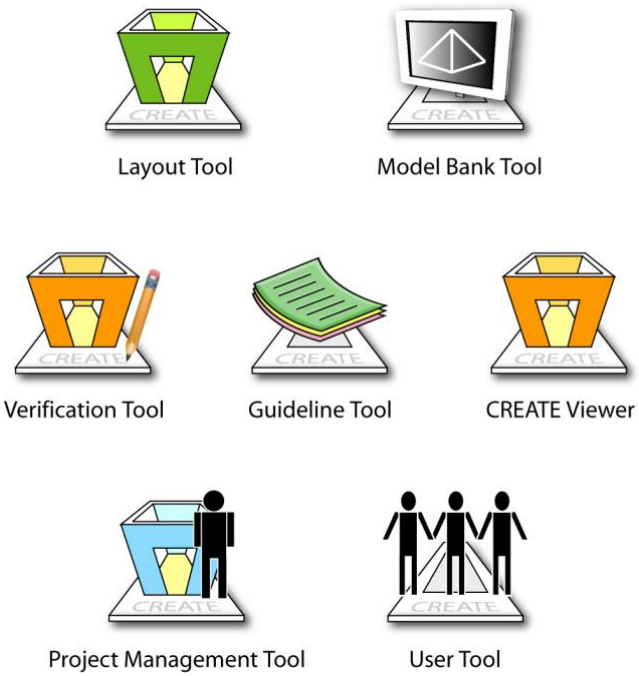
Halden Virtual Reality Centre

HVRC CREATE

User Guide

HVRC CREATE Overview

HVRC CREATE System



HVRC CREATE

Release 4.2.2

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HVRC CREATE: HVRC CREATE Overview User Guide.

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1 Overview

HVRC CREATE 4 is the fourth generation of the CREATE tool suite, and builds on the technical platform and functionality established during the implementation of earlier versions of the software, as well as valuable feedback gained from usability evaluations and research work by the development team.

The CREATE control room design tools combine advanced interactive 3D technology with server-based user, project, and file management, providing an integrated package that supports and traces the various stages of a human-centred design process.

The software has been designed to support a flexible, iterative, design methodology, where a control room design is refined and tested many times before a final design is reached. This contrasts with traditional control room design methods where the design process only goes through one or two human factors review iterations, and where it is necessary to build a costly physical control room mock-up. Design iterations are tracked by the system.

When these virtual reality tools are used, it is not necessary to wait until a physical mock-up has been constructed before commencing design verification and validation against human factors guidelines, so greater emphasis can be placed on finding an optimal design solution for safe and efficient control room operation. Users with a variety of technical skills can operate the software, so control room operators, designers, human factors specialists, engineers and managers can all participate to some degree in the design process.

CREATE provides features designed to support and enhance communication between the various interest groups involved in a design project. Support for communication between the layout designers and reviewers is integrated into the system, while it is possible to extract electronic documents such as models, designs and reports for distribution to other interested parties.

The CREATE tools support the management of a reusable database of 3D objects, the interactive construction of control room layouts, and the validation of control room layouts against guidelines.

The CREATE tools are based on cross-platform Internet and Java technology and open standards such as VRML97 (ISO/IEC 14772-1:1997), DAE/COLLADA (ISO/PAS 17506:2012), XML, and HTML.

2 Definition of Terms Used in the Documentation

Administrator	The user that is responsible for the management of the CREATE server. The Administrator is the primary user of the User Tool, Guideline Tool, and Model Bank Tool.
Administration rights	Access rights that can be assigned by the Administrator to other users to allow them to use the administration tools (User Tool, Guideline Tool, and Model Bank Tool). Administration rights are assigned on a per-tool basis.
Apache	An open source Web server application.
COLLADA	COLLAborative Design Activity interchange file format for 3D digital assets. See DAE.
CR	Control room.
CREATE	Control Room Engineering toolkit software developed by IFE.
DAE	Digital Asset Exchange; an ISO-standard file format for exchange of digital assets, including 3D models between software systems (ISO/PAS 17506:2012).
Designer	A user that produces a layout using the Layout Tool.
glTF	Graphics Language Transmission Format is a standard file format for three-dimensional scenes and models intended primarily for delivery of 3D data on the web.
HED	Human Engineering Discrepancy
HF	Human factors.
HFE	Human factors engineering.
HSI	Human-system interface
HTML	Hypertext Mark-up Language.
HVRC	Halden Virtual Reality Centre. A lab managed by the VR&AR department at IFE Digital Systems.
IFE	Institute for Energy Technology (Institutt for energiteknikk). A research foundation in Norway located at Kjeller and Halden.
Java	A general purpose cross-platform programming language.
JPEG	An image format with lossy compression.
KB	Knowledge-based.
Layout	A 3D scene with associated data such as annotations that comprise a revision of a layout design.
Manikin	A virtual human. A 3D model of a human used to evaluate ergonomics.
MCR	Main control room.
Model	A 3D geometric object defined in a 3D model file, which can be added to a Layout via the Model Bank.
Model Bank	Hierarchically organised database of 3D Models.
MTO	Human Technology Organisation. A sector at IFE.
NRC	Nuclear Regulatory Commission
NUREG	US Nuclear Regulatory Commission Regulation
PNG	An image format that supports efficient lossless compression.
Parametric Object	An object that can be added to a layout that is defined by a set of user-modifiable parameters as opposed to a static pre-defined Model Bank object.
Project Manager	User that is, or can be, responsible for the management of a project configuration.
Project Owner	The project manager that is responsible for a specific project.
Reviewer	A user that uses the Verification Tool to review layouts.

Revision	A saved modification to a version. A revision is created when a layout version is modified and saved without specifically saving it as a new version.
Role	In CREATE, users can have one or more of the following roles: Administrator, Designer, Reviewer, Project Manager.
Scene	The view of a layout displayed in a 3D view, comprising of a hierarchy of models and parametric objects.
Server	A central database containing the CREATE system and project data.
Tool	A CREATE client application (e.g. User Tool, Guideline Tool, Model Bank Tool, Project Management Tool, Layout Tool, and Verification) used to manipulate data on a CREATE Server.
UI	User interface.
User	The primary user of whichever piece of software is being described.
Version	A layout with a unique name in the scope of a project. A version may comprise of several revisions.
V&V	Verification and Validation.
VR	Virtual reality.
VRML	Virtual Reality Modeling Language. VRML 97 is an ISO standard 3D file format (ISO/IEC 14772-1:1997).
XML	Extensible Mark-up Language. A meta-language used to define a valid data hierarchy for structured data that can be used to encode data.

3 Getting Started

3.1 System Requirements

The *minimum* requirements for the HVRC CREATE Tools are:

- Intel Core i5 (8th gen) x64 processor or similar
- 8GB RAM
- 64-bit Microsoft Windows 10 or Apple macOS 11
- Discrete 3D graphics accelerator with at least 2GB memory and OpenGL 3.3 driver support
- For Microsoft Windows: 250MB free disk space for the complete tool suite.
  For macOS: 1GB.
- A three-button mouse (or a two-button mouse with scroll-wheel "button")

Use the option or alt-key on your keyboard in combination with the left mouse button to simulate the middle mouse button if you do not have three mouse buttons.

