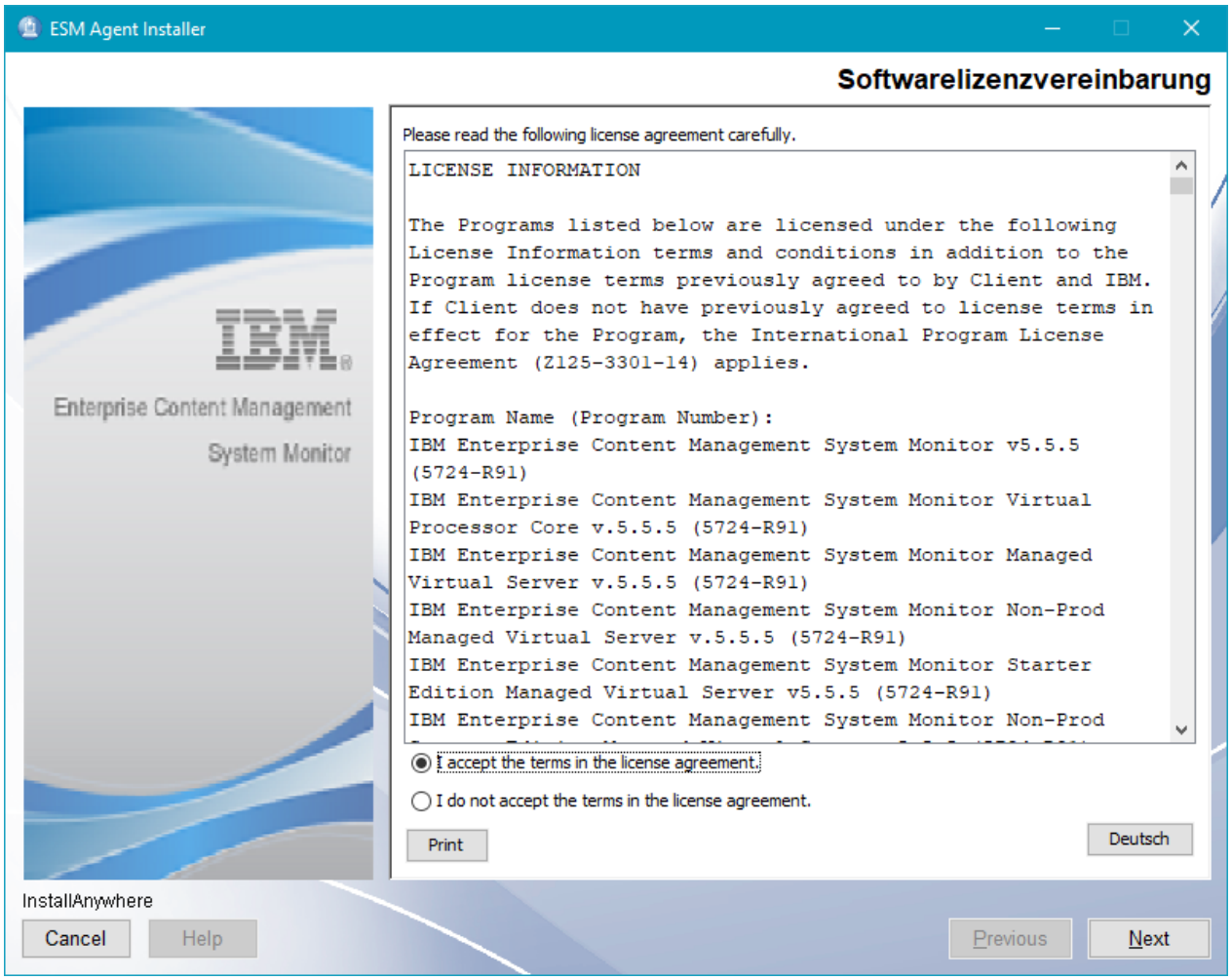

Image of Software License Agreement

- The next window is "Welcome to ESM Agent". It shows some information about the installation. Click "Next" to proceed.

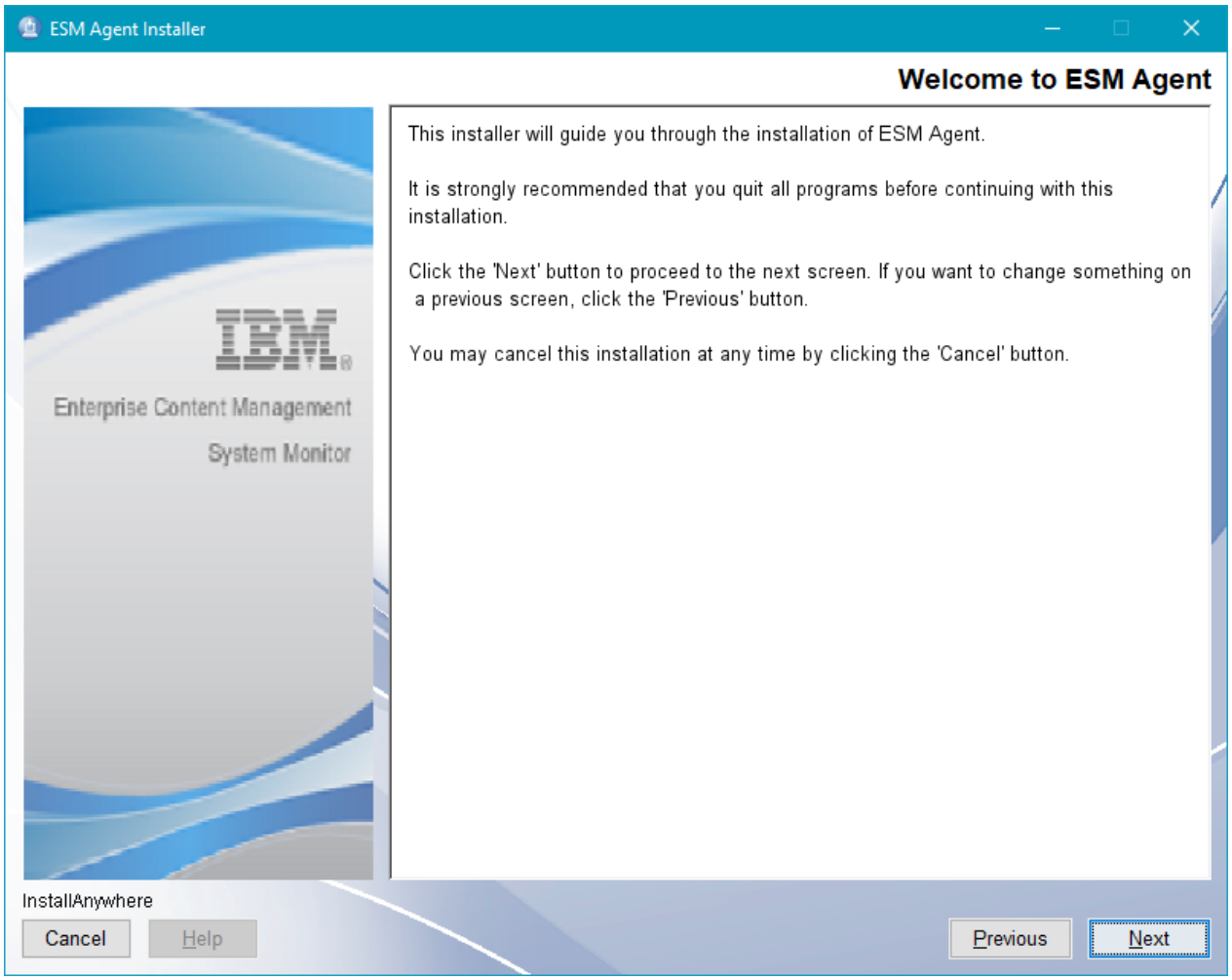

Image of Welcome to ESM Agent

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `/opt/IBM/ESM/Agent`. Click "Next" to proceed.

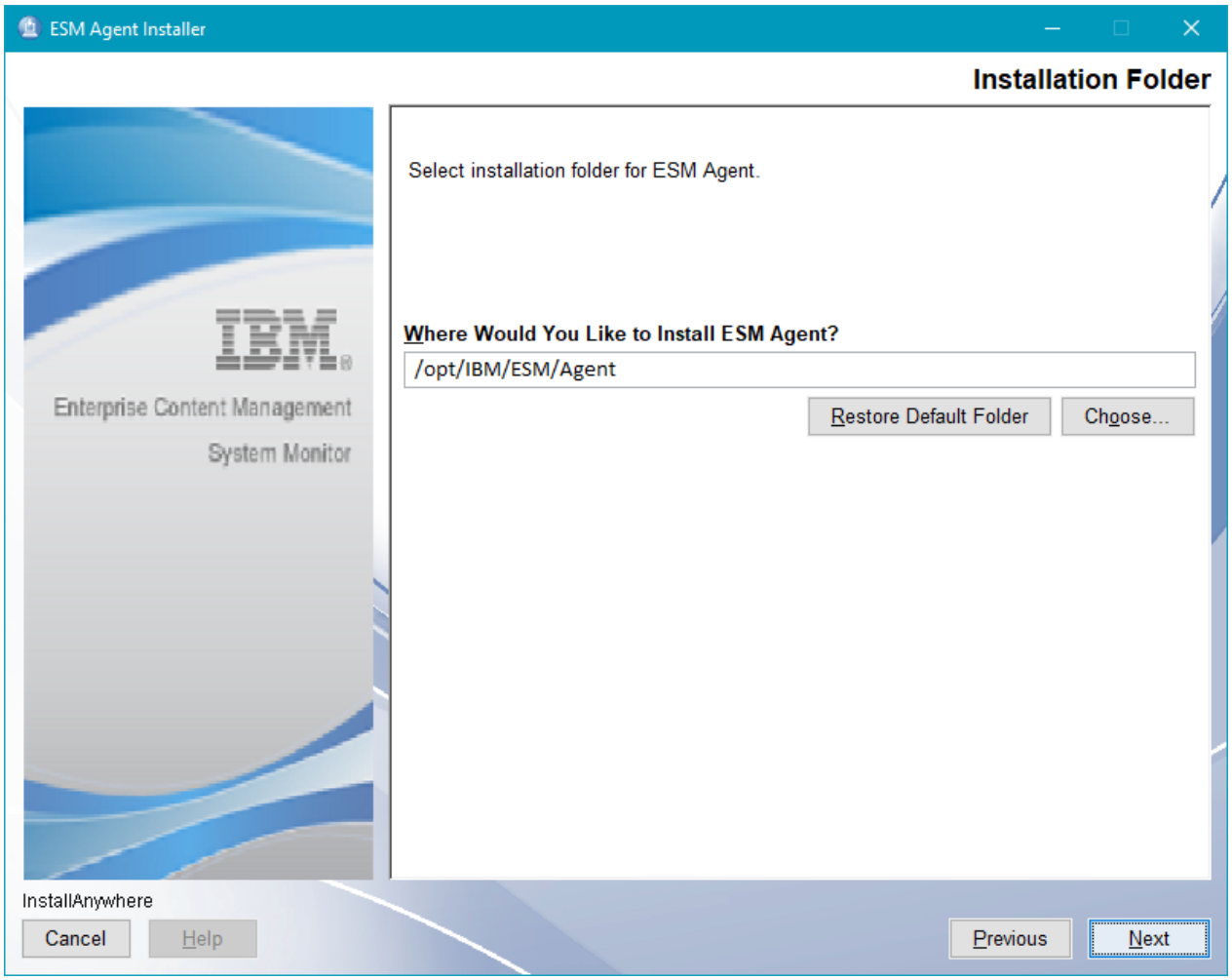

Image of Choose Installation Folder

- The next window is "Enter Agent Name, Hostname and Ports". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Unique Agent Name

  Default: `EsmAgent`

  ESM Server Name

  Default: `localhost`

  Server Port

  Default: `1883`

  Http Port

  Default: `1180`

  Https Port

  Default: `1543`

  RMI Registry Port

  Default: `2099`

RMI Server Port

Default: *55555*

SSH Port

Default: *9202*

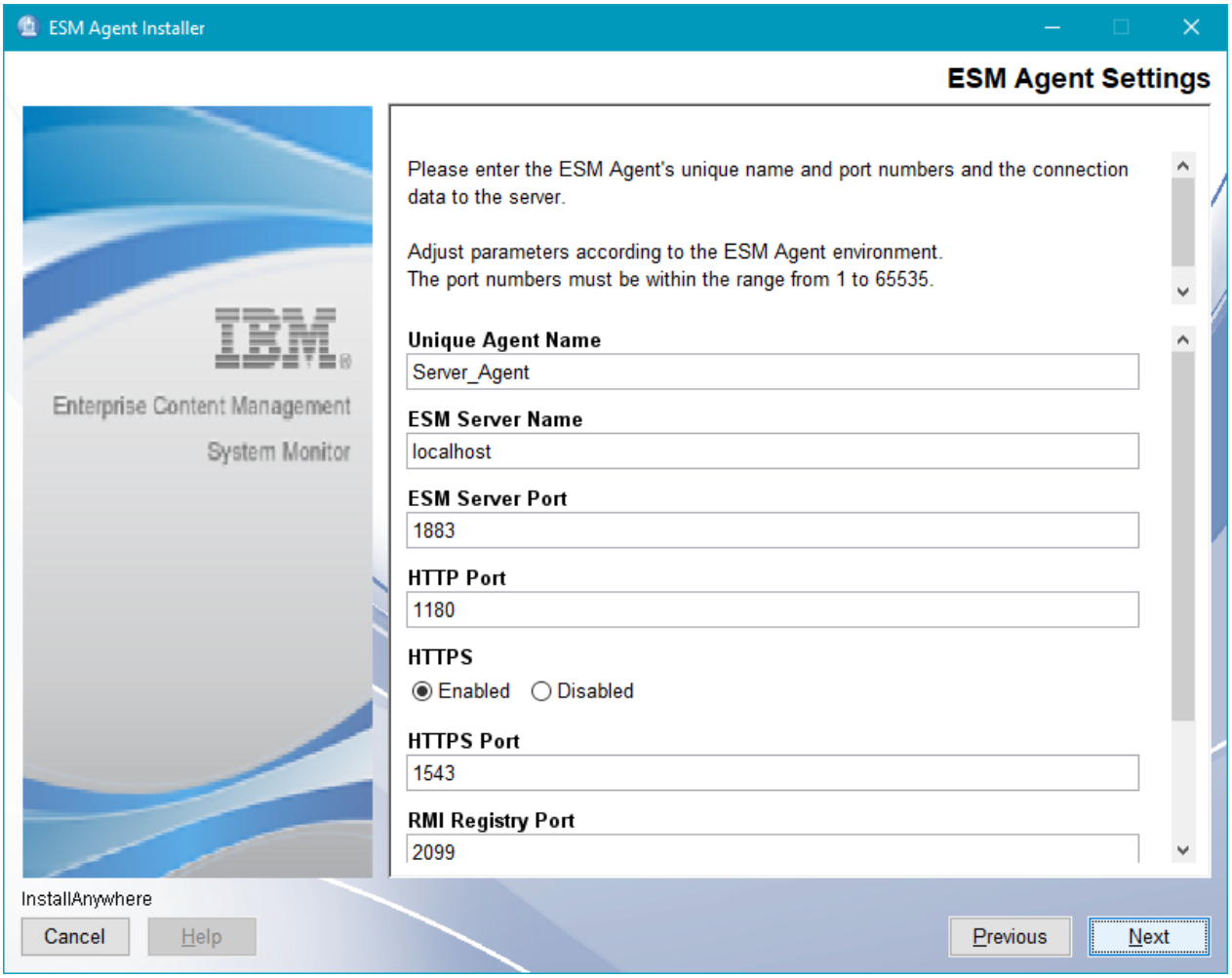

Image of Agent Settings (1)

