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Materialise
Build Processor

User Guide

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1 Introduction to Build Processors

Materialise works in close collaboration with HP to develop a customized and integrated solution, which allows you to get the most out of your HP machines and create parts with the highest quality possible. Our **Build Processor Software** can be considered as an advanced export function that bridges the gap between your digital build files and your HP Jet Fusion machine, helping to ensure a smooth and trouble free production.

How the Build Processor connects the HP Machine to the Materialise 3D Print Suite, is visualized below:

The complete Materialise 3D Print Suite includes the following components:

Create the best designs for 3D Printing	Prepare your files for 3D Printing	Get the most out of your 3D printing machine	Manage your AM production process
Materialise 3-matic Design Optimization	**Materialise Magics** Data Preparation	**Materialise Build Processor** Machine Communication	**Materialise Streamics** Production Management
	Materialise Magics Reporting Quotes and Measurements	**Materialise Control Platform** Machine Control and Steering	**Materialise Robot** Workflow Automation
	Materialise MiniMagics Free File Viewer		**Materialise Cloud** Workflow Automation
	Materialise e-Stage Automatic Support Generation		

2 This user guide…

…will give you an overview of all the features and functions of the HP Build Processor.

Getting started with **Build Processor machine management** is explained in a separate manual that you can find under the **help** icon in the Build Processor manager. Here you can find everything that is common across all the Build Processors. Like how to add and manage machines.

Technical Requirement

These boxes appear throughout this guide and describe a technical requirement to ensure that the HP Build Processor works correctly. If you are not sure on how to attend to these, please contact your IT department.

Warnings / Notifications

These boxes appear throughout this guide and emphasize various warnings or important notifications. Many of these are linked to some of the more frequently asked questions regarding the workings of the HP Build Processor.

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3 Setup

3.1. Prerequisites

Before installing the HP Build Processor

- It would be a great help if you could contact us in case you experience any unexpected software behavior. For all problems, questions or suggestions regarding the HP Build Processor (installation/ use of software), please contact your local Materialise office (see chapter 9: Support on page 22).

- Please follow the installation steps in the given order and verify your installations to ensure that your HP Build Processor works correctly. The HP Build Processor has been tested and verified on Windows® operating system version 7 and 10 and requires at least Materialise Magics software version 24. Be sure to check out section 3.3: Licensing on page 9 before using the HP Build Processor from Materialise Magics software.

- We hope you will enjoy the HP Build Processor!

In order to install and use the HP Build Processor, you need the following:

Minimal System Requirements:

- Windows® operating system version 7 or 10

Software Installation Packages:

- Materialise Magics software version 24 or higher
- HP Build Processor 2.0

Technical Requirement

Please note that administrative rights are required to install the components.

3.2. Installation

3.2.1 HP Build Processor

1. Double click the **HP Build Processor bundled installer**:
   This is a 'bundled installer', meaning that it is responsible for installing all the different necessary components to run the HP Build Processor. These include:

   - Microsoft® .NETFramework 4.6.2
   - Materialise License Server 7.0
   - Build Processor Manager 3.0
   - Build Processor Interface 3.1.1
   - HP Build Processor 2.0

2. Select a language, accept the license agreement and press **Install**
3. The following screen will appear, informing you about the components that are already installed on your system and those that will be installed during this installation. In the following dialog press **Proceed**:
   - ☑ indicates that the component is (already) installed on your system.
   - When no such icon preceeds the component name, it means that it will be installed upon pressing **Proceed**

4. The Build Processor Manager, HP Build Processor and other components will be installed or updated. A final screen will appear showing you the overall result of the installation process. Press **Finish** to close the installation window.

Technical Requirement

If prompted to reboot your system after installation, please do as such.

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5. Before using the HP Build Processor, please verify that all components have been correctly installed by checking the Programs and Features list on your system:
   - Build Processor System
   - Build Processor

3.2.2 Magics

Please refer to the Magics User guide for detailed installation instructions.