The CREATE Server is based on Apache web server technology. Windows and macOS operating systems are supported as server platforms. Installing the server on a laptop is only recommended for single user CREATE Server licenses. Contact CREATE Support (see below) for more information. Machines that will host the server for multiple users and will not be used as workstations do not need graphics acceleration but should have at least 1GB of free storage space. The server can be hosted on a virtual machine. The server data should be regularly backed up.

Machines used to host multi-user CREATE Servers on a network must have a static IP address. If you are unsure if the machine you plan to use as a server has a static IP address, please confer with your local network system administrator to ensure that your computer has the necessary credentials.

3.2 Installation

Important: See System Requirements above before installing.

The installer called “CREATE Tools Installer” installs the full set of tools.

Double-click on the installer and follow the instructions.

The installer called “CREATE Server Installer” installs and configures the server.

Always install the software onto the server with the server in the network state that it will be used in.

Networked (multi-user) servers that will be accessed across your local network must be connected to that network when the server software is installed. The machine’s network address is needed to generate the license key and the key will subsequently only work for that network address. You are advised to restart the computer before installing if you switch the network state prior to installing, to ensure that the system is in the correct state. Note that this is not necessary for single-user servers (typically single-user servers on laptop computers) as the server in that case will function in a standalone mode where other computers on a network cannot access it.

Double-click on the installer and follow the instructions carefully.

See the example data in Data directory in the software distribution image for data that you can install on your server to get started using CREATE. It contains example guideline sets and templates for making new guideline sets. This data can alternatively be downloaded and installed from the CREATE support website.

Instructions for installation of your license key file will be distributed with the license key file. If you have not received a license key file then contact Support (see section 3.4) for assistance after installing the server with the license key request data that is reported by the installer program.

The server usually starts automatically once it has been installed. It is restarted automatically each time the sever computer is restarted. The rest of this user guide refers to the tools only, and not the server. Once installed, the server should not need any intervention except when installing upgrades.

3.3 Starting the Tools

To run one of the tools, open the CREATE directory, which was created when you installed the tools and/or server, and double-click on the icon for the tool you wish to use.

Depending on what options you selected when running the installer, you may also be able to start the tool by double clicking on an icon on the Microsoft Windows desktop or by selecting it from the Start menu (in the "HVRC CREATE" group).

Important: The first time you run a CREATE tool, a wizard will appear that guides you through configuring your connection to a CREATE Server. After the wizard has completed, you can change your settings via the Preferences Window (see The Preferences Window - section 7.1). Ask your system administrator or project manager for assistance if you do not know what server address to enter.

The information above assumes that you are running on a Microsoft Windows platform. On other platforms, the installer attempts to follow the conventions of that platform to provide easy access to the installed software.

3.4 Support

Please send questions, bug reports, or requests for new features to create-support@ife.no

When submitting bug reports, please include the following information:

- A description of the result and how it differed from what you expected
- The conditions or circumstances under which the problem occurred
- Any other information that could be useful to isolate the problem, including the version of CREATE you are using, the version of the operating system of your computer, and the type of graphics card you are using. An overview of useful technical information is displayed in the tool's About dialog, located in the Help menu, and can be copied into an email or saved to disk in a text file.

3.5 User Identification

System administrators using the tools for the first time should refer to the User Tool User Guide for instructions on managing users.

Before you can use a tool to do any work, the server administrator or your project manager must have assigned a login name and password to you. If you do not have a login name and password then contact the server administrator or your project manager for assistance.

When the tool starts up and needs to retrieve data from the server, it will usually request that you enter your login name and password. If this does not occur then you should check that the CREATE server address has been correctly set (see The Preferences Window – section 7.1). If the server address is correct then you should verify with your system administrator or project manager that the host is currently operating and accessible on your network.

You will not be able to use the tool to do anything other than access items in the Help menu and specify the server address in the Preferences Window if you are not logged on to a CREATE server.

Important: After a successful login, you can enable an auto-login feature via the Preferences Window so that you do not need to enter your username and password each time.

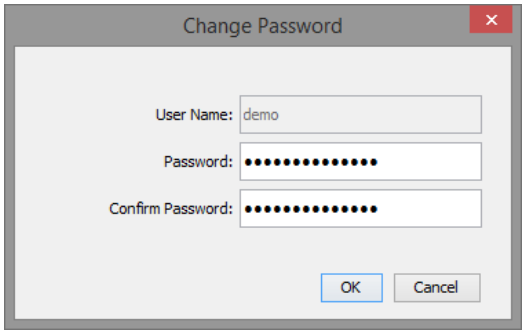
3.6 Changing Your Password

All of the tools, except the User Tool, enable you to change your password via the Edit > Set Password… menu item. For security reasons, you should change your password regularly and use a password that is difficult for other people to guess.

You must be logged on to a CREATE server in order to change your password.

To change your password:

1. Select Edit > Set Password…
2. The Change Password dialog will appear:



The Change Password Dialog

3. Enter a new password into the Password field
4. Enter the new password again in the Confirm Password field
5. Click on OK to commit the change or Cancel to abort
6. If you commit the change and the two passwords entered do not match, you will be asked to enter the passwords again

3.7 Using the Tools

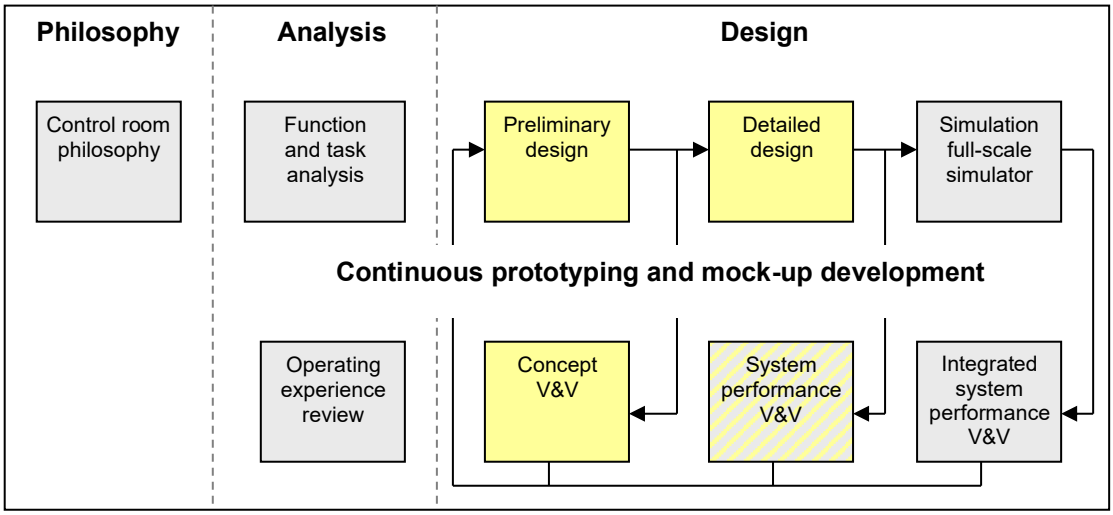
Please refer to the individual user guide for the tool you wish to use.