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Agent after Installation

  Default: Yes = checked

  Start at OS Start

  Default: Yes = unchecked

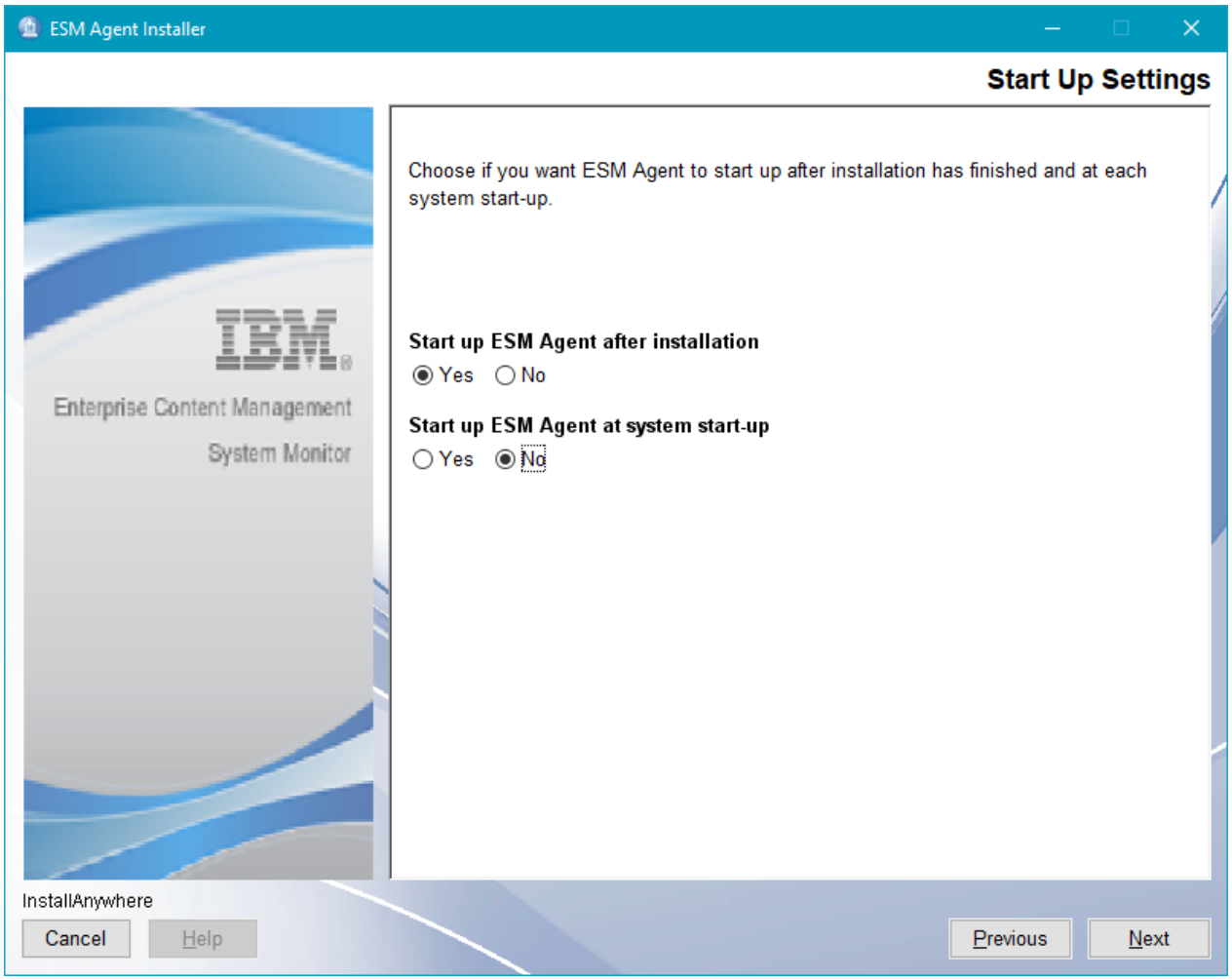

Image of Autotstart and Systemstart

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

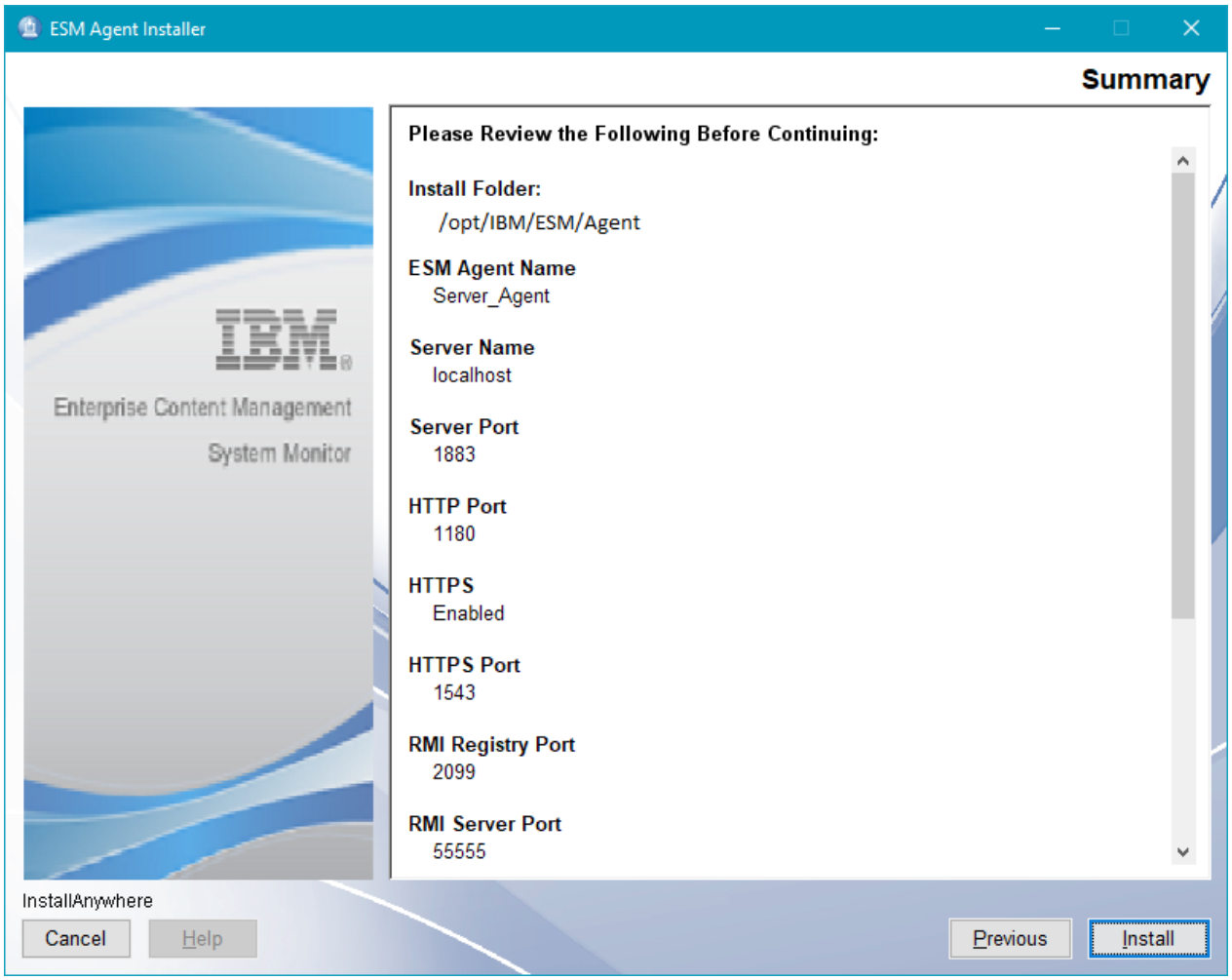

Image of Pre-installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

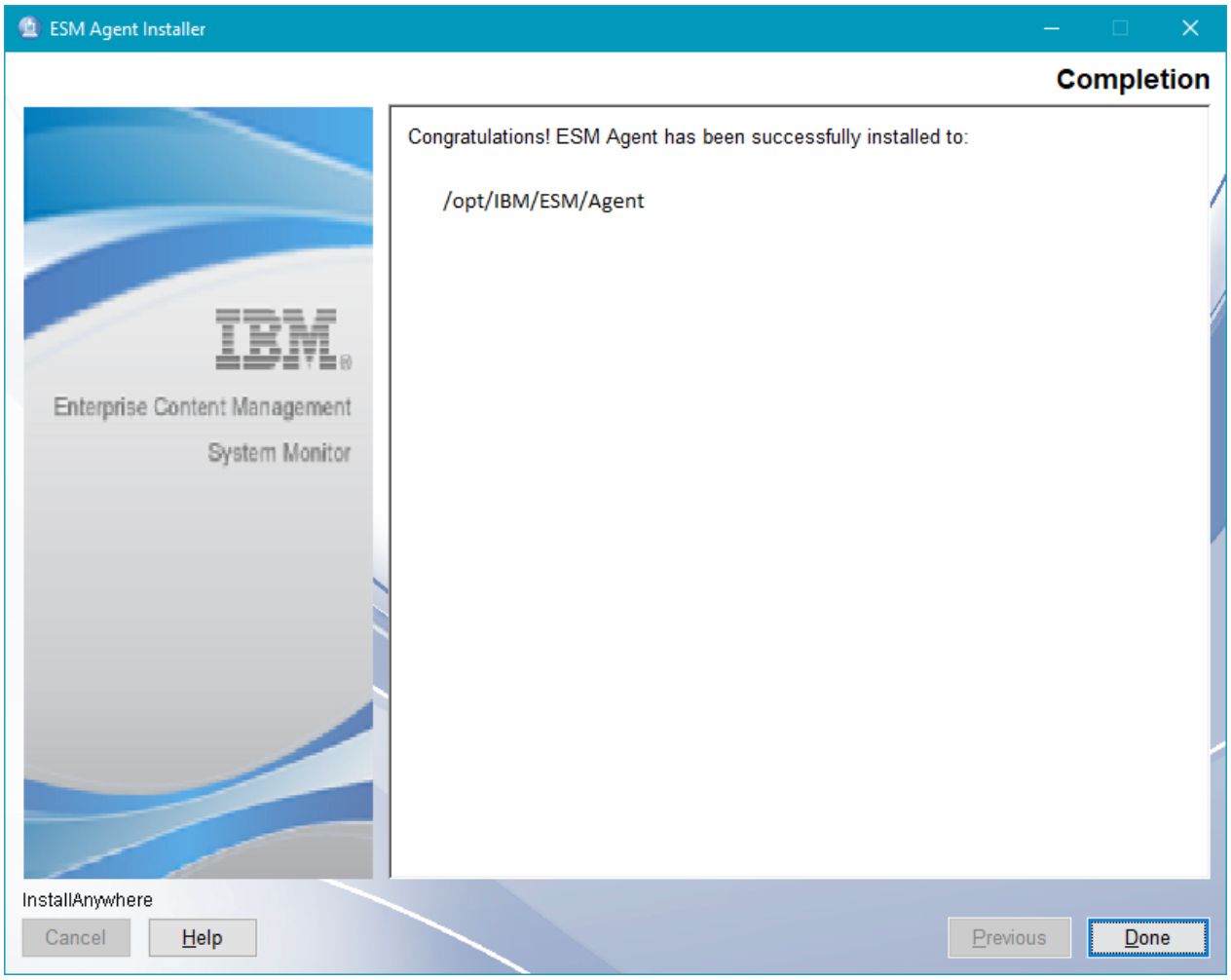

Image of Installation Complete

NOTE Every Agent that connects to an ESM server for the first time, will automatically have basic montioring activated. Per default 3 probes (cpu, memory and diskspace) will run. For more details see the Probes and Situation Guide chapter "Default (standard) base probes for all agent".

AIX based agent

IMPORTANT Large page support must be activated before the product can be installed.

NOTE

In some cases we have seen issues when installing on AIX. Typically you can see an error message that "Graphical Installers are not supported by th VM". This is often combined with the context "User interface mode not supported" and "Unable to load and to prepare the installer in console or silent mode."

If that happens, try to unset the LIBPATH and DISPLAY variable and run the installer in silent or console mode. A typical cause is that the LIBPATH is set to /opt/freeware/lib as first entry.

- Start the installation by executing the file "ESM_Agent_Installer.bin"
- The "Software License Agreement" window is loaded. Accept the license agreement and proceed with "Next".

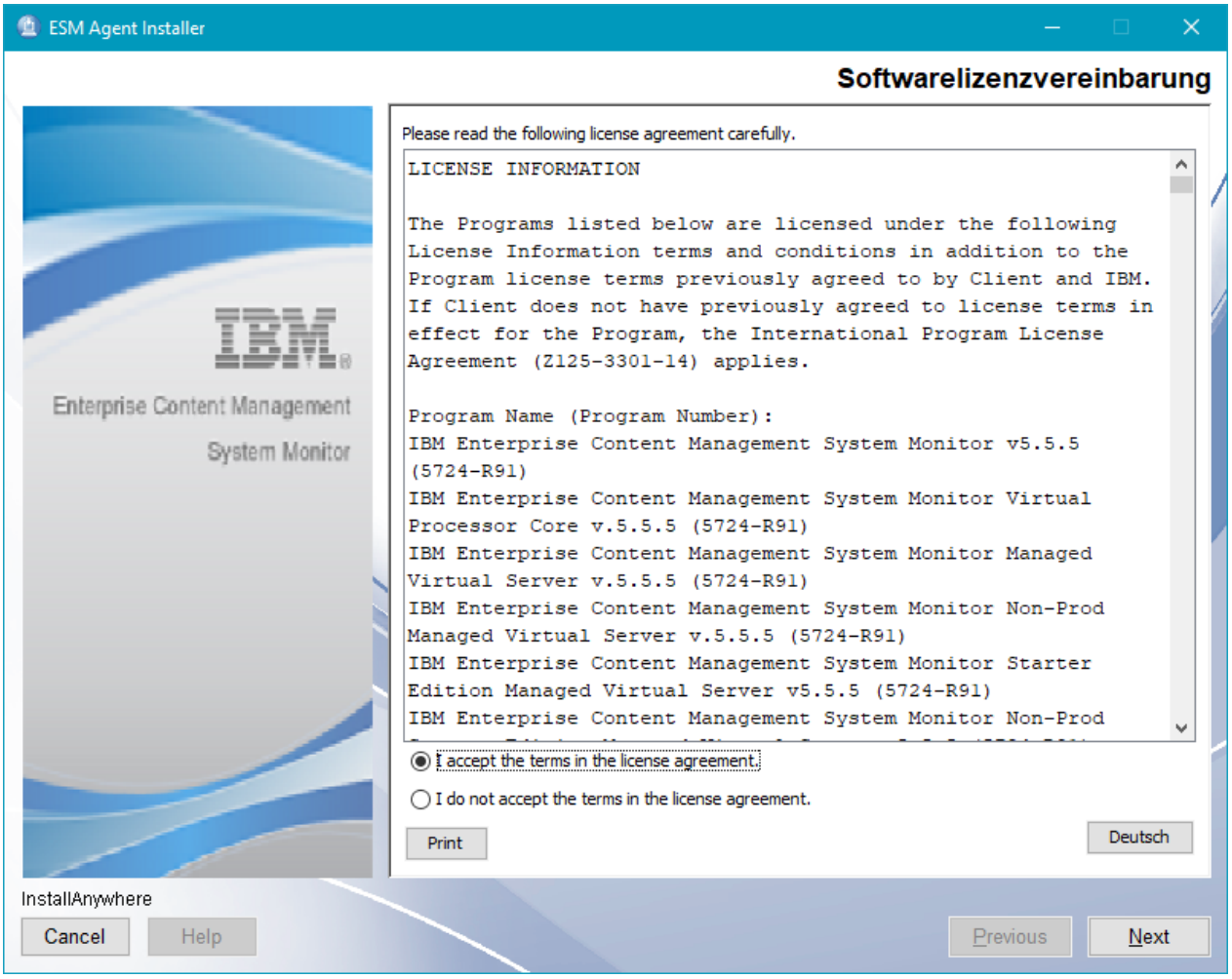

Image of Software License Agreement

- The next window is "Welcome to ESM Agent". It shows some information about the installation. Click "Next" to proceed.