3.3. Licensing

For instructions on how to (re)active your Materialise software licenses, please consult:

http://software.materialise.com/frequently-asked-questions-materialise-software

Once the Materialise Magics software and the HP Build Processor have been successfully installed, you will need to license it. The HP Build Processor performs a license check when:

- Processing and uploading a job
- Calling Build Processor functions from within Materialise Magics or Streamics software

You can either license your software locally or use a floating license server to supply a license for you. This section will quickly describe these two different models of licensing.

3.3.1   Working with a Local License

Local Licensing is the traditional system with the license stored locally on each computer (see figure below). The software can only be used on the computer for which the license is issued. However, more than one session of Materialise Magics software & Build Processor can be opened on a single computer.

Local PC(s)
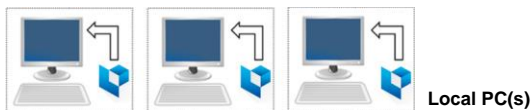
3.3.2   Working with a Floating License

The licenses for Floating Licensing are stored on a central computer somewhere on the company network (Server PC). This computer has the Materialise Floating License Server installed to manage all the licenses available on the network.

When a session of Materialise Magics software and Build Processor is started on a computer, the software will contact the Floating License Server via the network. When there is a license available, the Floating License Server will assign a license to Materialise Magics software & Build Processor allowing it to open.

Server PC

Local PC(s)
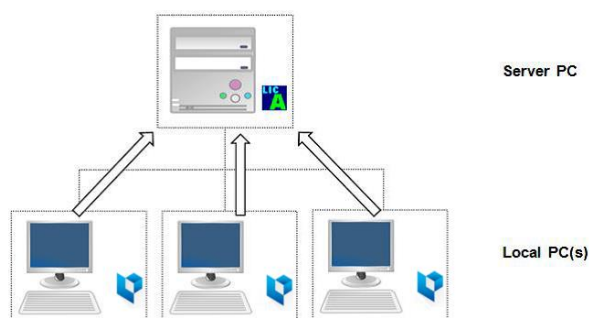
However, if all licenses are in use, Materialise Magics software & Build Processor will not open. The user must wait until elsewhere on the network an open session closes, thus making a license available.

3.4. Add a Machine

Functionality like adding or removing machines, accessing the properties and queue is common for all machines. Please find this in the Build Processor Manager manual.

A Build Processor Manager is always included in your Build Processor installer but it can also be updated independently of your Build Processor.

3.5. Configure a Machine

To access the Configuration window, select the desired Machine and press **Configure**
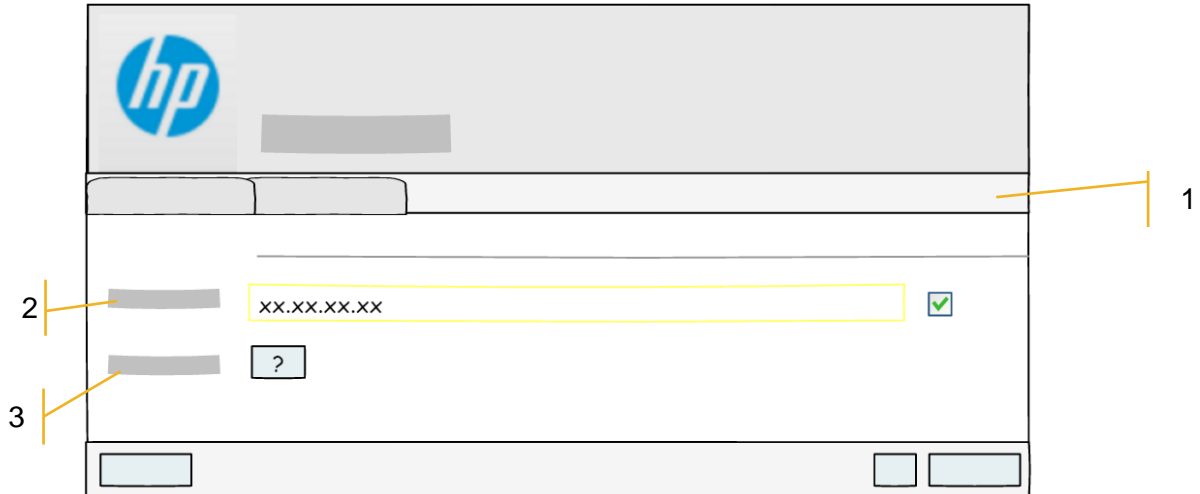
1	Machine Configuration	Configure your machine, this is the active tab
	Profile Editor	Consult the available profiles and parameters. This is explained later.
2	Host/IP Address	Establishing a connection between the HP Build Processor and the HP machine with the IP address.
3	Help	Access the user manual