An overview of the tools and their usage is provided in section 5 of this document.

4 The Design Process

CREATE has been designed to support human-centred design processes, in particular to support complex control room design requirements. Using CREATE to work with virtual room layouts early in a design process benefits project continuity and enables the active participation of designers and reviewers that are not accustomed to traditional technical design tools. CREATE enables human factors and operational experience input to be included at an early stage in a design process, to ensure that end-user requirements are addressed and that the final design meets the expectations of all stakeholders.

Individual projects vary widely in nature. However, inter-disciplinary design teams are commonly needed to adequately address the complex requirements of projects. For a control room design project, the design team typically includes engineers, process experts, operational staff, managers, vendors, and human factors specialists. Each discipline brings to the design it's view of the goal, and a virtual control room can therefore serve as an effective common focal point for discussion. By presenting a design in a visual manner that is easy to comprehend, CREATE can thus help multi-disciplinary design teams to communicate and assess design ideas effectively.



Outline of a typical human-centred design process with the tasks that the CREATE tools support highlighted.

The diagram above shows a typical control room design process (simplified from NUREG-0711, from Drøivoldsmo & Louka, 2011), with the tasks supported by CREATE highlighted. The arrows indicate design iterations at each stage.

For additional information on this approach to control room design, see:

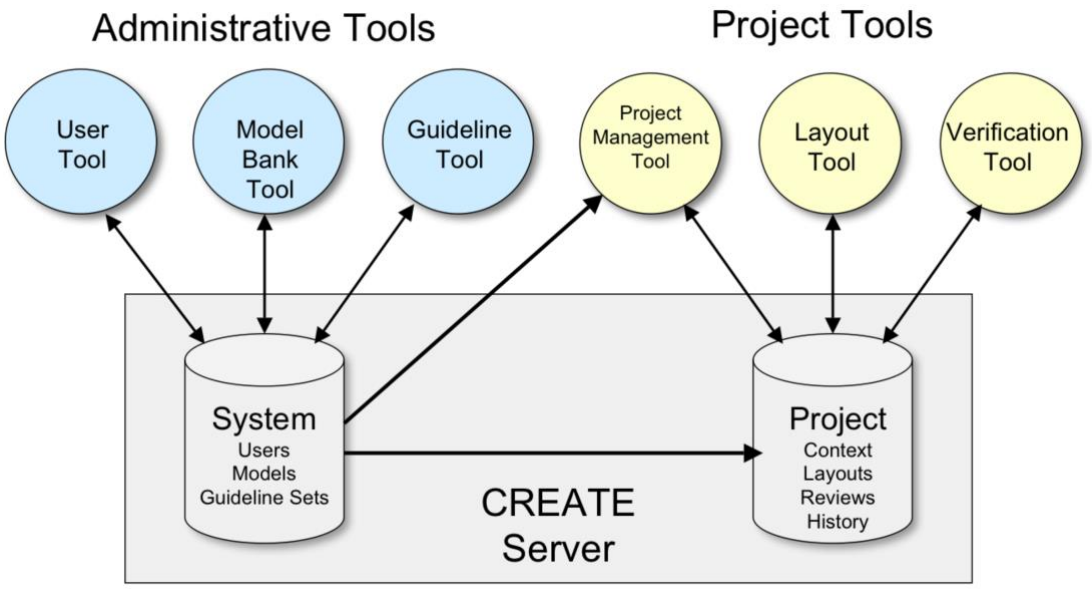
Drøivoldsmo, A. and Louka, M. N. (2011) Virtual Reality Tools for Testing Control Room Concepts. In B. G. Liptak (ed.), *Instrument Engineers' Handbook: Process Software and Digital Networks* (Volume 3, 4th Edition), ISBN 9781439817766. Boca Raton, FL, USA: CRC Press LLC.

Louka, M. N., Gustavsen. M. A., Edvardsen, S. T. (2006) Using Virtual Reality to Support Multi-participant Human-Centered Design Processes for Control Room Design. In *Proceedings of 5th International Topical Meeting on Nuclear Plant Instrumentation, Controls, and Human Machine Interface Technology (NPIC&HMIT 2006)* at the American Nuclear Society 2006 Meeting, November 12-16, 2006, Albuquerque, NM, USA: American Nuclear Society.

5 Toolkit Overview

The CREATE toolkit is client-server based, to enable users to share data "transparently". Through storing all data on a centralised password-protected server, users are identifiable and always have access to the latest versions or revisions of data. There is also reduced risk of data loss as the central databases can be backed up conveniently at regular intervals.

An overview of the system is shown in the diagram below:



Overview of the CREATE system.

The *administrative tools* are used to manage system data, including user access to the system in general and libraries of guideline sets and models that are shared by projects. Access to these tools is normally restricted to a small number of users. The *project tools* are used by the majority of users and are used to create and manipulate project data.

A brief description of each of the tools is provided in the sub-sections below.

5.1 Server Administration Tools

User Tool	The User Tool is used to manage user login names and passwords for users that can be assigned to projects or have administration rights and to assign privileges to users.
Guideline Tool	The Guideline Tool is used to install and update sets of guidelines that can be used by any project.
Model Bank Tool	The Model Bank tool is used to install and update 3D models that can be used to construct control room layouts.

5.2 Project Tools

Project Management Tool	The Project Management Tool is used to specify which users, guidelines, and models in the global database can be used in a project context, and to assign roles to project participants.
Layout Tool	The Layout Tool is used to create and modify room layouts, with optional online design guidelines to provide assistance.
Verification Tool	The Verification Tool is used to test room layouts against design review guidelines.

5.3 Ontologies

An ontology is a declaration of a set of concepts that can be used to describe the essence of entities in a data model. In CREATE, the concepts in an ontology represent roles and properties of objects in a layout. Without this additional knowledge, a layout in CREATE is essentially a hierarchically organised set of objects with properties that primarily describe each object's geometry and appearance. By declaring the purpose and conceptual properties of objects, the user can leverage powerful rule-based reasoning capabilities that would not otherwise be possible.

An ontology in CREATE is represented by a set of tags that can be associated with an object in a layout. The ontology used to reason about a specific layout is comprised of two sets of tags that are applied in combination: Model Tags and Context Tags.

Model Tags are general-purpose descriptor tags that declare classifications and physically oriented properties of real world objects. The set of model tags available to describe models is pre-defined in CREATE. When a model is added to the Model Bank then the Model Bank Tool can be used to assign model tags to it. Examples of such tags include *chair*, *desk*, and *monitor*, which are classifications of objects. Other tags, such as *sitting* or *standing* describe the pose or state of a person using the object. Model tags are in principle applicable to the use of a model in any conceivable context, and are therefore independent of any specific context. Any model can have multiple model tags assigned. For example a stool is a class of *chair* and is used by a *sitting* on it.