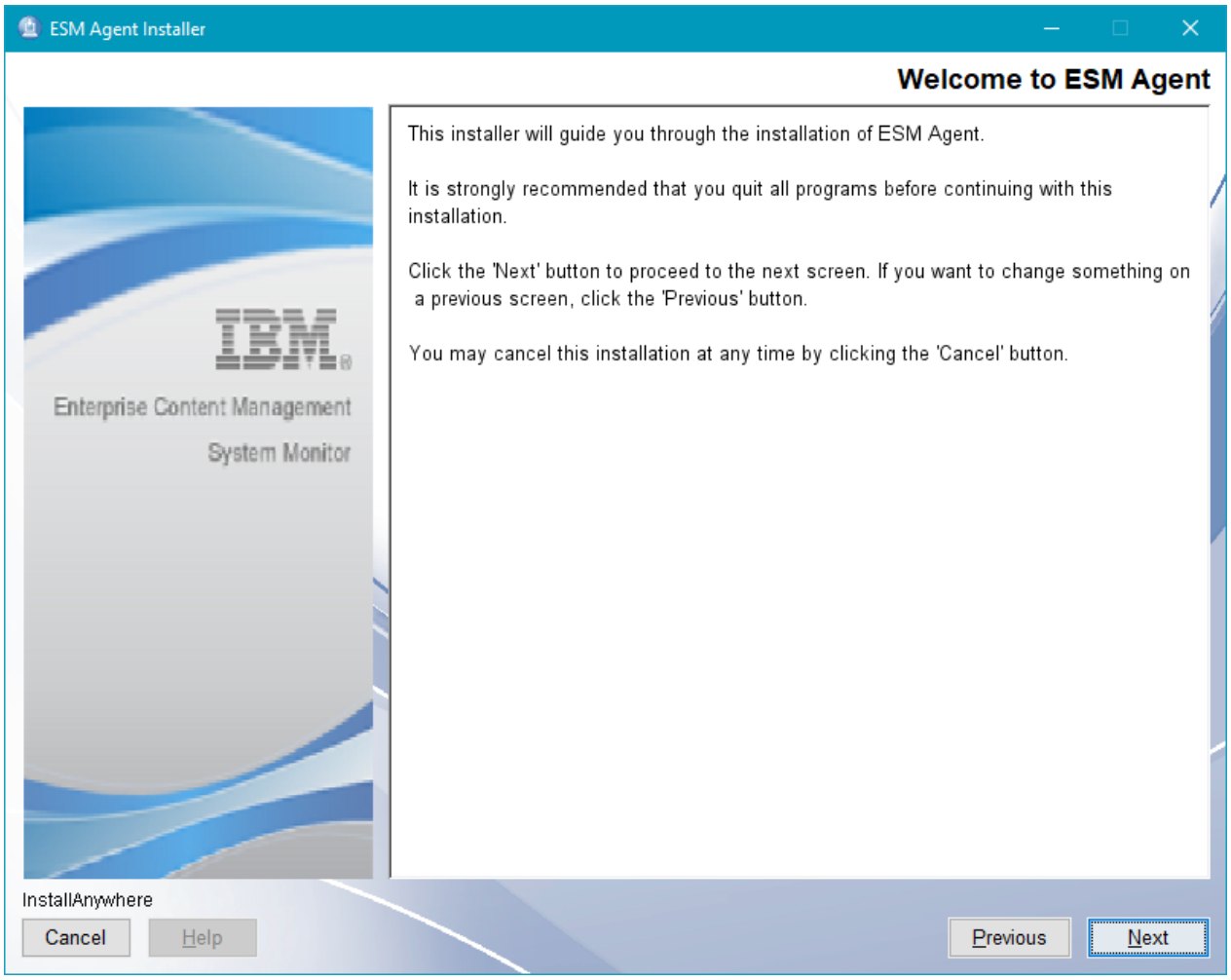

Image of Welcome to ESM Agent

- The next window is "Choose Installation Folder". Specify your path for the installation here. The default is `/opt/IBM/ESM/Agent`. Click "Next" to proceed.

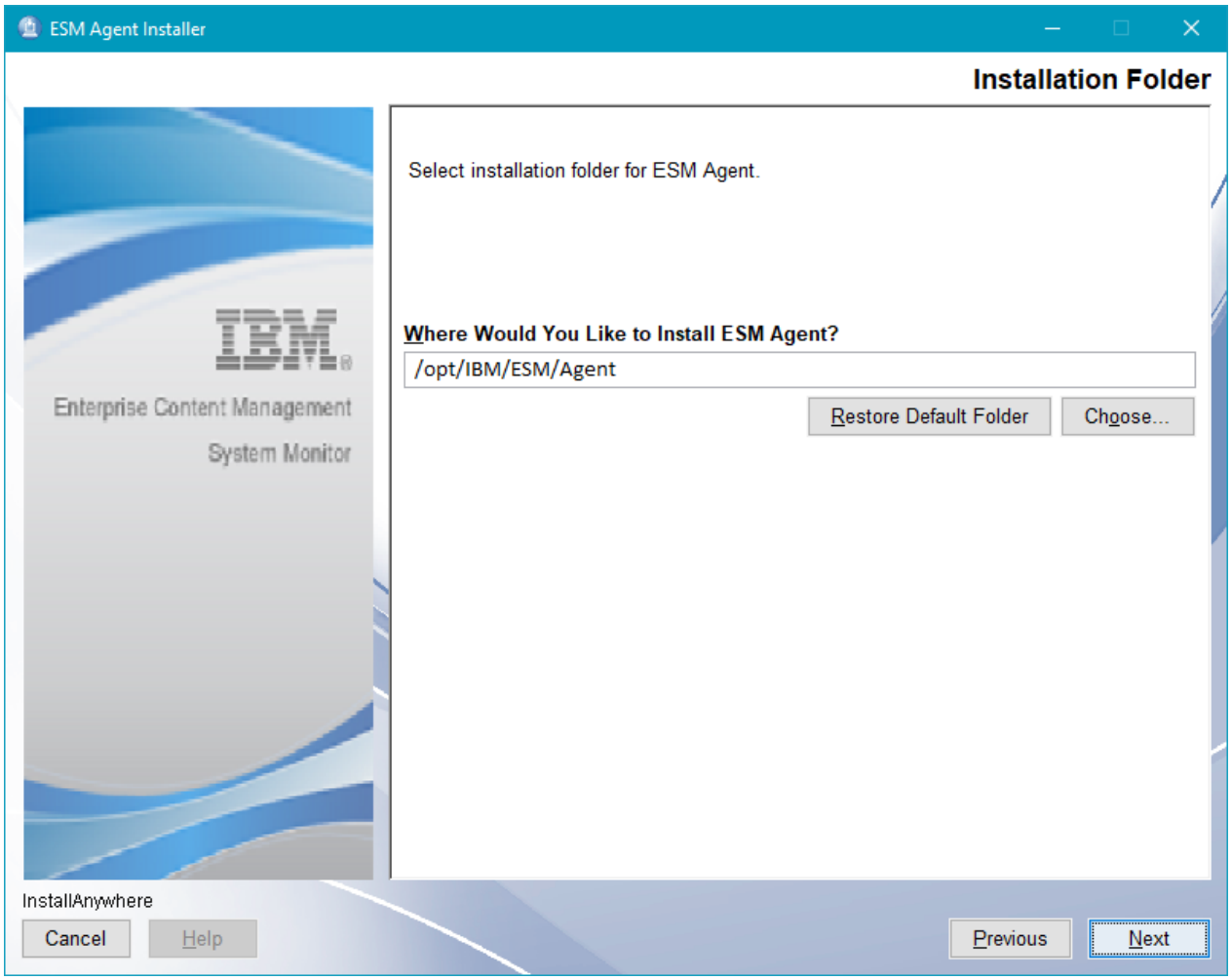

Image of Choose Installation Folder

- The next window is "Enter Agent Name, Hostname and Ports". The following parameters can be specified. Click "Next" to proceed. We recommand to keep https enabled.

  Unique Agent Name

  Default: *EsmAgent*

IMPORTANT The agent name on AIX is limited to 8 charactes.

ESM Server Name

Default: *localhost*

Server Port

Default: *1883*

Http Port

Default: *1180*

Https Port

Default: *1543*

RMI Registry Port

Default: *2099*

RMI Server Port

Default: *55555*

SSH Port

Default: *9202*

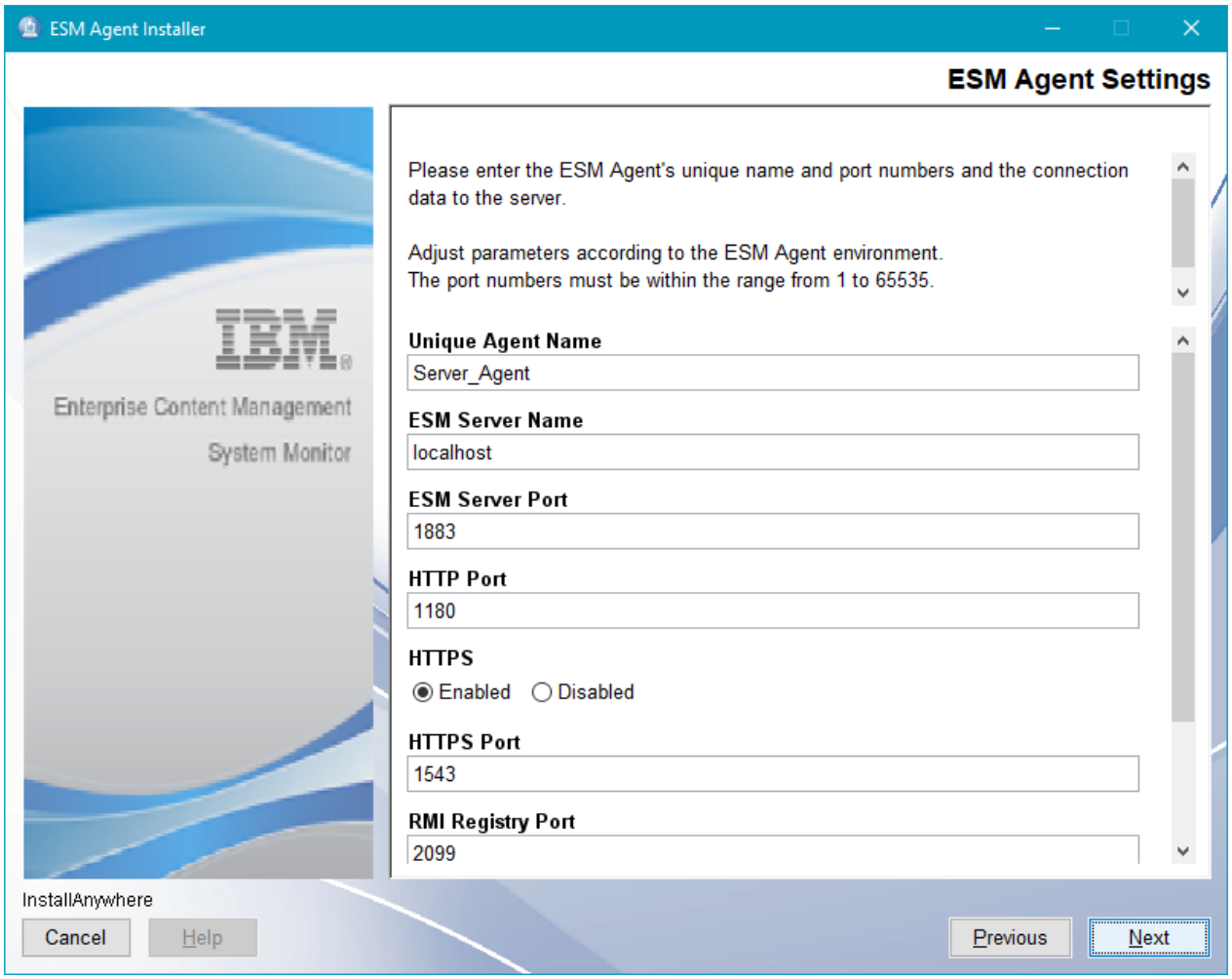

Image of Agent Settings (1)

- The next window is "Autostart and Systemstart". The following parameters can be specified. Click "Next" to proceed.

  Start ESM Agent after Installation

  Default: Yes = checked

Start at OS Start

Default: Yes = unchecked

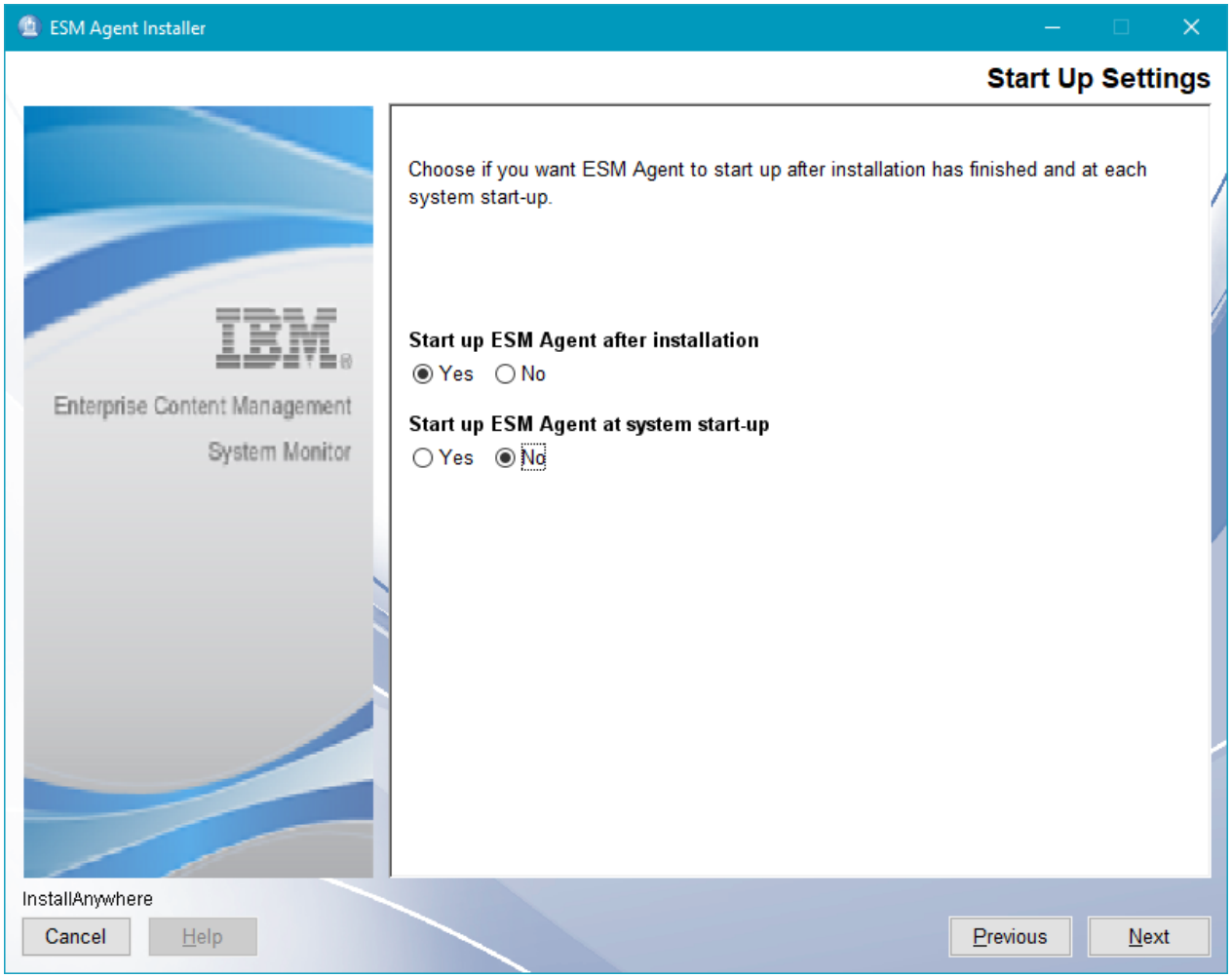

Image of Autotstart and Systemstart

- The next window is "Pre-Installation Summary". Click "Install" to proceed.