<u>**Note**</u>
The **edit profiles** will only appear after adding the host and pressing **Ok**.

4 Connect to the HP Machine

The HP Build Processor is the component that bridges the gap between the Materialise Magics 3D print suite (including Magics and Streamics) and the HP machine.

Establishing an active connection between the HP Build Processor and an HP machine is a prerequisite for using the HP Build Processor.

Note

The HP Build Processor connection requires version 1.0 or 1.2 of the HP Machine API

4.1. Establish the Connection

1. Add a new HP Build Processor machine in the Build Processor Manager as explained in the Build Processor Manager manual

2. Access the Configure window for this HP Build Processor machine and enter the network address of the HP machine in the Host/IP Address field. On the HP machine, this address can be consulted via the **Connectivity** menu option.

3. Wait a moment while your computer searches for the printer. Verify the connection by checking the connection indicator icon:

✔	*Connected*	The Build Processor has established an active connection to the HP Machine at the given address.
✘	*Not Connected*	The Build Processor is unable to connect to the HP Machine at the given address, please verify that: - The address entered corresponds to the network address of the HP machine - The network address is reachable from the current workstation on which the Build Processor is installed - The HP machine software is currently running

4.2. When Connected

4.2.1 Retrieve HP Machine Print Profiles and Platform Size

Via the **Edit Profiles** in the Configuration window, an overview of the available HP Machine profiles and parameters is shown:
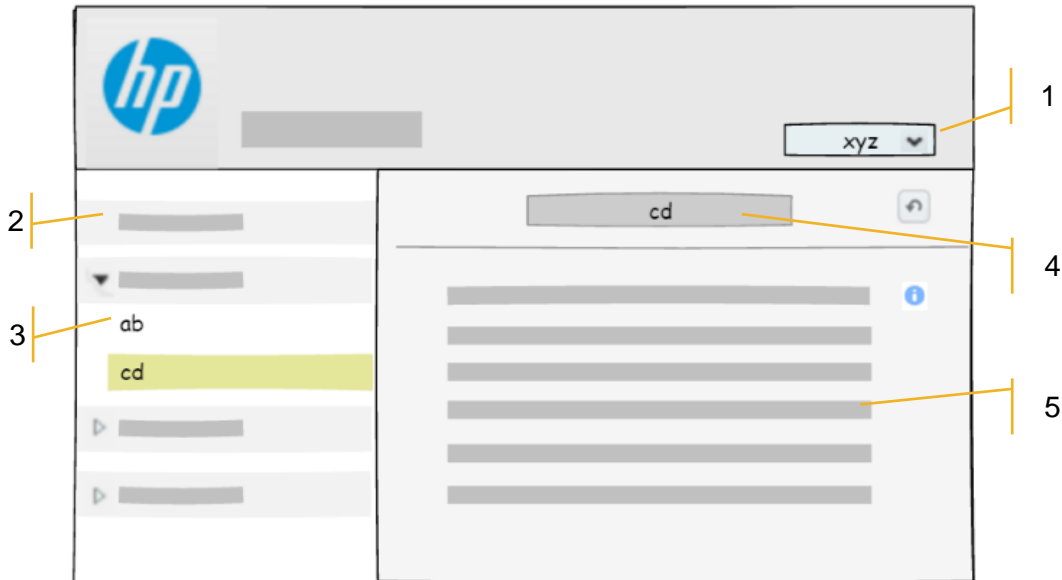
1	Material	Select a Material and the corresponding available profiles are shown in the left pane
2	Profile group	The IP address is needed to allow establishing a connection between the HP Build Processor and the HP machine
3	Profile	You can see (and adapt) the parameters for the selected profiles.
4	Name	This is the name of the selected profile.
		Rollback to the latest saved changes
5	Parameters	These are the parameters used by the machine for the selected profile. Most are read only.
		The tooltip can give additional information.