Context Tags describe properties that are specific domain and are therefore embedded in a guideline set together with any domain-specific rules that depend on them. For example, a human factors review guideline set intended for use in the domain of nuclear power control rooms may define tags for roles such as *reactor-operator* and *turbine-operator*, as well as more general role tags for control room environments, such as *shift-supervisor*. Any tags required by the rules in a guideline set that are not already declared as model tags need to be defined in a tag list embedded in the guideline set. The context tags embedded in any guideline sets referenced by a project (as configured in the Project Management Tool) are available to designer of layouts in that project, in addition to the globally defined model tags.

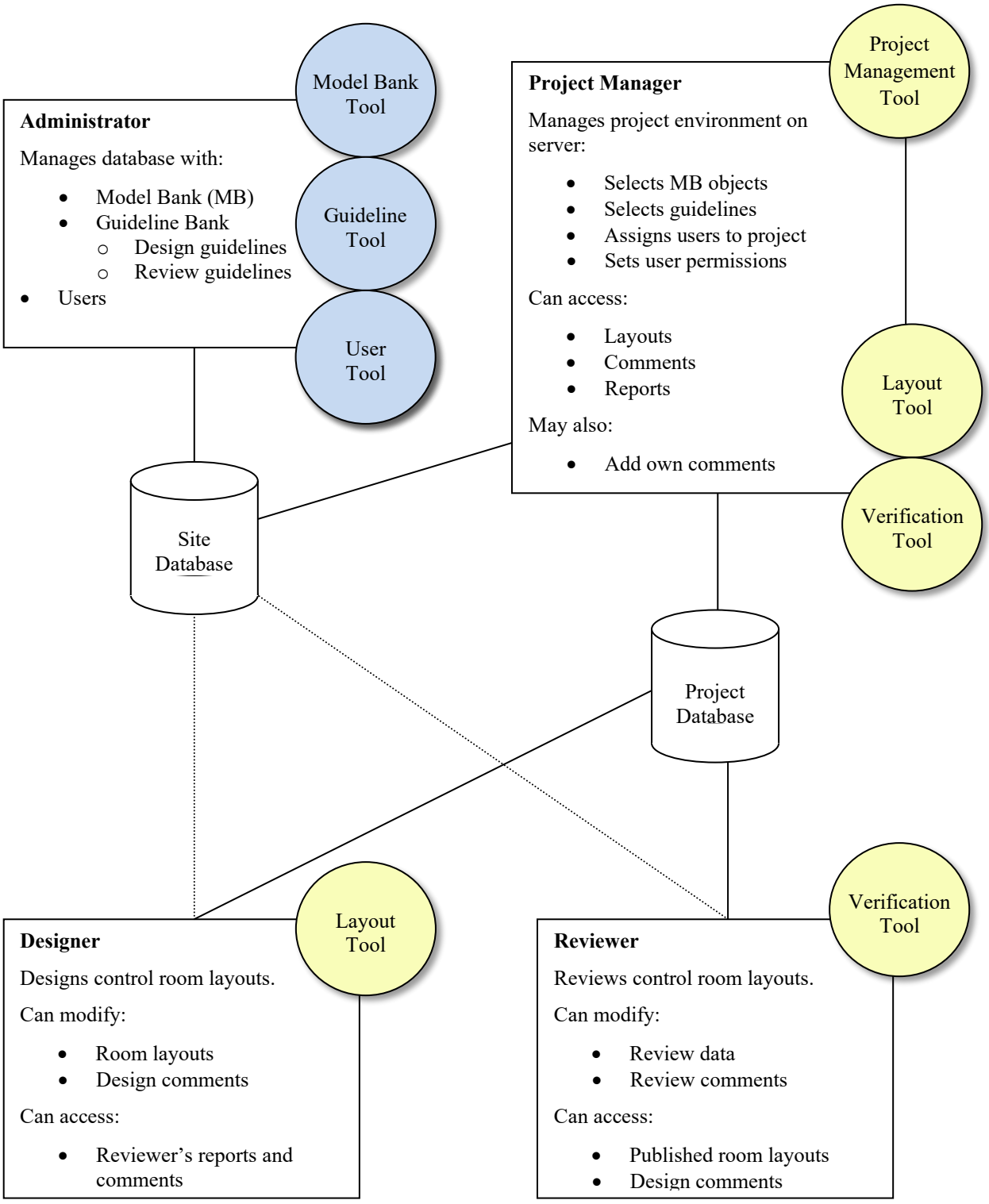
When modelling a layout in the Layout Tool, any object added to a layout from the Model Bank inherits any model tags associated with it. The layout designer is free to remove any tags from a model object in a layout but doing so only applies to the specific instance of the model in the layout. Any object in a layout can be tagged with any of the tags from the project context or model tags list. Multiple tags (even ones that potentially conflict) can be applied, and there is even a tag called *ignore-all-tags* that can be used to leave all tags about an object in place but to ignore them when reasoning about the layout. Although it is permitted, removing, or opting to ignore tags is generally discouraged.

The rule-based reasoning system integrated into CREATE is very powerful and will be applied more extensively in future versions of the CREATE tools. In CREATE 4.2, the Layout Tool can be used to tag a layout but only the Verification Tool provides support for executing rules to evaluate the scene. In future, we expect to support ad-hoc rule-creation to query and test layouts in the Layout Tool, as well as options to batch-execute rules in both the Layout Tool and Verification Tool to quickly evaluate the consequences of layout changes with regards to guideline or requirements compliance.

Rules defined in a guideline set and associated with specific guidelines can perform a broad variety of tests involving reasoning about the data model in a layout, including tests of cardinality, logical queries, and spatial analyses.

6 Toolkit Users

6.1 User roles and associated tasks



The diagram above shows the user roles, associated tasks, tools, and communication routes within the context of a control room design project.

Users have *rights* that are assigned using the User Tool by a user with administration privileges and *roles* that are specified by a project manager within the scope of a specific project. A user can be given the rights to create new projects (i.e. the right to assume a *project manager* role), and can be given administration rights (i.e. permission to assume an administration role to a degree specified by an *administrator* user). A user's role in a project is specified by the project manager that owns the project, using the Project Management Tool, and can be either a *designer* or a *reviewer* (or as both). Any user, except the built-in *admin* user can be assigned to projects using the Project Management Tool.

Users can therefore be viewed as belonging to groups that specify which rights and roles they can have within the context of a project or the administration of a HVRC CREATE system.

6.2 Workflow for each user role

For an overview of the typical workflow, readers are referred to section five (V) of the paper:

> Louka, M. N., Gustavsen. M. A., Edvardsen, S. T. (2006) Using Virtual Reality to Support Multi-participant Human-Centered Design Processes for Control Room Design. In *Proceedings of 5th International Topical Meeting on Nuclear Plant Instrumentation, Controls, and Human Machine Interface Technology (NPIC&HMIT 2006)* at the American Nuclear Society 2006 Meeting, November 12-16, 2006, Albuquerque, NM, USA: American Nuclear Society.