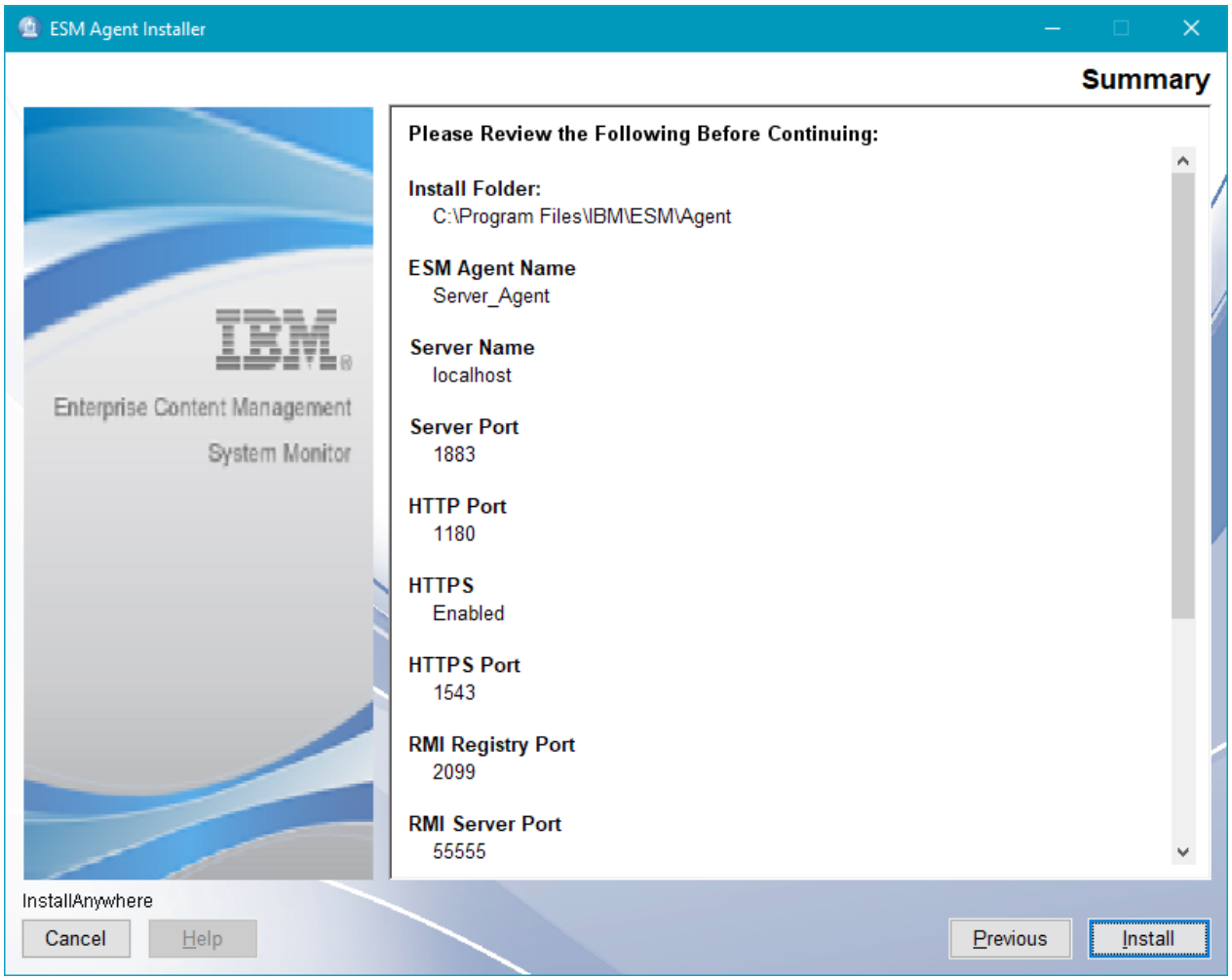

Image of Pre-installation Summary

- The installation starts and finishes with the window "Install Complete". Click "Done" to close and finish the installation procedure.

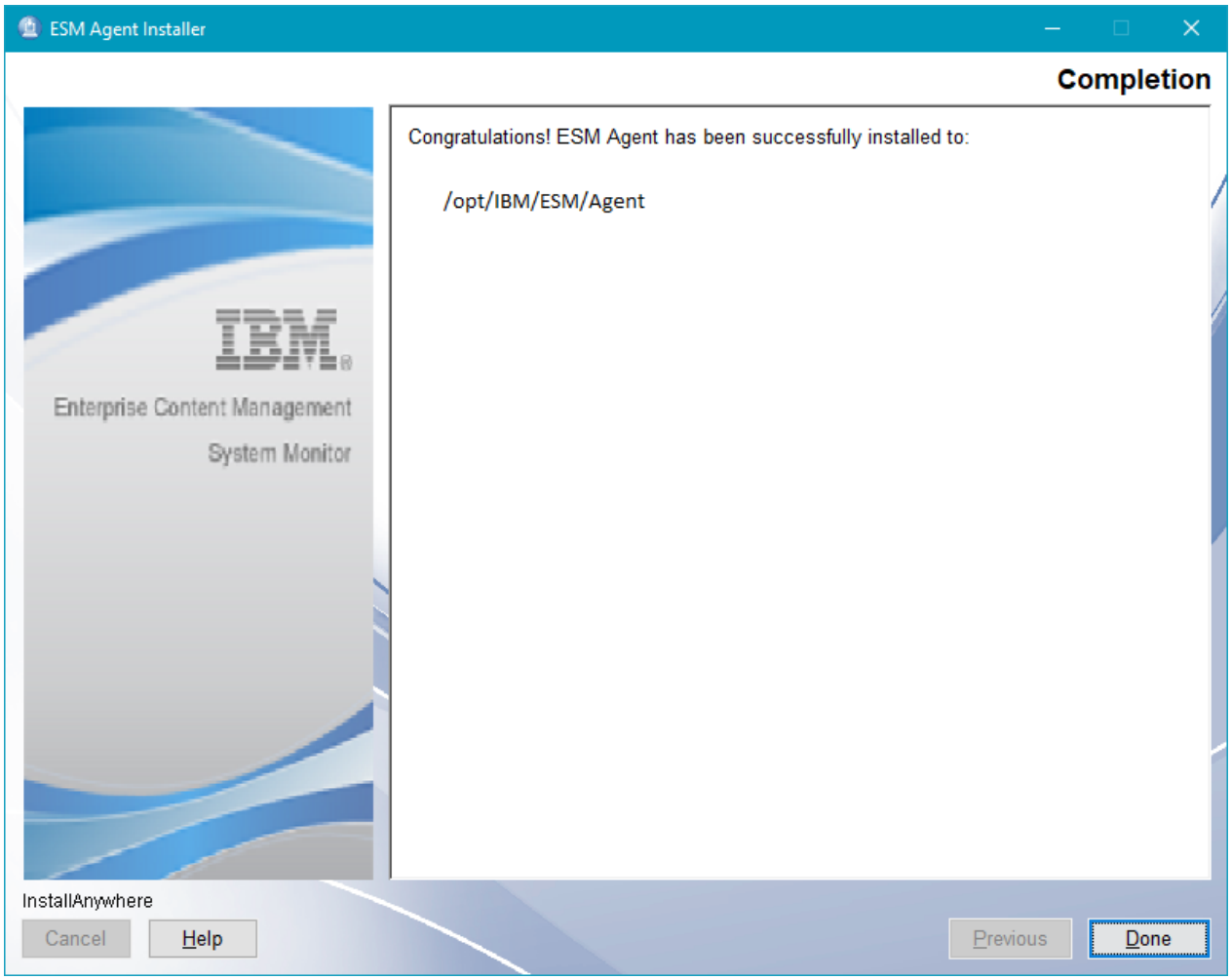

Image of Installation Complete

NOTE

Every Agent that connects to an ESM server for the first time, will automatically have basic montioring activated. Per default 3 probes (cpu, memory and diskspace) will run. For more details see the Probes and Situation Guide chapter "Default (standard) base probes for all agent".

Installation using silent mode

For the silent installation a properties file is needed. An example file will be given for each possible OS and the execution command will be listed.

Windows based server

- Open a "Command Prompt (Admin)" and execute the installation package as shown:

```
<YourPackageLocation>\ESM_Server_Installer.exe -i silent -f
<YourPropertiesLocation>\installer.properties
```

Example 1. Example for installer.properties file with H2 Database

```
# Thu Aug 10 07:26:01 PDT 2017
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#-----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=C:\\Program Files\\IBM\\ESM\\Server

#Server Settings
#---------------
SERVER_HOSTNAME=localhost
SERVER_IP=0.0.0.0
SERVER_PORT=1883
JETTY_PORT=80
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=443
RMI_REGISTRY_PORT=1099
RMI_SERVER_PORT=44444
SSH_PORT=8101

#Configuration Database Settings
#-------------------------------
JDBC_URL=jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
JDBC_DRIVER_NAME=org.h2.Driver
JDBC_USER=db
JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Monitoring Database Settings
#----------------------------
MONITORING_JDBC_URL=jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
MONITORING_JDBC_DRIVER_NAME=org.h2.Driver
MONITORING_JDBC_USER=db
MONITORING_JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0
SYSTEM_START_INSTALLATION=0
NOT_SYSTEM_START_INSTALLATION=1

#Install
#-------
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\Uninstall_ESM_Server.lax=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\resource\\iawin64_x64.dll=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\resource\\iawin32.dll=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\resource\\win64_32_x64.exe=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\resource\\remove.exe=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Server\\resource\\invoker.exe=Yes
-fileOverwrite_C\:\\Program\
Files\\IBM\\ESM\\Server\\version\\ibm.com_IBM_Enterprise_Content_Management_System_Monitor_S
erver-5.5.2.swidtag.xml=Yes
```

Windows based agent

- Open a "Command Prompt (Admin)" and execute the installation package as shown:

```
<YourPackageLocation>\ESM_Agent_Installer.exe -i silent -f
<YourPropertiesLocation>\installer.properties
```

Example 2. Example for installer.properties file

```
# Thu Aug 17 07:54:20 PDT 2017
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=C:\\Program Files\\IBM\\ESM\\Agent

#Agent Settings
#--------------
CLIENT_ID=Agent
SERVER_HOSTNAME=localhost
SERVER_PORT=1883
JETTY_PORT=1180
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=1543
RMI_REGISTRY_PORT=2099
RMI_SERVER_PORT=55555
SSH_PORT=9202

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0
SYSTEM_START_INSTALLATION=0
NOT_SYSTEM_START_INSTALLATION=1

#Install
#-------
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\Uninstall_ESM_Agent.lax=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\resource\\iawin64_x64.dll=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\resource\\iawin32.dll=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\resource\\win64_32_x64.exe=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\resource\\remove.exe=Yes
-fileOverwrite_C\:\\Program\ Files\\IBM\\ESM\\Agent\\resource\\invoker.exe=Yes
-fileOverwrite_C\:\\Program\
Files\\IBM\\ESM\\Agent\\version\\ibm.com_IBM_Enterprise_Content_Management_System_Monitor_Ag
ent-5.5.2.swidtag.xml=Yes
```

Linux based server

- Open a "shell (root)" and execute the installation package as shown:

```
<YourPackageLocation>./ESM_Server_Installer.bin -i silent -f
<YourPropertiesLocation>\installer.properties
```

Example 3. Example for installer.properties file with H2 Database

```
# Thu Jan 04 01:40:27 EST 2018
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#-----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=/opt/IBM/ESM/Server

#Server Settings
#---------------
SERVER_HOSTNAME=localhost
SERVER_IP=0.0.0.0
SERVER_PORT=1883
JETTY_PORT=80
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=443
RMI_REGISTRY_PORT=1099
RMI_SERVER_PORT=44444
SSH_PORT=8101

#Configuration Database Settings
#-------------------------------
JDBC_URL=jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
JDBC_DRIVER_NAME=org.h2.Driver
JDBC_USER=db
JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Monitoring Database Settings
#----------------------------
MONITORING_JDBC_URL=jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
MONITORING_JDBC_DRIVER_NAME=org.h2.Driver
MONITORING_JDBC_USER=db
MONITORING_JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0

#Install
#-------
-fileOverwrite_/opt/IBM/ESM/Server/karaf/version=Yes
-fileOverwrite_/opt/IBM/ESM/Server/Uninstall_ESM_Server.lax=Yes
-fileOverwrite_/opt/IBM/ESM/Server/properties/version/ibm.com_IBM_Enterprise_Content_Managem
ent_System_Monitor_Server-5.5.2.swidtag.xml=Yes
```

Linux based agent

- Open a "shell (root)" and execute the installation package as shown:

<YourPackageLocation>/ESM_Agent_Installer.bin -i silent -f <YourPropertiesLocation>\installer.properties

Example 4. Example for installer.properties file

```
# Thu Jan 04 01:54:20 EST 2018
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#-----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=/opt/IBM/ESM/Agent

#Agent Settings
#--------------
CLIENT_ID=Agent
SERVER_HOSTNAME=localhost
SERVER_PORT=1883
JETTY_PORT=1180
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=1543
RMI_REGISTRY_PORT=2099
RMI_SERVER_PORT=55555
SSH_PORT=9202

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0

#Install
#-------
-fileOverwrite_/opt/IBM/ESM/Agent/karaf/version=Yes
-fileOverwrite_/opt/IBM/ESM/Agent/Uninstall_ESM_Agent.lax=Yes
-fileOverwrite_/opt/IBM/ESM/Agent/properties/version/ibm.com_IBM_Enterprise_Content_Manageme
nt_System_Monitor_Agent-5.5.4.swidtag.xml=Yes
```