Your results and workflows are influenced by the selected material and profiles.

For example, the platform size in Magics will dynamically update depending on the material and machine model you select. The build time estimations, parameter defaults all change depending on the material and machine model.

Note

The default values, limits and step size used are given by the HP machine. If you update the software on the machine, those values might change.

4.2.2 Load and Monitor Job on HP Machine

After processing the input platform according to the assigned HP profiles, the result is sent directly to the HP Machine which requires an active connection between the HP Build Processor and the HP Machine. Submitting this job via the Build Processor to the machine can be triggered from either Magics or Streamics.

When the build cycle for a job sent via the HP Build Processor is started on the HP Machine, information of the ongoing activities are displayed in the Build Processor queue. Amongst others, this includes Machine State, Estimated End Time and Current / Total Layer information.

Job Tracking

Only jobs sent via the HP Build Processor are tracked in the Materialise Software.

By having Streamics (from the Materialise Magics 3D Print Suite) connected to the HP Build Processor as a front-end application, the monitored machine information can be interpreted and visualized.

5 Using Magics with the HP Build Processor

This section will guide you through a typical workflow, using the Materialise Magics software.

Note that it is required to have an HP Build Processor Machine added and connected to the HP Machine before proceeding.

5.1. Create an HP Build Processor Scene

In Materialise Magics software, go to the Scenes toolbar and press **New Scene**. A Change Machine dialog box will appear, where you can choose *your HP Build Processor Machine* and the correct material. The platform size is automatically retrieved from the HP Machine depending on the selected material.

The platform will now appear in your Materialise Magics software workspace and visualized as shown below:

The blue bounding box represents the 'Buildable Volume'. It is highly recommended to place all parts inside the bounds of this volume. These dimensions already compensate for the rescaling applied to the parts upon processing.

The gray baseplate represents the total volume of the HP machine build chamber.
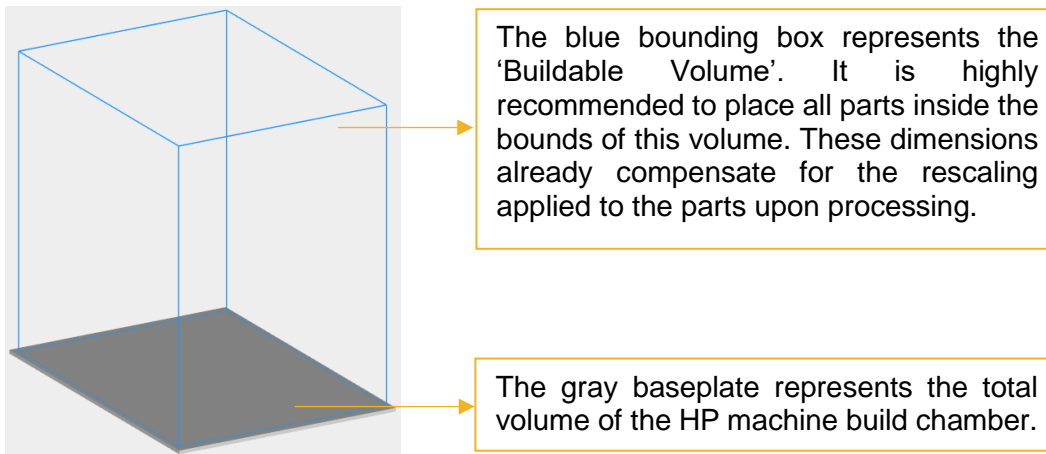
You can import, fix and orientate all necessary parts as you normally would, followed by the usual nesting operations.