A copy of which is distributed with the HVRC CREATE user documentation as:

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ife-hr-e-2006-017.pdf
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6.2.1 Administrator

The administrator installs the software, and manages guideline sets, models, and users.

The main task of the administrator is to maintain and update the system environment to support the requirements of the project managers. The tasks that the administrator does are therefore usually the result of requests from project managers.

Project managers contact the administrator if they need new users to be added to the system, new guidelines sets to be made available to projects, or additional models to be installed in the Model Bank, and the administrator should inform the project managers if significant updates are made to the CREATE environment or the software that may affect their work.

The administrators first job is to install the CREATE Server software on a server and the CREATE tools on the client computers that the other users will use.

The administrator can then install sets of guidelines. Additional sets of guidelines can be added to the system at any time once the server has been installed. This work is done using the Guideline Tool.

The administrator can add models to the Model Bank, and manage its contents, at any time using the Model Bank Tool. Associated with every model is a list of tags for that object. These tags describe general properties of the object, and should be domain independent. It is generally good practice to tag a model when it is added to the Model Bank. The tags for an object are not permanent, and can be updated at any time. Modifying the tags in the Model Bank will not force an update of layouts that use that model, the designers have to manually synchronize tags for a layout to get the changes.

The administrator creates and manages all the users of the CREATE system, and assigns them some basic rights. This is done using the User Tool.

When a new version of CREATE is released, the administrator upgrades the installation on the server and client machines.

While there is only one Administrator user, whose access rights to the administration tools cannot be restricted, the Administrator user may assign other users the right to use the User Tool, Guideline Tool, or Model Bank Tool, and therefore assume the role of the administrator when using those tools. Thus, for example, a specific user whose usual role in a specific project is as a designer may be given permission to also use the Model Bank Tool. When that user uses the Model Bank Tool, she assumes an administration role, whereas she assumes her usual designer role when she uses the Layout Tool. A

user can therefore belong to several groups simultaneously, where each group gives permission to use a tool associated with a role.

Note that permission to assume a designer or reviewer role within a project is granted by the project manager that owns the project.

6.2.2 Project Manager

A user with project manager rights can create a new project environment. He then becomes the new projects owner and assumes the role of project manager for that project.

The project environment is configured by choosing guidelines, models, manikins, and users for use in the project, from the data in the system database that the administrator maintains. The project manager needs to ask the administrator to update the system database if he needs additional guideline sets, users, or models, so that he can make changes to the project environment.

The project manager assigns roles to users, enabling them to act as designers or reviewers within the project context.

As a project progresses, the project manager may assign additional users to the project or modify the roles of specific users. For example, a user that has completed work as a designer and will no longer work on the project can have the designer role relinquished if the project manager wants to prevent that user from using the Layout Tool to modify layouts belonging to the project context.

The project manager can also modify the selection of models that are available to the designer as a project progresses. Thus new models can be made available after the project has started, and others can even be taken away (without affecting any existing layouts that use them).

For all layouts in a project context, the project manager can access layouts and related information, created by designers using the Layout Tool and can access work related to the layouts done by reviewers using the Verification Tool.

Unless the project manager wishes to assume the role of a designer or reviewer, he cannot make modifications to layouts or reviews. If the project manager also wants to be able to work as a designer or reviewer then he may give himself specific permission to do so – he can then use the Layout Tool as a designer or the Verification Tool as a reviewer.

The project manager can communicate with the designers and reviewers of a layout by adding comments to the layout using the Layout Tool or Verification Tool.

The project manager does not need to assume a designer or reviewer role in order to add comments to a layout – comments can be added using either the Layout Tool or Verification Tool in a manner equal to that of the designer and reviewer.

The project manager can relinquish ownership of the project by giving another user with project management rights ownership of the project.

6.2.3 Designer

For any project that the user has been assigned permissions to assume a designer role, the user can create new layouts using the Layout Tool and publish layouts when they are ready to be reviewed. She communicates with the reviewer by adding comments to the layout she is working on or viewing).

The designer usually works on a layout until she considers it completed, and then publishes it for review. After it has been reviewed, she can read the reviewers report and comments and create a new version of the layout that takes the results of the review into account. This iterative process continues until the project manager decides that the goals of the project have been met.

The designer has access to use all the Model Bank models that the project manager has made available to the project at any given moment, and can also browse design guidelines, if any have been assigned to the project.

The designer works with a design by dragging models from a view of the Model Bank into a 3D representation of the control room layout. These models can be arranged as required in the model and the result can then be saved. The Layout Tool provides a variety of powerful functions to support the easy arrangement of models in a control room and to informally verify the results.

In addition to objects from the Model Bank, the user can also insert parametric objects, including walls, labels, image surfaces, and primitive geometry, to compensate for models not available in the Model Bank and enable rapid prototyping. These objects have user-configurable parameters such as width, height, and colour.

To verify the results, the designer can move around in the control room and use the same testing tools that the reviewer uses in order to informally check distances, sight lines, and other details related to the layout. This would typically be done with reference to design guidelines.

The designer is responsible for tagging the layout with meta-data using tags from the project context's ontology. Tags are used to provide information about properties and purposes of entities and objects in a layout. Most general-purpose tags are inherited when a model is added to a layout from the Model Bank (e.g. that a model is of class *monitor* or *chair*). Usually, the designer only needs to concentrate on adding context-specufic tags to the layout. These are declared in the applicable guideline sets for the project context in which the layout has been created. For example, this may involve tagging displays are used, *frequently* or the seat where the *shif-supervisor* will normally be seated.

If sufficient meta-data has been associated with the layout then the Verification Tool will be able to automate recommendations on compliance for guidelines with rules assosicated.

The designer can export a 2D screenshots of the 3D view of any layout, or the entire 3D layout, and can also export a report containing an inventory of all the models used and details about them. These can be distributed to stakeholders who are not CREATE users. The layout itself can also be exported as 3D geometry, enabling the layout to be imported into other tools.

There may be several designers working on alternative layouts simultaneously or modifying the same layout at different times within the context of a project. The layouts, therefore, belong to the project environment and not to the individual designers. This means that any designer assigned to a project can modify any unpublished layout belonging to the project. While a designer opens a layout for editing, it is designated as read-only for any other designers assigned to the project to prevent two or more designers attempting to make conflicting changes simultaneously.

6.2.4 Reviewer

Each reviewer assigned to a project has an individual review environment per layout, so several reviewers can make independent reviews of the same layout.

The reviewer, can access any published layout within a project in which she has a reviewer role. Once a published layout has been opened, she can step through the review guidelines, testing the layout against each guideline. Review comments can be entered for each guideline and an opinion on review status of each guideline is set before proceeding. Review comments can be supported with snapshot images of the layout, with whichever 3D testing tools are active shown. Thus a snapshot of a control room with various measurements shown, or a manikin with a view cone, for example, can be stored together with the review text.