AIX based server

- Open a "shell (root)" and execute the installation package as shown:

```
<YourPackageLocation>/ESM_Server_Installer.bin          -i          silent          -f
<YourPropertiesLocation>\installer.properties
```

Example 5. Example for installer.properties file with H2 Database

```
# Thu Jan 04 01:40:27 EST 2018
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#-----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=/opt/IBM/ESM/Server

#Server Settings
#---------------
SERVER_HOSTNAME=localhost
SERVER_IP=0.0.0.0
SERVER_PORT=1883
JETTY_PORT=80
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=443
RMI_REGISTRY_PORT=1099
RMI_SERVER_PORT=44444
SSH_PORT=8101

#Configuration Database Settings
#-------------------------------
JDBC_URL=jdbc:h2:./configuration;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
JDBC_DRIVER_NAME=org.h2.Driver
JDBC_USER=db
JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Monitoring Database Settings
#----------------------------
MONITORING_JDBC_URL=jdbc:h2:./monitoring;AUTO_SERVER=TRUE;AUTO_RECONNECT=TRUE;MV_STORE=FALSE
MONITORING_JDBC_DRIVER_NAME=org.h2.Driver
MONITORING_JDBC_USER=db
MONITORING_JDBC_PASSWORD=ENC(JWvE1aMYXp+TQMRha6gROg==,PasswordEncryptor)

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0

#Install
#-------
-fileOverwrite_/opt/IBM/ESM/Server/Uninstall_ESM_Server.lax=Yes
```

AIX based agent

- Open a "shell (root)" and execute the installation package as shown:

```
<YourPackageLocation>/ESM_Agent_Installer.bin -i silent -f
<YourPropertiesLocation>\installer.properties
```

Example 6. Example for installer.properties file

```
# Thu Jan 04 01:54:20 EST 2018
# Replay feature output
# ---------------------
# This file was built by the Replay feature of InstallAnywhere.
# It contains variables that were set by Panels, Consoles or Custom Code.


#Indicate whether the license agreement been accepted
#-----------------------------------------------------
LICENSE_ACCEPTED=TRUE

#Choose Installation Folder
#--------------------------
USER_INSTALL_DIR=/opt/IBM/ESM/Agent

#Agent Settings
#--------------
CLIENT_ID=Agent
SERVER_HOSTNAME=localhost
SERVER_PORT=1883
JETTY_PORT=1180
JETTY_SECURE_ENABLED=true
JETTY_SECURE_DISABLED=false
JETTY_SECURE_PORT=1543
RMI_REGISTRY_PORT=2099
RMI_SERVER_PORT=55555
SSH_PORT=9202

#Start Up Settings
#-----------------
AUTO_START=1
NOT_AUTO_START=0
SYSTEM_START=1
NOT_SYSTEM_START=0

#Install
#-------
-fileOverwrite_/opt/IBM/ESM/Agent/Uninstall_ESM_Agent.lax=Yes
```

Tests for a successful installation

- Check if the services or start up files have been created.
- Login to your console (http(s)://<hostname>:<port>
- The default login is admin / admin, please change the password.
- See if the console is behaving normal. Switch between dashboards and check if it is working, etc.

De-installation of the software

InstallAnywhere offers an uninstall method that can be used.

Windows based systems

On Windows based installations the uninstall can be triggered via ControlPanel → Programs → Programs and Features. Select the Software (Server / Agent) you want to uninstall and click on the uninstall button.

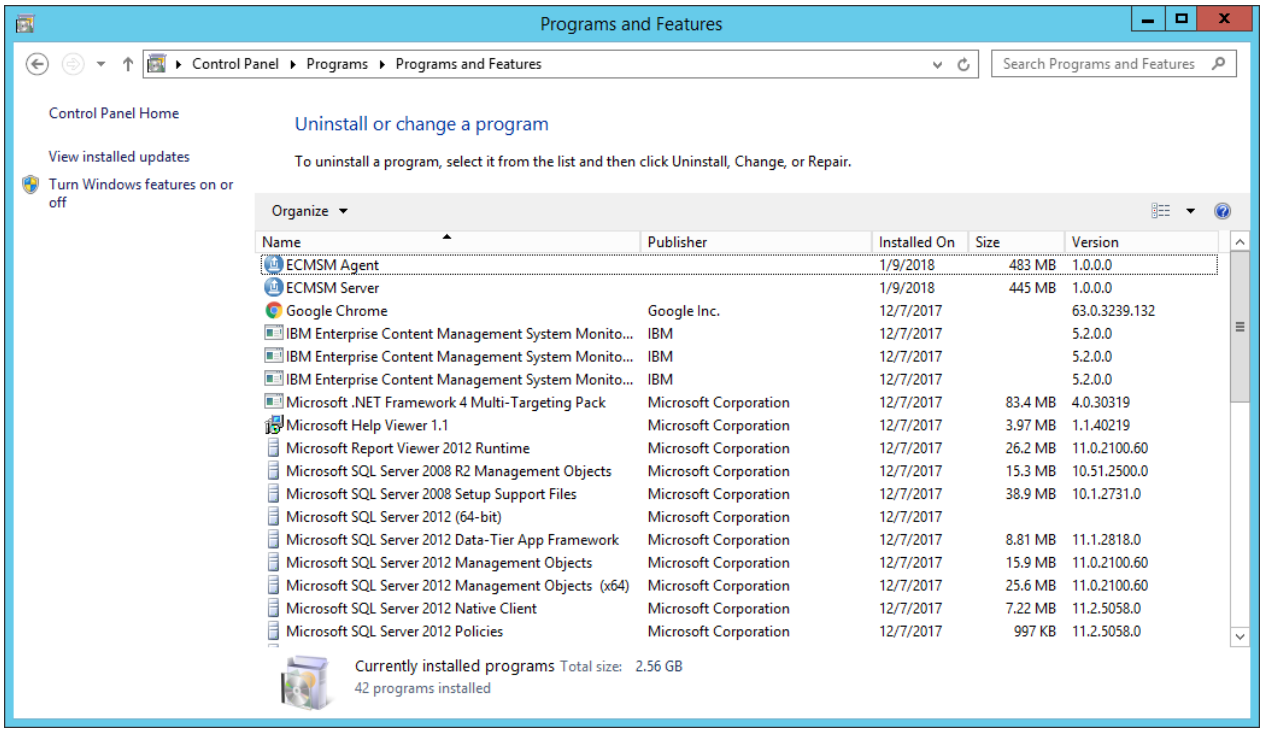

Image of Program and Features

Follow the procedure, the first window will point out that you are about to uninstall the product.

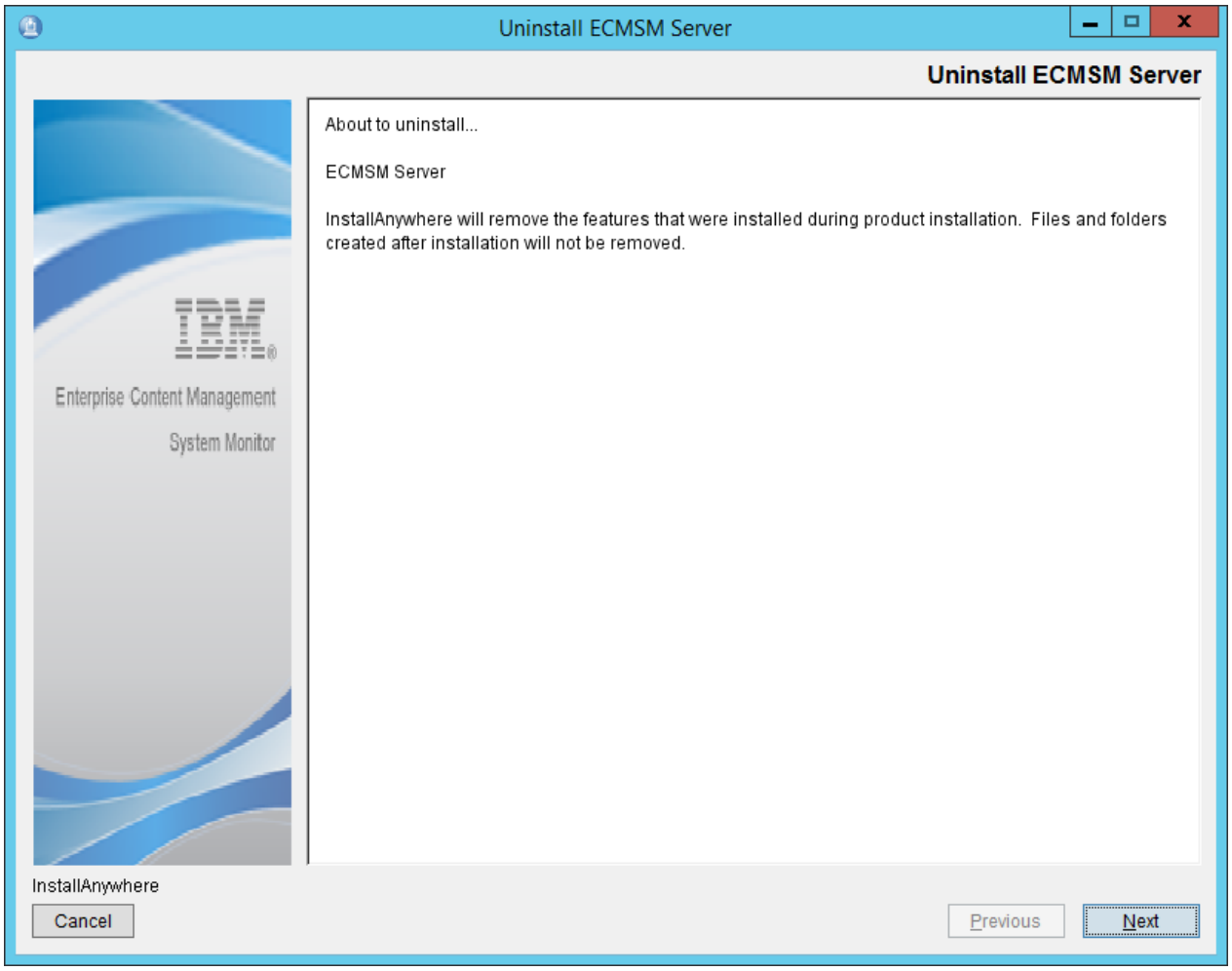

Image of Uninstall ESM Server

Select the Uninstall Option, by default "Complete Uninstall" is selected.

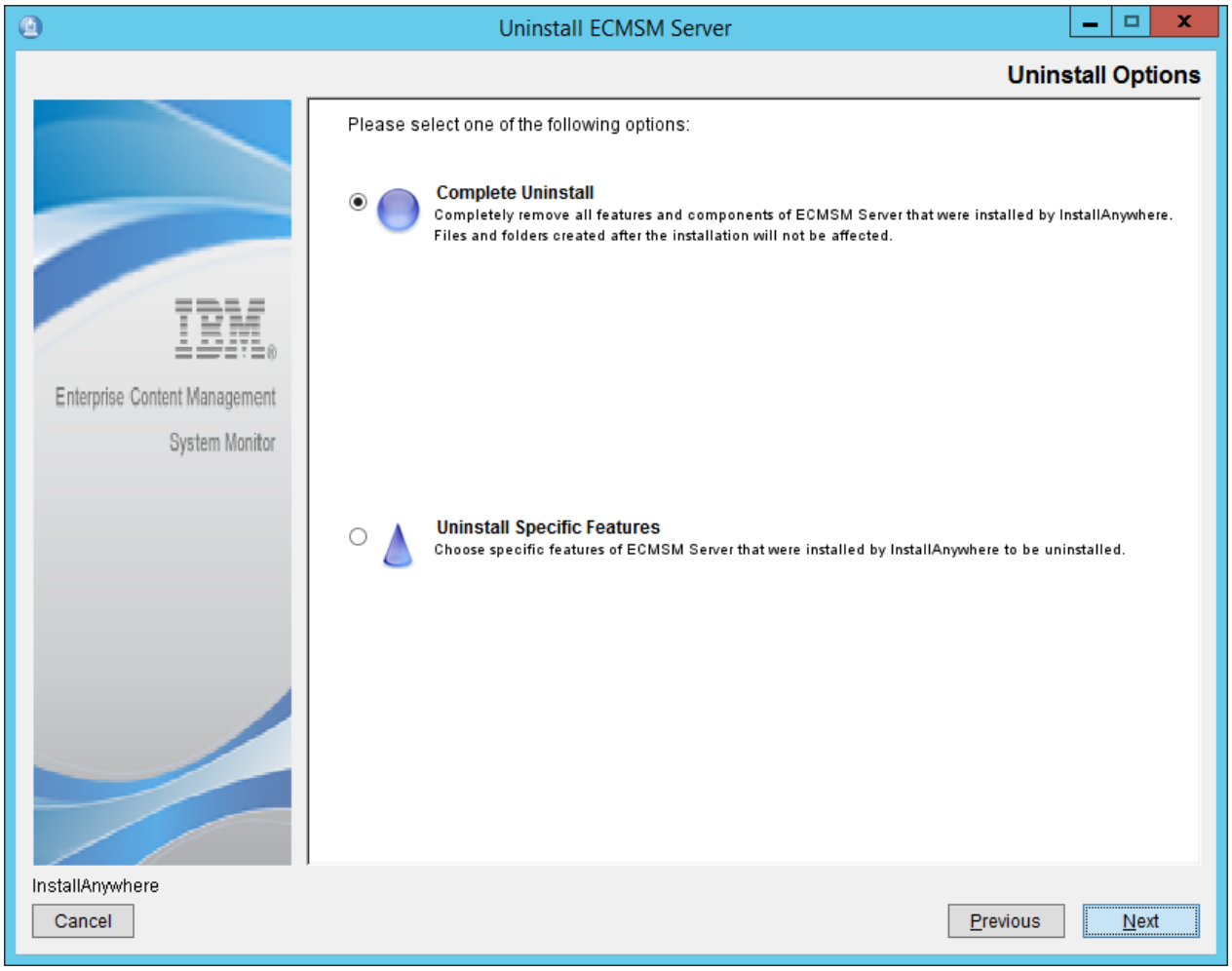

Image of Uninstall Options

The software is getting uninstalled. It can happen that not all files could be removed during uninstall process.