5.2. The HP Build Processor Toolbar

When working in a HP Build Processor scene in Magics, the toolbar **HP Machine** is made available:

Besides the Configure Machine, it offers three functions which are covered in the next sections:

5.3. Configure an HP Build Processor Scene

Use **Configure Platform**, you can assign the Print Mode, Cooling Profile and Annealing profile to your current build. Note the available profiles and corresponding parameters are defined by the HP Machine (as covered in section 4.2.1: on page 12). The default Material and assigned Profiles are also retrieved from the HP Machine. If you change the material after creating the scene, the visual platform will not be correct anymore. This can lead to the BP reporting parts being out of bounds while visually this does not seem the case in Magics.

5.4. Estimate Build Time for an HP Build Processor Scene

This dialog provides an estimation of the Maximum Z-Height, Layer Count and corresponding Build Time of the current build with current profile assignments.

These calculations take into account the applied rescaling factors as well as further processing of the build file on the HP machine which affects the total number of build layers.

5.5. Submit a Job

Use **Build** to launch the user interface for submitting a job from Magics to the HP Build Processor (and subsequently the HP Machine). This window allows you to set some general build settings, specific job settings and eventually submit your build job for further processing.

Submit a Job

1	Select Machine	Shows the selected Machine
2	Job Type	
	Build	The build will be processed by the Build Processor, followed by a job loading action directly to the HP Machine
	Preprocess	Allows you to perform processing only and sending the output to a custom output folder rather than immediately to the HP Machine.
3	Job name	This name will be associated with this particular job throughout the rest of the workflow
	%	Add tags to the job name (such as current date) which will be resolved upon job generation
4	Job settings	These advanced settings allow adjust the way in which the Build Processor starts or ends the processing operation of the job (eg: pause initially or remove after completion).
5	Configure Machine	Change the configuration of the currently selected Machine
	Configure Job	Gives an overview of the current job configuration. It is still possible at this point to change these settings if necessary.
	Submit J 5	Submit the job to the Build Processor for processing and loading to the machine.

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5.5.1   Preprocess

The progress of translating the input platform to a job package that can be interpreted by the HP Machine is shown in the **Preprocess Jobs** queue of the corresponding HP Build Processor machine.

In case the Build Processor encounters unfixed STL's during processing, the operation is aborted with an appropriate error shown.

5.5.2   The Build Output

The following files are generated by the Build Processor after successfully processing the job:

3MF File	This file contains the geometric data (after rescaling and slicing), as well as meta-data (such as part thumbnails for preview purposes)
	Depending on the machine model, the Build Processor will export 3mf with or without a slice extension.
JobTicket	An HP specific (intermediate) file that includes the assigned platform profiles, to be interpreted by the HP machine during building.

5.5.3   Load to Machine

Once the Build Output has been calculated, it can be sent from the Build Processor directly to the HP Machine. This can be done via:

(a) The **Send to Machine** option in the right click context menu of the preprocessed job or

(b) Automatically in case the default **Build** has been chosen in the Submit Job window

6 Slice Based Operations

6.1. Supported Machines

Some of the functionality in Magics can only be applied when using slice based operations. Not all the HP machine models support sliced based operations. This is why the functionality below can only use on the models Jet Fusion 3D 3200, 4200 and 4210.

6.2. Why

Applying textures or structures to a model can easily result in very large STL files which become difficult to manipulate, store and transfer. Materialise has developed a technique to skip the intermediate STL file stage by generating the desired geometry directly into the slices using the HP Build Processor.

6.3. How

Materialise 3-matic^{STL} software models containing metadata about textures (texture bitmap, location and size of texture, white and black offsets) or structures (area, graphs, thickness of graphs) can be loaded into Materialise Magics software and placed on the build platform. The HP Build Processor will then automatically apply the textures or structures directly into the generated slices.