If a specific guideline has rules associated with it and the layout has been tagged with sufficient meta-data then the Verification Tool may give a suggestion of the compliance of the layout with the guideline. The reviewer can examine a breakdown of the individual analyses that the software has done to arrive at its conclusion in order to verify that the reviewer agrees with the automated test.

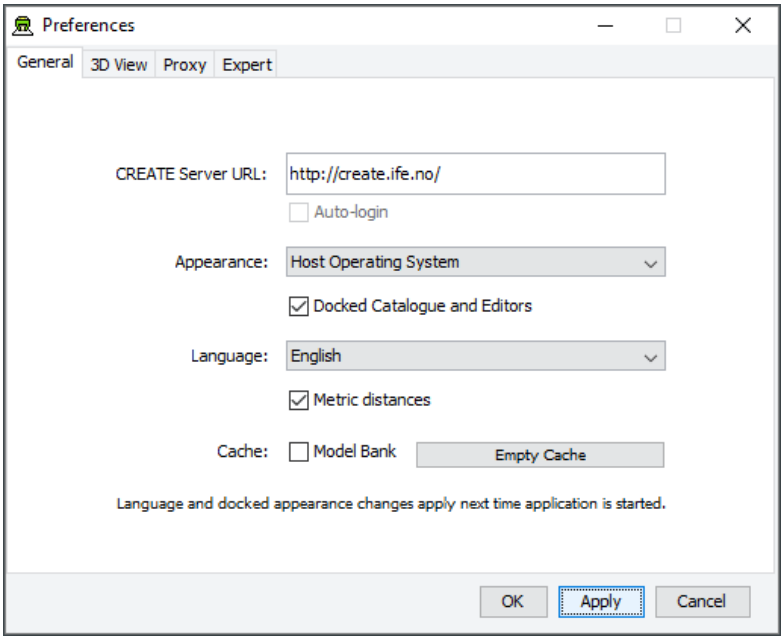
In addition to snapshots of the 3D layout, the reviewer can add arbitrary images from the local file system to the review. This enables the reviewer to use the Verification tool to include a review of a digital HSI in the report data managed by the Verification Tool.

At any time, the reviewer can export a report where guidelines can be listed with comments, conformance status, and snapshots in various formats. The reviewer can also export 2D images of the 3D view. These can be distributed to stakeholders who are not CREATE users.

The reviewer can view and add general comments to the layout itself as a way of communicating with the designer. These comments may contain explanations from the designer or suggestions from the reviewer, for example.

7 Configuration

7.1 The Preferences Window



The Preferences Window

The first time you use one of the CREATE tools you will normally be presented with a wizard that assists you in setting the configuration options that you need to get started using HVRC CREATE. Subsequently, you can adjust your personal configuration via the options in the Preferences Window.

The Preferences Window can be accessed from the main menu bar's Edit > Preferences… menu item. The keyboard shortcut to open the Preferences Window is ctrl-comma (or command-comma).

Changes to preferences are global and therefore affect all CREATE tools that you use, however they are also personal and will not affect any other users of CREATE that share a computer as long as you are not sharing a computer user account.

There are four sets of preferences in the Preferences Window, the most important of which is the "General" set, which is used to enter the address of the CREATE server that will be used. The individual sets and the options they contain are described in the subsections below.

The Preferences Window has three buttons:

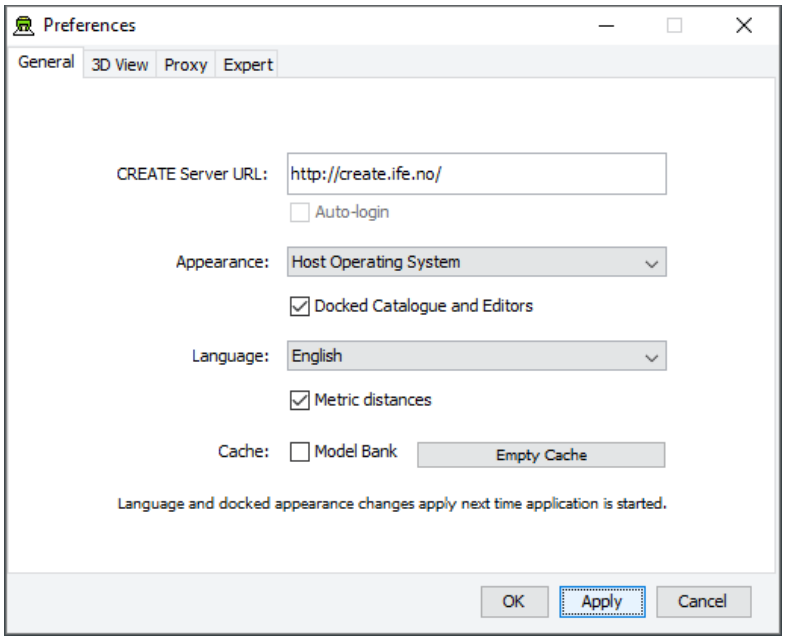
- OK is used to update the preferences and close the window
- Apply is used to set the update the preferences but not close the window
- Cancel is used to dismiss the window without making any changes

Clicking Apply followed by Cancel is equivalent to clicking OK.

A configuration file containing your preferences is created in your home directory and will be applied the next time you run a CREATE tool.

Closing the window by clicking on the close box (top right of the window) is equivalent to clicking on the Cancel button. Hitting the escape key is also equivalent to clicking on the Cancel button.

7.1.1 General Preferences



The General Preferences section of the Preferences Window with server create.ife.no set

The General Preferences section of the Preference Window is used to set the CREATE server URL, to specify the appearance of the CREATE tools, and to toggle caching to local disk of 3D models in the Model Bank.

Important information about changing the server URL:

- In general, it is recommended that you change the server URL setting either immediately after starting up a tool or immediately after saving any unfinished work to the current server, to avoid any risk of data loss before switching to a different server.
- If you are behind a firewall and are using a proxy server to access the internet then you should also refer to Proxy Preferences – section 7.1.3 if you need to access a CREATE server that is not on your local network (e.g. to access the demonstration server on `create.ife.no`).

If some features of the tool are not working correctly and the software is reporting server access errors then the reason may be that the server is incorrectly configured, in which case you should report this to your CREATE server administrator.

The General options are described below:

CREATE Server URL

The server URL is the Web address of the CREATE server where all CREATE system and project data is stored. It is shared by all of the tools. If you attempt to modify the server URL then you will be asked to confirm the change.

Changing the server URL to a non-existent host will render the tools unusable until a valid host URL has been entered. Changing the server URL before saving any work that has been done during the current work session will result in any unsaved data being lost.