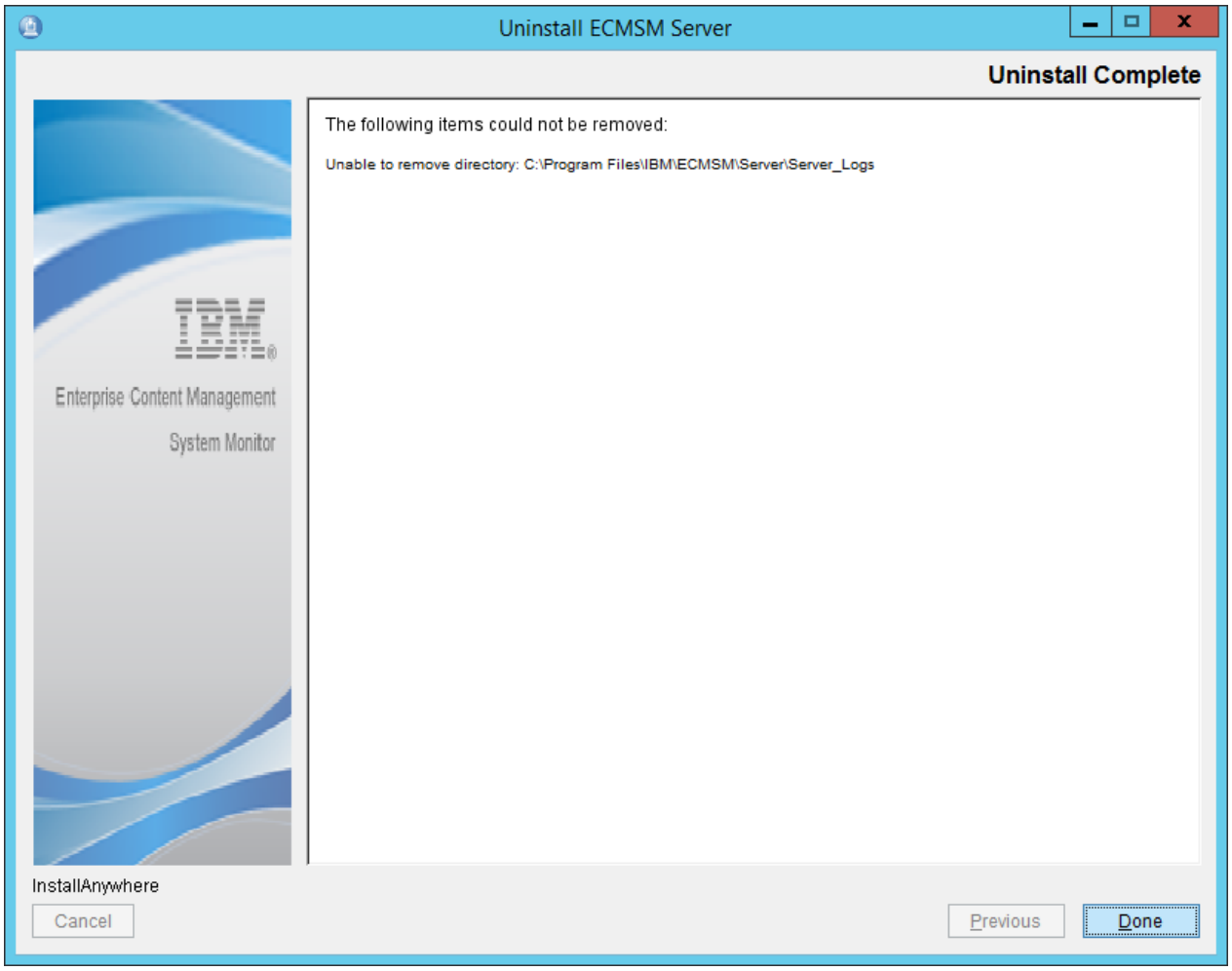

Image of Uninstall Complete

Please review the installation folder afterwards. You can delete any left over files and folders.

Linux based systems

On Linux based installations the uninstall can be triggered via an uninstall binary (Uninstall_ESM_Agent or Uninstall_ESM_Server both located in the *`Installation_Root`*). Please make sure that you have the possibility of running a graphical installer (X11 is enabled) otherwise the procedure starts in console mode.

Follow the procedure, the first window will point out that you are about to uninstall the product.

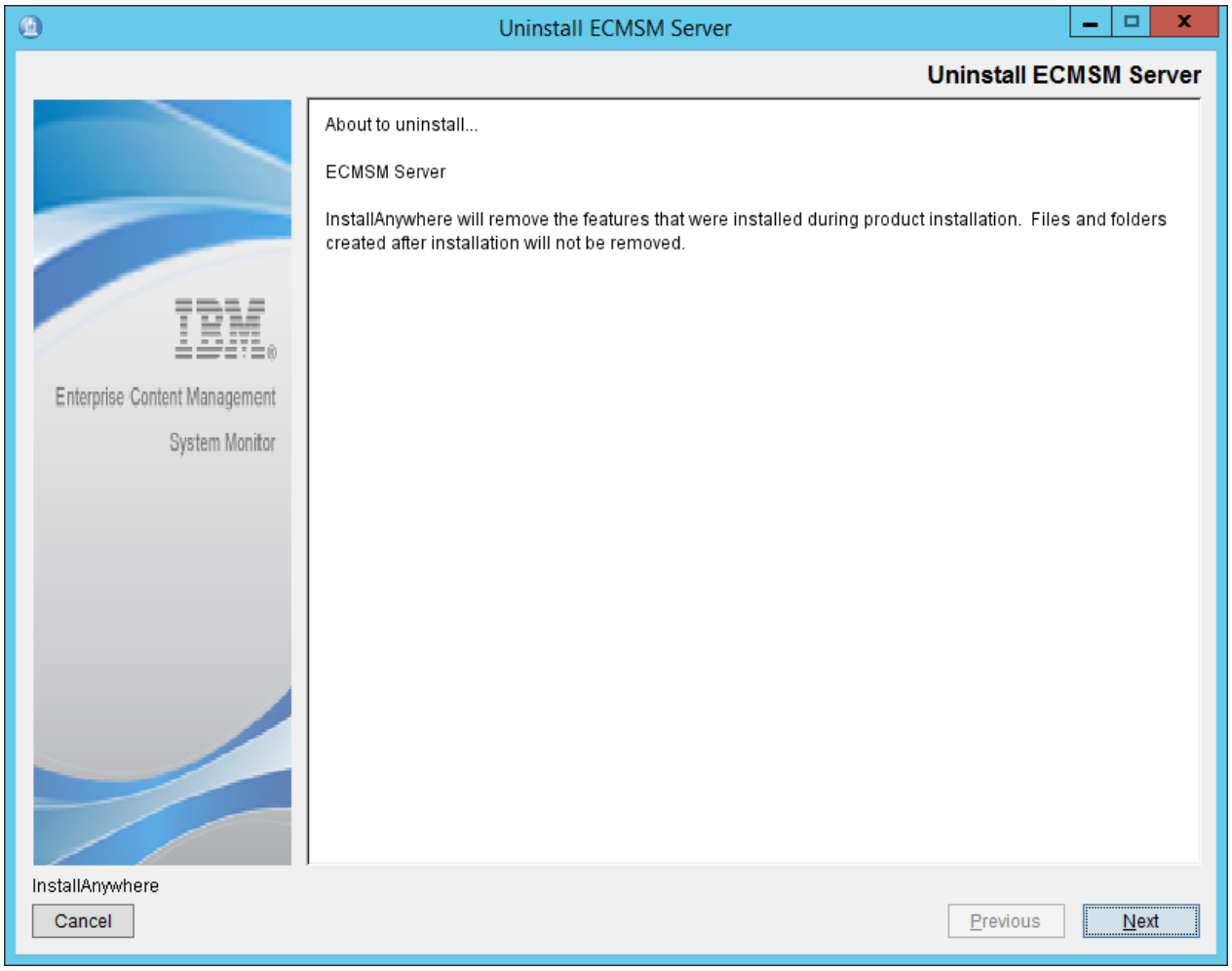

Image of Uninstall ESM Server

Select the Uninstall Option, by default "Complete Uninstall" is selected.

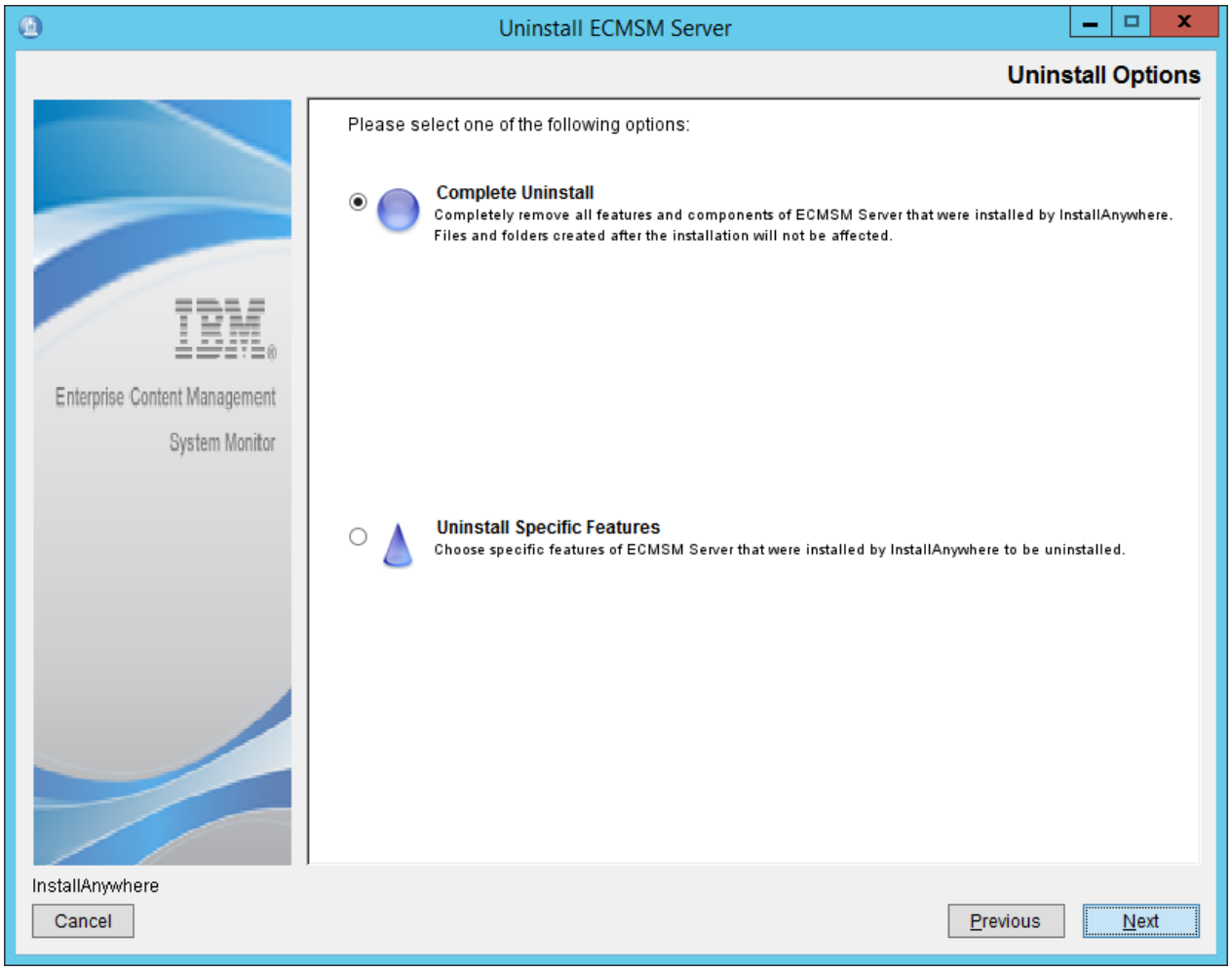

Image of Uninstall Options

The software is getting uninstalled. It can happen that not all files could be removed during uninstall process.

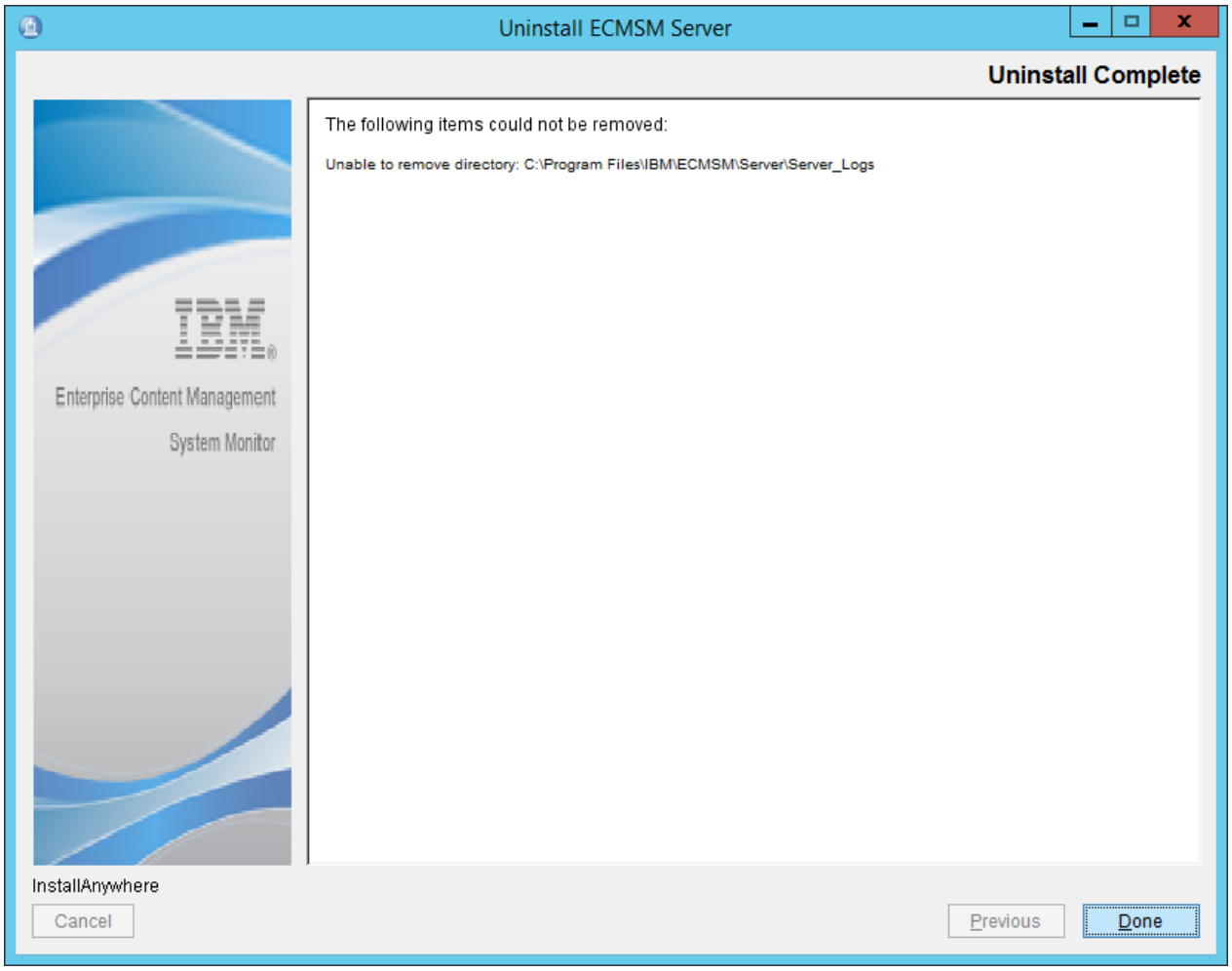

Image of Uninstall Complete

Please review the installation folder afterwards. You can delete any left over files and folders.

AIX based systems

On AIX based installations the uninstall can be triggered via an uninstall binary (Uninstall_ESM_Agent or Uninstall_ESM_Server both located in the *`Installation_Root`*). Please make sure that you have the possibility of running a graphical installer (X11 is enabled) otherwise the procedure starts in console mode.

Follow the procedure, the first window will point out that you are about to uninstall the product.