Materialise Magics software version offers a module to generate Slice Based Structures straight from within Materialise Magics software.

Avoid the large STL data stage by using a compact
file format and Slice Based Operations

The desired geometry is applied directly during slicing with the HP Build Processor

Complex design
lightweight, texture, structure

Slice STL's with the HP Build Processor

For complex parts, this STL data becomes very difficult to manipulate, store and transfer
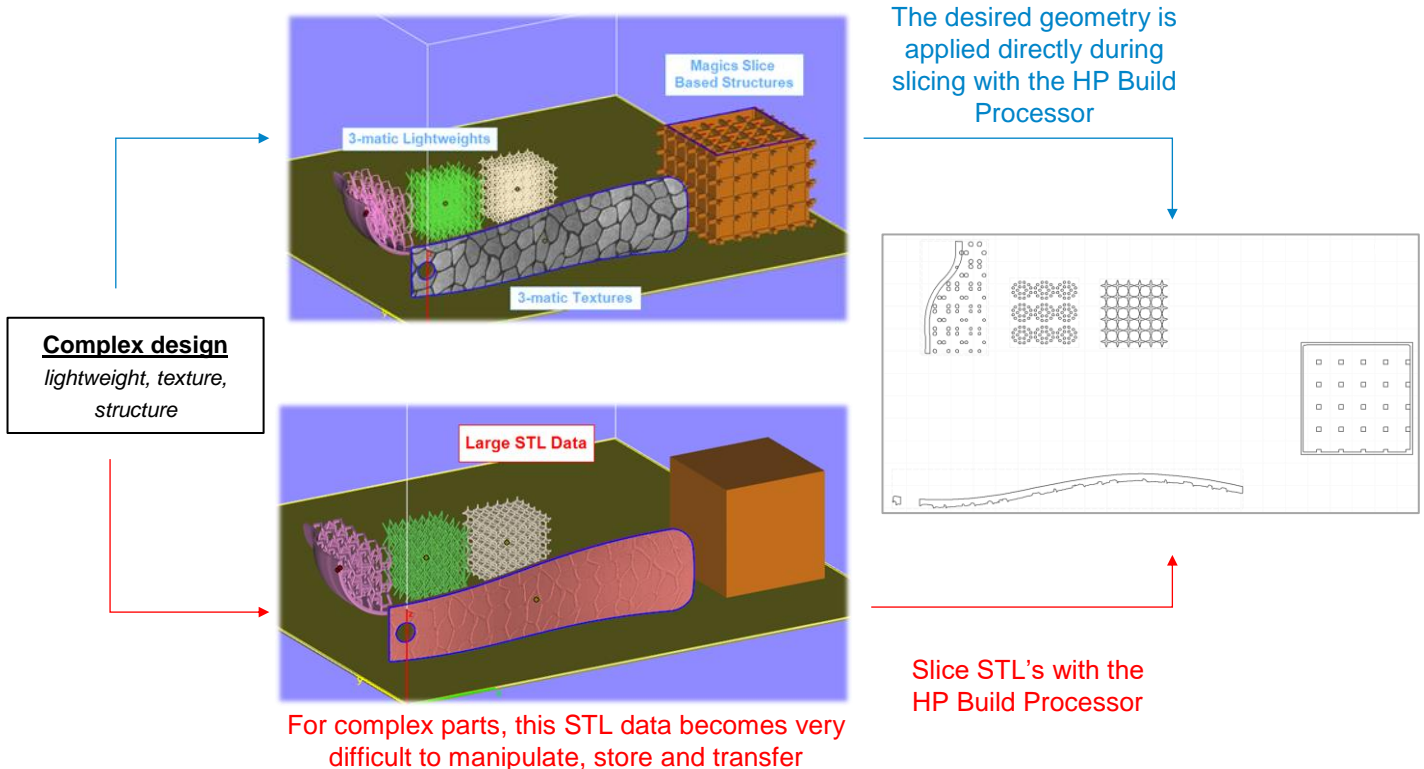
For more information on how to access slice based operations please visit
http://software.materialise.com/making-complex-designs-printable

7   Frequently Asked Questions

7.1. How do I activate my Materialise Software?

Please refer to section 3.3: Licensing on page 98 for more information.