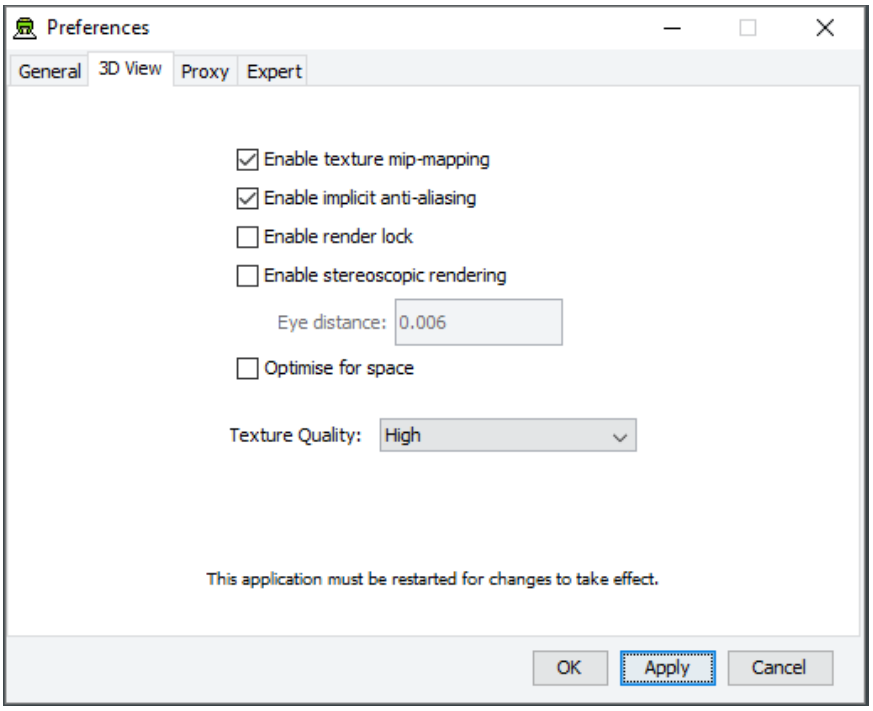
Important: See notes above regarding changing the URL.

Auto-login

If you are logged onto a CREATE Server then this option will be enabled. Once enabled, you can select it to indicate that you would like the tools to remember your user name and password for the current server and use it to automatically log on to the server at any time where you would otherwise be prompted to enter user name and password. The password is stored in encrypted form in the create preferences file for security reasons.

Appearance	The default Appearance is that of the host operating system. The host operating system appearance normally gives the CREATE Tools a look similar to that of other applications on your computer. The cross-platform setting provides a consistent user interface look and feel regardless of whether you are running the software on Windows, Linux, macOS, or some other operating system.
Docked Catalogue and Editors	This option (currently only used by the Layout Tool) causes the Model Bank Catalogue and Editors side panels to be detached from the main application window. When detached, the panels appear as floating windows that can be moved freely around your computer screen. This is especially useful if you have multiple displays attached to your computer as you can then move the Catalogue and Editor panels to a different display, giving more space to work with the 3D view on your main display. This option takes effect the next time the Layout Tool is started.
Language	The text of the HVRC CREATE tools user interfaces can be displayed in English, US English, French or Norwegian. By default this option is set to system default, enabling the software to select the language automatically depending on your operating system language settings. However, you can also select the language specifically. For example, this can be useful if you are working on an international project where English is the project language, but your personal computer is otherwise configured to use a non-English language.
Metric distances	If you want distances to be displayed using U.S. measurement units then you can turn this option off, otherwise distances are displayed in metric units.
Cache	If Model Bank caching is enabled then frequently used models load faster as copies of the models are read from the local hard drive, rather than transferred over the network, each time the model is loaded. The effect of this depends on the speed of the network and the size of the models. The greatest benefit of using caching is achieved when frequently accessing models over a slow connection to a server. Since the model cache is stored on the local disk, it is important that there is sufficient disk space (a few megabytes is usually sufficient) and that you are not using an insecure computer and an insecure user account to access the models (from which the cached models could be copied). Pressing “Empty Cache” deletes the data in your local cache, freeing up disk space. Caveat: If you are using a computer where your home directory is on a server (rather than stored locally on the computer that you are using) then turning on the cache may actually slow down the loading of Model Bank data, if the network connection to the CREATE Server is not significantly slower than the connection to your home directory. **We do not recommend turning on the cache if your home directory is on a network server.**

7.1.2 3D View Preferences



The 3D View Preferences section of the Preferences Window

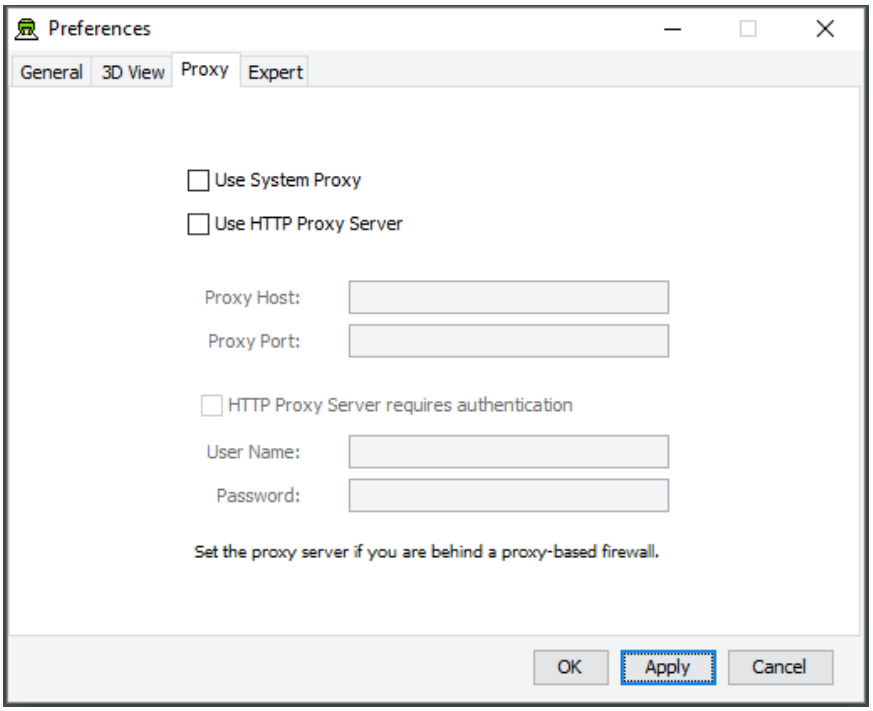
The 3D View Preferences are only applicable to the tools that display 3D graphics, and offer control over the way in which the 3D graphics are rendered. These options generally have no effect until the application has been restarted as the affect the way in which the 3D view is initialised.

The 3D View options are described below.