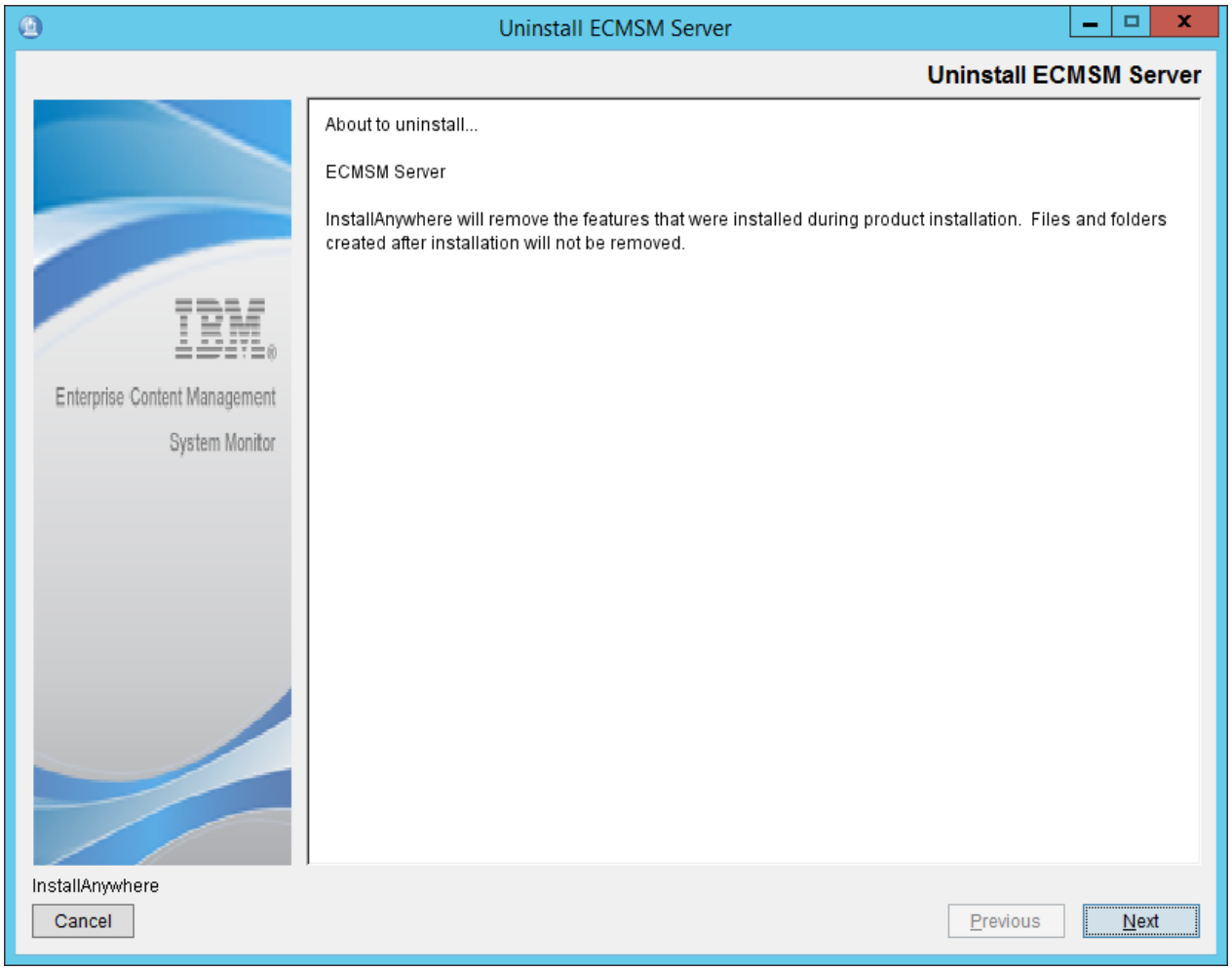

Image of Uninstall ESM Server

Select the Uninstall Option, by default "Complete Uninstall" is selected.

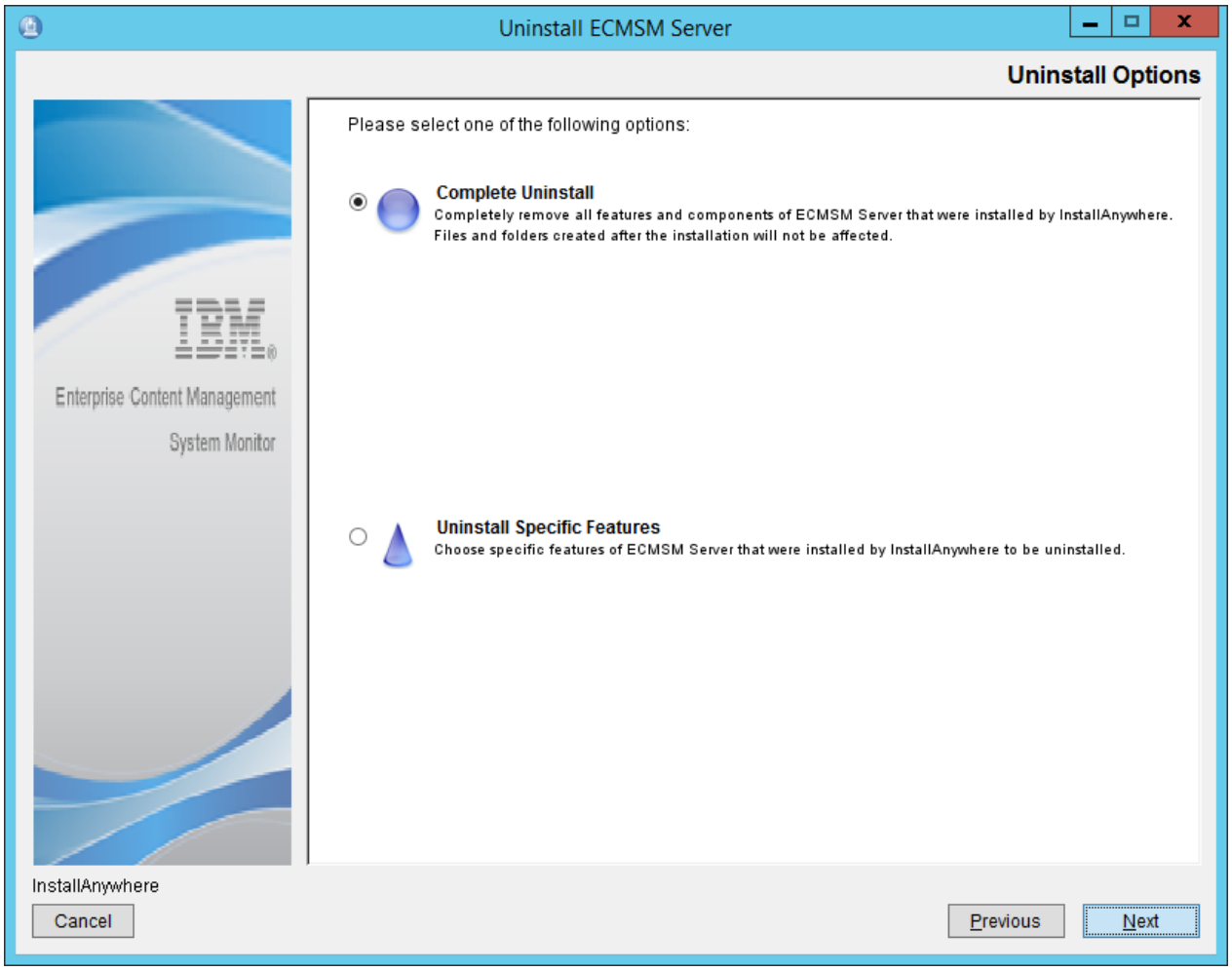

Image of Uninstall Options

The software is getting uninstalled. It can happen that not all files could be removed during uninstall process.

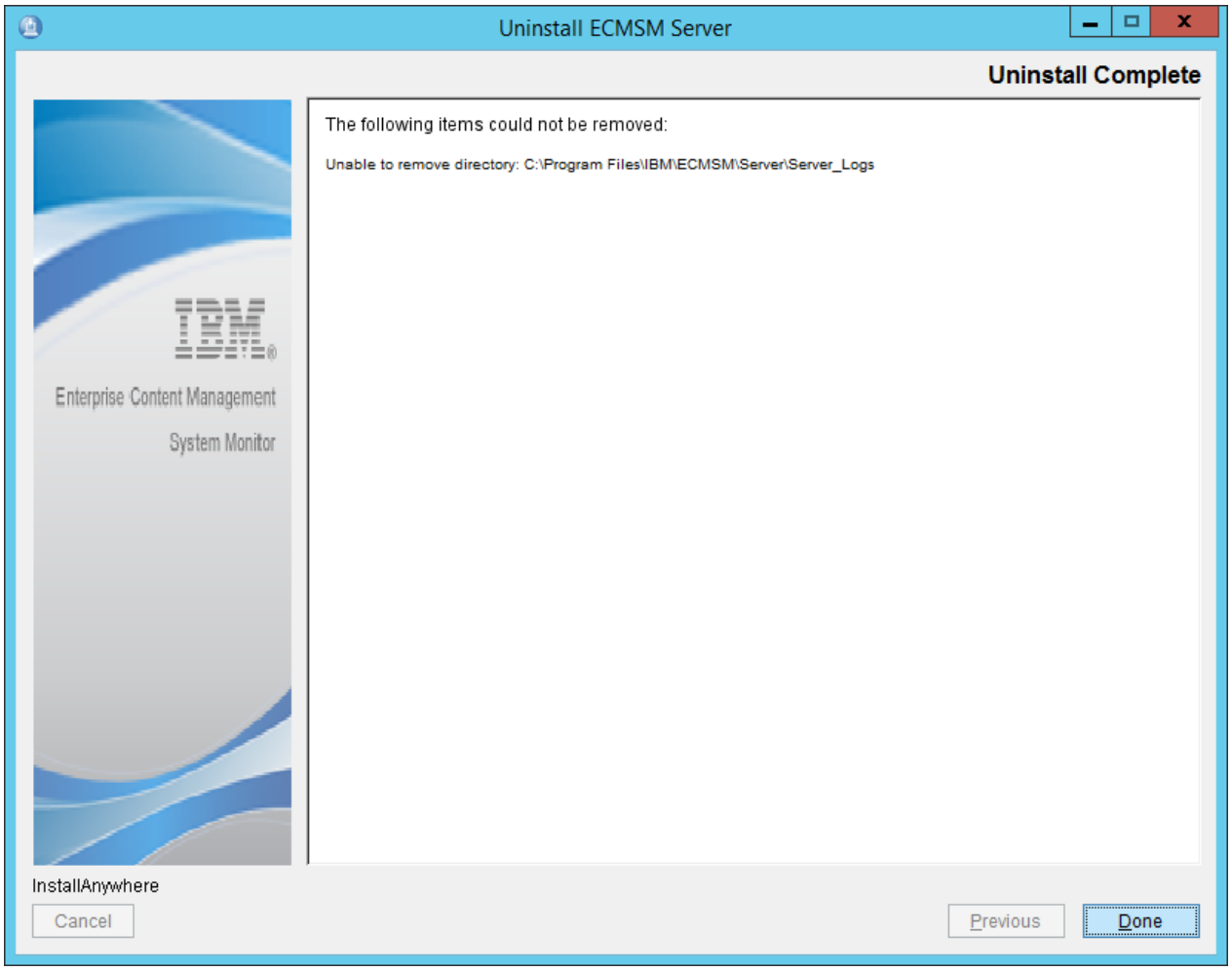

Image of Uninstall Complete

Please review the installation folder afterwards. You can delete any left over files and folders.

Running the ESM server with https - Using self signed or authority signed certificates

The configuration for starting the ESM gui https based is located in the file org.ops4j.pax.web.cfg. The file can be found in <Installation-Root>/karaf/etc. The file also contians a java command which can be executed to create a self signed certificate. The keystore file is located in the subdirectory ssl and named keystore and per default just conatins a dummy certificate.

Create a selfsigned ceritificate

Delete or rename the keystore file before running the command. The ESM server must be stopped.

Example 7. Java Command

```
$JAVA_HOME/bin/keytool -genkey -keyalg RSA -alias selfsigned -keystore keystore -storepass
password -validity 9999 -sigalg SHA256withRSA -keysize 2048 -storetype jks
```

To create a new self signed certificate open a cmd or shell and switch to <Installation-Root>/karaf/etc/ssl. Execute the following command:

Windows

(CMD with full admin rights) ..\..\..\jre\bin\keytool -genkey -keyalg RSA -alias selfsigned -keystore keystore -storepass password -validity 9999 -sigalg SHA256withRSA -keysize 2048 -storetype jks

Unix/Linux

../../../jre/bin/keytool -genkey -keyalg RSA -alias selfsigned -keystore keystore -storepass password -validity 9999 -sigalg SHA256withRSA -keysize 2048 -storetype jks

Answer the question for username with FQDN of the ESM server. Leave the rest empty or answer if you like.

Restart the ESM - The GUI is available via https on port 443 (default) now.

Use an authority signed certificate

- Request a certificate and private key for the certificate. The certificate must contain all possible subject alternative names like alias, hostname and hostname + domain.
- Make sure you have the password for the private key, best is if the password is already password.
- Create a keystore with the name keystore from type jks.
- As password for the keystore use password.
- Add the server certificate and the private key to this keystore.
- The private key password must be password within the keystore.
- Replace the keystore file in <Install-Dir>/karaf/etc/ssl on the ESM Server

- Restart the ESM Server afterwards - The GUI is available via https on port 443 (default) now and uses the new certificate.

NOTE Use a tool like keystore explorer for this procedure. It can be used to export and import certificates and private keys with password change etc.

IMPORTANT The keystore file is not maintained and is overwritten during the update process, please keep a copy and replace the file again after the update.

Installing ESM 5.5.9 Containers

This section is intended for administrators and developers who want to operate ESM in a Container environment. Two installation types are covered:

- **Installation on a Container Orchestration Platform** Running ESM on a Kubernetes or OpenShift 4.x Cluster. This is the primary option if the cluster runs the applications that are to be monitored using the capabilities of ESM.
- **Installation on a Container Runtime:** Running ESM directly on a Container Runtime (i.e. Docker). This option is suitable for getting familiar with the product or in scenarios in which there is no Container Orchestration Platform (like OpenShift) available. This type of installation is described in this document

To follow this guide the reader should be familiar with the following topics:

- Operating on a Linux Shell
- Linux Containers concepts (Docker, containerd, CRI-O …)
- YAML

Tracking License Consumption of ESM

License Service is required for monitoring and measuring license usage of ESM in accord with the pricing rule for containerized environments. Manual license measurements are not allowed. Deploy License Service on all clusters where ESM is installed.

Overview

The integrated licensing solution collects and stores the license usage information which can be used for audit purposes and for tracking license consumption in cloud environments. The solution works in the background and does not require any configuration. Only one instance of the License Service is deployed per cluster regardless of the number of Cloud Paks and containerized products that you have installed on the cluster.

Deploying License Service

Deploy License Service on each cluster where ESM is installed. License Service can be deployed on any Kubernetes cluster. For more information about License Service, how to install and use it, see the License Service documentation.

Validating if License Service is deployed on the cluster

To ensure license reporting continuity for license compliance purposes make sure that License Service is successfully deployed. It is recommended to periodically verify whether it is active.

To validate whether License Service is deployed and running on the cluster, you can, for example, log in to

the cluster and run the following command:

```
kubectl get pods --all-namespaces | grep ibm-licensing | grep -v operator
```

The following response is a confirmation of successful deployment:

```
1/1 Running
```

You can also check the License Service is running and the license metrics of ESM pods are measured corectly by accessing the status page. Follow the steps on Obtaining a status page.

Installation on Kubernetes & OpenShift 4.x

For this option a Helm Chart is available to automate the installation of ESM in a Kubernetes or OpenShift 4.x Cluster. The Helm Chart and all associated documentation can be found on GitHub.