7.2. How do I access the HP Build Processor features in Magics?

The HP Build Processor toolbar is available in Magics, when working in a HP Build Processor scene. Please refer to Chapter 5: Using Magics on page 14 for step-by-step instructions.

7.3. Can I view the generated Build Processor output?

Yes, the generated 3MF files can be loaded into Materialise Inspector – Slice Viewer, where they are visualized.

7.4. Can I see what profiles were applied to my processed job?

Yes, you can either:

a) Reopen the input platform associated with that job (Materialise Streamics stores revisions and association between all input and output files from Magics, HP Build Processor and HP Machine)
b) Inspect the JobTicket.xml that is created as an intermediate output file (see section 5.5.2 The Build Output on page 16)
c) Check the job information in the HP Machine software once it has been uploaded

7.5. Can I retrieve log files from the HP Machine?

Yes, the Build Processor is able to retrieve log files from the HP Machine when Materialise Streamics has been connected as a front-end application (see section 4.2.2 Load and Monitor Job on HP Machine on page 12).

7.6. How can I automatically nest different parts inside my HP build volume?

There is a dedicated Magics module available called the 'Sinter Module' which includes a powerful 3D Nester toolbox. For more information, please refer to http://software.materialise.com/magics-sinter-module.

7.7. How can I create new Print Modes (or other machine profiles)?

This is only possible via the HP software. The HP Build Processor automatically retrieves the available profiles and parameters as exposed by the HP Machine (see section 4.2.1 on page 12).

7.8. Why do my HP Machine jobs not appear in my Build Processor queue?

A prerequisite for this communication is an active connection between the Build Processor and the HP Machine (as detailed in chapter 4: Connect to the HP Machine on page 11).

Note that only jobs which are sent via the HP Build Processor will be tracked in the Materialise Software. In case multiple workstations are used for the same HP machine, the Build Processors can be configured in a Network Setup to allow sharing of machine settings and synchronization job queues.

7.9. How can I track and trace all my HP machine jobs?

The HP Build Processor connects the HP Machine to the Materialise 3D Print Software Suite. This Suite includes Streamics, which is a central AM automation & control system which allows you to get a grip on your entire AM business. The system links people, machines, processes and materials. For more information, please consult http://software.materialise.com/streamics.

8   Typical Error Cases

8.1. Connection is broken

- Error message during uploading: 'A connection …'
- Machine status error message: 'Error (Machine state …'
- Error message during Build Time Estimation: 'Internal Error: …'
- Error message during Platform Configuration: 'Internal Error: …'
- Unable to connect the Build Processor to the HP Machine

All of the above Error Cases are caused by a broken connection between the HP Build Processor and the HP Machine.

As described in Chapter 4: Connect to the HP Machine on page 11, this connection is required for the HP Build Processor to exchange information with the machine used during build preparation, processing, job loading and monitoring.

Please refer to section 4.1: Establish the Connection on page 11 for information on configuring and troubleshooting this connection.

8.2. Error message in Build Processor Manager: '…check if the Build Processor System service is running'

This error indicates that the Build Processor System service has stopped running. To start it again, go to Windows Task Manager and:

(1) Press **Services** to open the **Services** Tab,
(2) Locate the 'Materialise Build Processor System' service
(3) Press the play icon to start it again
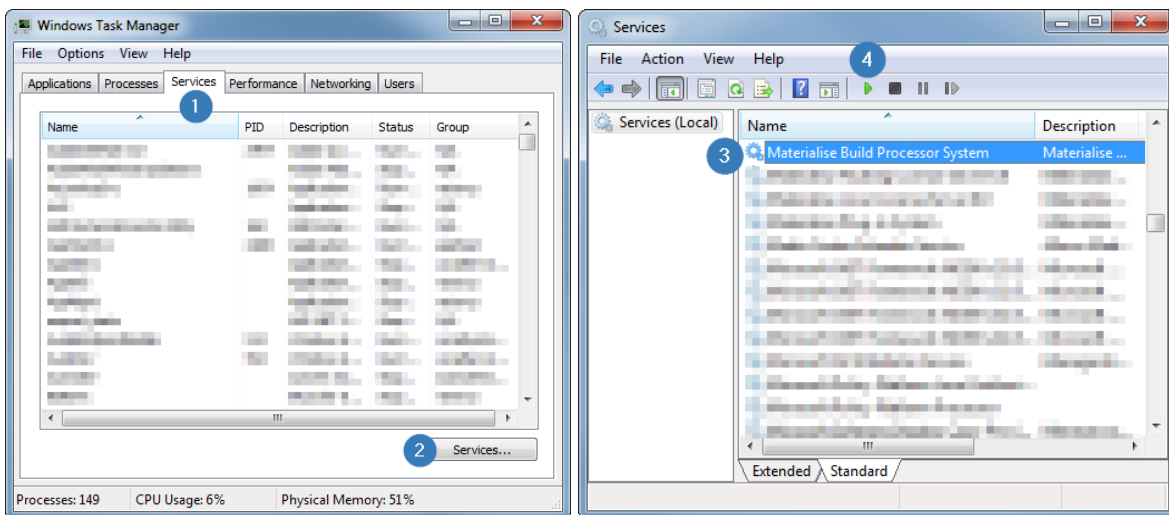
8.3. Error message during processing: 'Invalid slicing profile…'

This error message means that one or more of the profiles that are assigned to this build, do not exist for the machine to which you are trying to send this build. Please (re)assign the profiles (see section 5.3 on page 14) and submit the job again

8.4. Error message during processing: 'Unexpected open contours…'

This error message means that the indicated input part contains errors that result in open contours during slicing. Such errors indicate that there are errors present in the original digital model. It is highly recommended to fix these in Materialise Magics software, where you have a large set of dedicated fixing functions and visual feedback available.

8.5. Error message during processing: 'One or more parts detected which exceed platform bounds.'

This error message may appear when you changed materials after creating the scene. Magics won't update the platform size after creating the scene. So if the platform size for the newly selected material is smaller than the originally selected scene it might be out of bounds while you do not visually see it in Magics.

9 Support

9.1. HP

In case you have any questions regarding the HP Machine, it's building process and resulting part quality, please contact your dedicated machine support channels.

9.2. Materialise

We want you to have a smooth user experience when working with the Materialise software suite and the HP Build Processor. If you do encounter any issues, please always try to save your work and restart your system first. Should the problem persist, you may contact Materialise Support. The technical support will be able to help you with technical problems you have when working with Materialise software suite and the HP Build Processor.

For more information on how to reach us, please consult:
http://software.materialise.com/customer-service

10 Appendix A: Create a Report File

In case of unknown errors the technical support of Materialise needs more detailed information of what has happened with the Build Processor or Build Processor Manager.

This information can be provided by the Build Processor Manager by creating a report file collecting data which might be useful to detect the error.

Notification

Please do the actions described below as soon as possible after the error appears.

---

1. Open the **Build Processor Manager**
2. Press **Help** in the top right corner and press **Troubleshooter**
3. Press **Generate Report** to collect all data
4. Save report.cab to a temporary folder

More details on the above can be found in the Build Processor Manager manual.

Notification

No personal data will be collected. The collected data are logs of the Build Processor, information on the system environment and parameter files.

Before sending the report file to Materialise it is advised to open the report.cab to check the collected data. Make sure no data are enclosed which might be in conflict to the security policies of your company.

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5. In order to send the report file successfully to Materialise the file <u>must</u> be zipped <u>and</u> password protected in order to pass the Materialise firewall.

6. Send the zipped file together with the password and a good error description to the technical support of Materialise.

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