Enable texture mip-mapping	Enable generation of multi-resolution textures when textured models are loaded. This option improves the appearance and performance of textures, however some older graphics cards may not support this feature and the loading of textured models may be significantly slower if this option is enabled.
Enable implicit anti-aliasing	Allow the display driver to control full-screen anti-aliasing settings. If you have a graphics card with support for anti-aliased rendering then this option enables will cause the tool to acknowledge your anti-aliasing set-up. This option can greatly improve the visual appearance of the 3D view but there may be a performance impact, and some older graphics cards may not support this feature.
Enable stereoscopic rendering	Enable initialisation of 3D views in stereo mode. This option will only have an effect if you have a graphics card that supports active stereoscopic rendering. Unless you are actually using stereoscopic hardware, you should not enable this option as stereoscopic rendering will decrease the overall performance of the 3D view as it requires more effort of the graphics card. Default off.
Enable render lock	Controls rendering execution. Try changing this if you have driver problems. In general, you should leave it off. This option is offered only because it can resolve graphics driver problems in some special cases. Default off.
Optimize for space	Optimize 3D geometry to use less memory at the expense of slower performance. Disable this if you need to squeeze out a little more performance. In most cases the difference is unperceivable, so we recommend leaving it on. Default on.

Texture Quality	If your layouts contain many high-resolution image surface parametric objects then you may reach a point where the rendering performance degrades significantly as you run out of memory on the GPU. You can improve performance by reducing the maximum quality used for texture rendering. Note that the images themselves are always stored at high resolution within CREATE so this only affects their appearance (both in the 3D view and when exporting 2D images). You can safely work with this set to Low if you want to maximise performance while working on a design, and increase it when you are ready to output high quality images. Default is High.

7.1.3 Proxy Preferences



The Proxy Preferences section of the Preferences Window

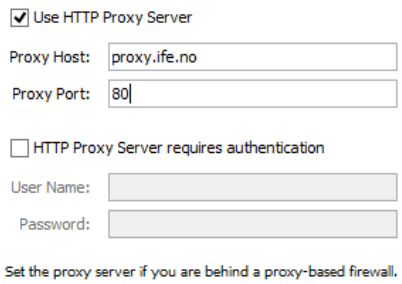
If you are behind a firewall and are using a web proxy server to access the Internet then you will need to configure the CREATE tools to use a proxy server if you wish to access a CREATE server that is not on your local network (e.g. to access the demonstration server on create.ife.no).

To enable proxy support, check the Use HTTP Proxy Server option, enter the server address (without entering `http://` in front of it and without any trailing slashes) in the Proxy Server field and the port number in the Port field. If you leave the port field blank then the default port (80) will be used.

To disable proxy support, uncheck the Use HTTP Proxy Server option.

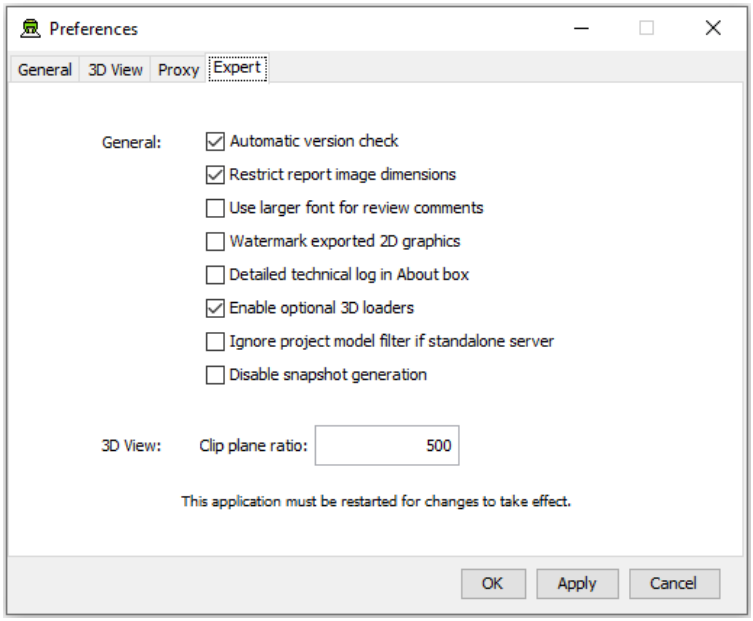
If necessary, select Proxy Server Requires Authentication and enter your network (i.e. not CREATE) user name and password.

Note that changing these items while in the middle of doing work with a CREATE tool is not recommended. Change these settings immediately after starting up a tool or after saving any unfinished work to avoid any risk of data loss.



Example of a filled-in Proxy Preferences section of the Preferences Window

7.1.4 Expert Preferences



The Expert Preferences section of the Preferences Window

The Expert preferences provide access to additional options, described below.

Automatic version check	Turn off the automatic daily checking for a new release of the HVRC CREATE Tools. If you turn this off then you will not be informed automatically of new updates, but can still check for updates manually via the Help-menu (Help > Check for Update). Default on.
Restrict report image dimensions	In versions of CREATE up to 4.0, snapshots of the 3D view added to reports in the Verification Tool were exact duplicates of the image in the 3D view, with the same resolution and aspect. From CREATE 4.0, the snapshots are taken with a consistent aspect to always fit neatly into a report page, with landscape or portrait format depending on the current 3D view aspect. Default on.
Use larger font for review comments	When using a non-Latin character set for entering review comments or procedures, some users may find the text easier to read if a large font is used than the system default size. Default off.
Watermark exported 2D graphics	If this option is enabled then “HVRC CREATE” and the name of the licensee is inserted at the top left on exported images. In the demo version of CREATE then this cannot be turned off. Default off.

Detailed technical log in About box	Select to enable detailed technical logging of system behaviour in the log in the About box. This is useful for troubleshooting if you experience technical issues with the software, and you need to contact CREATE support for assistance. Enabling this option has a small negative effect on the system performance. Default off.
Enable optional 3D loaders	Select to enable 3D loaders, to support importing 3D models in glTF, LWO, OBJ, PLY, and SCENE (Ogre3D) formats. These are described as optional as they are not guaranteed to load all files in those formats correctly but are useful as they can load most files in those formats. Saving your work before attempting to import a model for the first time in one of these formats is recommend. Default on.
Clip plane ratio	If you experience tearing effects in the 3D view then this may be because your graphics processor is unable to draw surfaces that are close together with sufficient accuracy. Reducing this number may minimise that effect, although at the cost of not being able to view near surfaces as closely. Similarly, if you are not having any problems with tearing then you might want to try increasing this number in order to be able to move even closer to surfaces before they disappear from view. A ratio of 1000 is a good choice for most modern discrete graphics cards. Default is 500.
Ignore project model filter if standalone server	If you are using a standalone CREATE Server (as opposed to a networked server), on the same machine that you are running the CREATE Tools on, then you can opt to ignore any project level model filters set for the Model Bank. This makes all categories and models visible in the Layout Tool regardless of any filters that have been specified using the Project Management Tool. If you are the only user of the server then this can be useful as you will see all new categories added to the Model Bank without having to update the project context using the Project Management Tool. Default is off.
Disable snapshot generation	Enable a partial workaround to enable CREATE 3D tools to run on hardware that does not fully support the 3D hardware minimum requirements. Default is off.