Installation on a Container Runtime

Prerequisites

- A **Container Runtime**, such as `docker` is available on the system on which ESM shall be installed. Installing a Container Runtime is out of scope of this documentation.
- The **ESM Container Images** are either available in `.tgz` file format or are pullable from a Container Registry.
- A **Linux Shell** to execute the described commands on.

Load Container Images

A locally running Container Registry is not mandatory in order to install the ESM container images. To simplify the installation, the images are loaded from `.tgz` archives consisting of the ESM Container Images.

Example 8. Example for loading the images

```
docker load -i esmserver.tgz
docker load -i esmagent.tgz
```

NOTE Images can alternatively be pulled from a registry using `docker pull <image name>`, in case the images are provided by a Container Image Registry to which the host has access to.

Provide a Common Container Network

A complete installation of ESM consists of a `esmserver` container and a `esmagent` container, whereat both containers need to communicate with each other. For this purpose, either use an exisiting Virtual Container Network, or create a dedicated one for ESM, like in this example:

Example 9. Example for creation of virtual container network

```
docker network create smnet
```

Run ESM Server Container With a Built-in H2 Database

In case the `esmserver` is executed without custom JDBC settings, the default behaviour is to initialize built-in H2 databases. H2 database instances run within the main container process of `esmserver` and do neither require a separate database container nor require a remote database to be provided.

Ephemeral Storage

Run a `esmserver` container with default settings and ephemeral storage:

Example 10. Example for running the container with default settings and ephemeral storage

```
docker run -d --name smserver \
    --net=smnet \
    -p 8080:8080 \
    -p 1883:1883 \
    esmserver:5.5.9.1-000
```

The option `--net=smnet` is not required to run the container, but is needed to attach `esmagent` containers later.

CAUTION This container deployment stores all configuration on ephemeral storage, which will vanish on deletion of the container.

Persistent Storage

When using persistent storage, configuration and monitoring data collected with ESM Server will survive a complete removal and recreation of the container. To prepare persistent storage, create two directories on your local system which will each be mounted as volume on the container:

Example 11. Example for creation of volumes

```
docker volume create smdb

docker volume create smdeploy
```

Directory `smdb` will be used to store the H2 database files of ESM Server. Directory `smdeploy` can be used to provide additional dependencies to the ESM Server like 3rd party libraries or JDBC drivers.

The following command creates a ESM Server container with both of these directories mounted as volumes on the appropriate paths within the ESM Server's directory structure:

Example 12. Example for the container configuration and mounting the volume for the H2 databases

```
docker run -d --name smserver \
    --net=smnet \
    -p 8080:8080 \
    -p 1883:1883 \
    -v smdb:/opt/sm/server/karaf/db \
    -v smdeploy:/opt/sm/server/karaf/deploy \
    esmserver:5.5.9.1-000
```

CAUTION

If existing H2 database files are found on the volume mounted, ESM Server will attempt to use these databases instead of overwriting them. In case the existing database files originate from an older version of ESM than the current container, the databases will be updated automatically.

Run ESM Server Container With IBM DB2

ESM provides support for IBM DB2 databases to store monitoring data and configuration data. With this option, collected monitoring data are stored in a DB2 database, instead of the built-in H2 database. Configuration data originating from configuration procedures in the Web UI cannot be stored in a DB2 database, but are still written to a built-in H2 database.

NOTE

ESM Server needs access to an *existing*, but empty database. ESM Server will not create the database itself. Hence, the user id for accessing the database does not require permissions to create a database, but only to create database objects.

Run a Local IBM DB2 Container

For testing and learning purposes it is possible to use an IBM DB2 database in a container on the same host. The following command will run an IBM Db2 database instance, which is attached to the common container network.

NOTE

ESM Server needs a Db2 database with a page size of 32768. By default the Db2 container used in these instructions does use a smaller page size. To mitiate this behaviour, the Db2 container’s database creation scripts are modified.

The following commands instantiate a fresh Db2 container for later usage by ESM Server with all the

neccessary prerequisities:

Example 13. Example for optional Db2 Container

```
# Create a directory to mount as a volume for persistence of the Db2
container's database data
docker volume create db2vol

# Run the container using the volume
docker run -itd -h mydb2 --name mydb2 \
    --net=smnet \
    --privileged=true \
    -p 50000:50000 \
    -e LICENSE=accept \
    -e DB2INST1_PASSWORD='MyDb2Database!' \
    -v db2vol:/database \
    docker.io/ibmcom/db2:11.5.5.0
```

On container start, the required image will be pulled automatically from Docker Hub's Image Registry, in case an internet connection is available. Find more information in the container's official documentation on Docker Hub. Startup and database initialization may take some time. The installation progress can be monitored by checking the container's log stream output for the term `Setup has completed`:

Example 14. Example for checking the log stream

```
docker logs -f mydb2 | grep "Setup has completed"
```

In the next step, the required Db2 database is created by using the CLI tools within the Db2 container:

Example 15. Example for creating the required Db2 databases

```
# Enter the container (the prompt will look like this: [db2inst1@mydb2 ~]$)
docker exec -ti mydb2 bash -c "su - db2inst1"

# Create the databases for {productName} Server (it may take several minutes
for the commands to complete)
db2 create database confdb pagesize 32768
db2 create database mondb pagesize 32768

# Check whether the database has been created correctly
db2 list database directory

# Quit the Db2 container's shell
exit
```

Provide Db2 JDBC Driver

It is required to provide a JDBC driver for IBM Db2. JDBC drivers required for ESM to establish connections to a DB2 database are not delivered with the ESM Container Images. Suitable JDBC drivers can be obtained from IBM's website or the Maven repository.

The JDBC driver has to be provided to the container on a volume. This is accomplished by creating a new volume and copying the driver into a volume, which will then later be used during the creation of the ESM Server container.

Example 16. Example for downloading the Db2 JDBC driver

```
wget -O db2jdbc.jar
https://repo1.maven.org/maven2/com/ibm/db2/jcc/11.5.5.0/jcc-11.5.5.0.jar
```

To make the JDBC driver accessible to the ESM Server it needs to be copied to the `smdeploy` volume.

Example 17. Example for copying the Db2 JDBC driver to the "smdeploy" volume

```
# Create a temporary container
docker container create \
    --name temp \
    -v smdeploy:/data \
    esmserver:5.5.9.1-000

# Use the container to copy the driver to the volume
docker cp db2jdbc.jar temp:/data

# Remove the temporary container
docker rm temp
```

Run ESM Server Container

In addition to running the container with a built-in database, using a Db2 database requires passing of JDBC parameters to the container:

- `JDBC_DRIVER_NAME`: Most likely `com.ibm.db2.jcc.DB2Driver`. May differ for future versions of DB2 JDBC drivers.
- `JDBC_URL`: URL including host, port, and database name. In a container context, make sure a to use a valid IP or DNS name that resolves to the remote DB2 database or a local DB2 container.
- `JDBC_USER` and `JDBC_PASSWORD`: Credentials for accessing the database.
- `JDBC*` variables without prefix `MONITORING_` refer to the ESM configuration database. Variables including the prefix `MONITORING_` refer to the ESM monitoring database.

The following example shows how to start the ESM Server container based on the Db2 preparations accomplished previously:

Example 18. Example for using the local Db2 container with ESM Server

```
docker run -d --name smserver \
    --net=smnet \
    -p 8080:8080 \
    -p 1883:1883 \
    -v smdeploy:/opt/sm/server/karaf/deploy \
    -e JDBC_DRIVER_NAME='com.ibm.db2.jcc.DB2Driver' \
    -e JDBC_URL='jdbc:db2://mydb2:50000/confdb' \
    -e JDBC_USER='db2inst1' \
    -e JDBC_PASSWORD='MyDb2Database!' \
    -e MONITORING_JDBC_DRIVER_NAME='com.ibm.db2.jcc.DB2Driver' \
    -e MONITORING_JDBC_URL='jdbc:db2://mydb2:50000/mondb' \
    -e MONITORING_JDBC_USER='db2inst1' \
    -e MONITORING_JDBC_PASSWORD='MyDb2Database!' \
    esmserver:5.5.9.1-000
```

Run ESM Server Container With SQL Server

ESM provides support for Microsoft SQL Server databases to store monitoring data and configuration data. With this option, collected monitoring data are stored in a DB2 database, instead of the built-in H2 database. Configuration data originating from configuration procedures in the Web UI cannot be stored in a DB2 database, but are still written to a built-in H2 database.

NOTE ESM Server needs access to an *existing*, but empty database. ESM Server will not create the database itself. Hence, the user id for accessing the database does not require permissions to create a database, but only to create database objects.

Run a Local SQL Server Container

For testing and learning purposes it is possible to use a SQL Server database in a container on the same host. The following command will run an SQL Server database instance, which is attached to the common container network:

Example 19. Example for runnig an SQL Server container

```
# Create a Docker volume for persistence of the SQL Server container's database
data
docker volume create sqlvol

# Run the container
docker run -d --name sqlserver \
    --net=smnet \
    -p 1433:1433 \
    --name sqlserver \
    -h sqlserver \
    -e ACCEPT_EULA='Y' \
    -e SA_PASSWORD='MySQLServerDatabase!' \
    -v sqlvol:/var/opt/mssql \
    mcr.microsoft.com/mssql/server:2019-latest
```

On container start, the required image will be pulled automatically from Microsoft's Image Registry, in case an internet connection is available. Find more information on the container in its official documentation at Microsoft. Startup and database initialization may take some time. The installation progress can be monitored by checking the container's log stream output for the message `SQL Server is now ready for client connections.`:

Example 20. Example for checking the log stream

```
docker logs -f sqlserver | grep 'ready for client connections'
```

To create the database required by ESM Server, run the following command in the container:

Example 21. Example for creating a database on the newly started SQL Server container

```
docker exec -it sqlserver /opt/mssql-tools/bin/sqlcmd \
    -S localhost -U SA -P "MySQLServerDatabase!" \
    -Q 'CREATE DATABASE confdb COLLATE Latin1_General_CI_AS;
        CREATE DATABASE mondb COLLATE Latin1_General_CI_AS;
        SELECT name FROM master.sys.databases'
```

Provide SQL Server JDBC Driver

It is required to provide a JDBC driver for Microsoft SQL Server. JDBC drivers required for ESM to establish connections to a DB2 database are not delivered with the ESM Container Images. Suitable JDBC drivers can be obtained from Microsoft's website or the Maven repository.

The JDBC driver has to be provided to the continer on a volume. This is accomplished by creating a new volume and copying the driver into a volume, which will then later be used during the creation of the ESM Server container.

Example 22. Example for downlading the SQL Server JDBC driver

```
wget -O sqljdbc.jar
https://repo1.maven.org/maven2/com/microsoft/sqlserver/mssql-
jdbc/9.2.1.jre8/mssql-jdbc-9.2.1.jre8.jar
```

To make the JDBC driver accessible to the ESM Server it needs to be copied to the `smdeploy` volume.

Example 23. Example for copying the SQL Server JDBC driver to the "smdeploy" volume

```
# Create a temporary container
docker container create \
    --name temp \
    -v smdeploy:/data \
    esmserver:5.5.9.1-000

# Use the container to copy the driver to the volume
docker cp sqljdbc.jar temp:/data

# Remove the temporary container
docker rm temp
```

Run ESM Server Container

Example 24. Example for using the local SQL Server container with ESM Server

```
docker run -d --name smserver \
    --net=smnet \
    -p 8080:8080 \
    -p 1883:1883 \
    -v smdeploy:/opt/sm/server/karaf/deploy  \
    -e JDBC_DRIVER_NAME='com.microsoft.sqlserver.jdbc.SQLServerDriver' \
    -e JDBC_URL='jdbc:sqlserver://sqlserver:1433;databaseName=confdb' \
    -e JDBC_USER='sa' \
    -e JDBC_PASSWORD='MySQLServerDatabase!' \
    -e
MONITORING_JDBC_DRIVER_NAME='com.microsoft.sqlserver.jdbc.SQLServerDriver' \
    -e MONITORING_JDBC_URL='jdbc:sqlserver://sqlserver:1433;databaseName=mondb'
\
    -e MONITORING_JDBC_USER='sa' \
    -e MONITORING_JDBC_PASSWORD='MySQLServerDatabase!' \
    esmserver:5.5.9.1-000
```

Run ESM Agent Container

Run an instance of ESM Agent with the following commands:

Example 25. Example for runnig an instance

```
docker run -d --name smagent \
    --net=smnet \
    -p 1180:1180 \
    -e SERVER_HOSTNAME='smserver' \
    -e CLIENT_ID='agent01' \
    esmagent:5.5.9.1-000
```

Variable `SERVER_HOSTNAME` must contain an IP address or DNS name that resolves to the ESM Server Container. In the example above it can use the name ESM Server Container as all containers have been started within the same network (`smnet`). The value for `CLIENT_ID` must be unique among all instances of Agents that connect to the same Server.

Accessing ESM Server Web GUI

Access the Web GUI using a http://IP-or-DNS-to-container:8080. Section "Agents" should list the previously started Agent Container with status `online`.

Troubleshooting

Container Logs

Extended logging can configured with the container environment variable `LOG_LEVEL`. Example:

Example 26. Example for adjusting the logging

```
-e LOG_LEVEL='DEBUG'
```

Validating DB2 Database Initialization

If an IBM Db2 database is used for the storage of Monitoring Data, ESM Server Container will automatically create all required database objects. To verify this on a DB2 database running as local container, enter the container:

Example 27. Example for entering the container

```
docker exec -ti mydb2 bash -c "su - db2inst1"
```

Run the Db2 CLI in the container:

Example 28. Example for running DB2 CLI in the container

```
db2
```

On the DB2 CLI, check the contents of the database for tables created by ESM Server:

Example 29. Example for checking the content

```
db2 => connect to smdb
db2 => list tables
```

The `list tables` command should print an output similar to the following:

Example 30. Example output of list tables

```
Table/View                      Schema          Type  Creation time
------------------------------- --------------- ----- --------------------------
DATABASECHANGELOG               db2inst1        T     2020-03-23-
11.04.47.610978
INCIDENT                        db2inst1        T     2020-03-23-
11.04.50.708366
INCIDENT_SAMPLEIDS              db2inst1        T     2020-03-23-
11.04.53.040725
SAMPLE                          db2inst1        T     2020-03-23-
11.04.53.600320
[...]
```

Validating SQL Server Database Initialization

If an SQL Server database is used for the storage of Monitoring Data, ESM Server Container will automatically create all required database objects. To verify this on a SQL Server database running as local container, enter the container:

Example 31. Example for querying for tables in "smdb"

```
docker exec -it sqlserver /opt/mssql-tools/bin/sqlcmd \
    -S localhost -U SA -P "MySQLServerDatabase!" \
    -Q 'SELECT TOP 10 TABLE_NAME FROM smdb.INFORMATION_SCHEMA.TABLES'
```

Example 32. Example output of tables

```
TABLE_NAME
------------------------------
INCIDENT
INCIDENT_SAMPLEIDS
SAMPLE
DATABASECHANGELOG
AGENT
AGENT_FILES
AUDITLOG
CONFIGURATION
CONFIGURATION_CONFIGURATION
CONFIGURATION_PROPERTY
[...]
```

Teardown & Cleanup

The ESM Server and ESM Agent containers catch signals sent by commands such as `docker stop` and thereupon attempt to stop themselves gracefully.

Example 33. Example for docker stop

```
docker stop smserver
docker stop smagent
```

To forcefully stop and delete the ESM containers at once, use:

Example 34. Example for forcefull stop

```
docker rm -f smserver
docker rm -f smagent
```

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IBM Enterprise Content Management System Monitor

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