

Deploy Generative AI with ease: the OpenVINO™ GenAI library provides developers with necessary tools to optimize and deploy Generative AI models. Based on OpenVINO™ tools and runtime, it provides best performance and characteristics for inference on the supported platforms.

## Which use cases are supported by OpenVINO™ GenAI?

OpenVINO™ GenAI provides intuitive and simple C++/Python APIs to run:

- Text generation models (text summarization, rewriting, chatbots, etc.)
- Image generation models (using Diffuser-based architectures)
- Whisper-based speech transcription and translation
- Image processing with Visual Language Models (LLaVa and others)

## Use OpenVINO™ GenAI to run models from



Hugging Face



ModelScope

## Install OpenVINO™ GenAI

[Linux install](#)

[Windows install](#)

[macOS install](#)

[PyPI example](#) for Linux, macOS & Windows:

```
#set up python venv
python -m pip install openvino-genai
```

A full list of installation options is [here](#).

## Download converted and optimized models from Hub

Use the huggingface\_hub package to download:

```
pip install huggingface_hub
```

Download a model to a local folder:

```
huggingface-cli download "OpenVINO/phi-2-fp16-ov" --local-dir model_path
```

Browse models from OpenVINO Toolkit in our collections:

- [Large Language Models](#)
- [Text2Speech Models](#)

## OpenVINO™ GenAI: Supported Models

A list of validated models is [here](#).

Note that even if your model is not listed, it may still work.

## 1a. Convert and optimize LLMs from Hugging Face



Use the optimum-intel package to convert and optimize models

```
pip install optimum-intel[openvino]
```

Download and convert a model to the OpenVINO IR format while keeping full model precision

```
optimum-cli export openvino --model meta-llama/Llama-2-7b-chat-hf --weight-format fp16 ov_llama_2
```

[Recommended] Download, convert a model, and compress weights to the int4 precision

```
optimum-cli export openvino --model meta-llama/Llama-2-7b-chat-hf --weight-format int4 ov_llama_2
```

A full list of conversion options is [here](#).Pre-converted LLMs are [here](#)

## 1b. Convert and optimize LLMs from Model Scope



Use modelscope and optimum-intel packages to convert and optimize models

```
pip install modelscope optimum-intel[openvino]
```

Download the required model to a local folder

```
modelscope download --model 'Qwen/Qwen2-7b' --local_dir model_path
```

[Recommended] convert the model and compress weights to the int4 precision (or int8 or fp16)

```
optimum-cli export openvino -m model_path --task text-generation-with-past --weight-format int4 ov_qwen_25
```

## 2. Run model using OpenVINO™ GenAI

In Python:

```
import openvino_genai as ov_genai
pipe = ov_genai.LLMPipeline(model_path, "GPU")
print(pipe.generate("What is OpenVINO?", max_length=200))
```

In C++:

```
#include "openvino/genai/llm_pipeline.hpp"
#include <iostream>

int main(int argc, char* argv[]) {
    ov::genai::LLMPipeline pipe(model_path, "GPU");
    std::cout << pipe.generate("What is Large Language Model?",
                               ov::genai::max_new_tokens(200));
}
```

Use CPU or GPU as devices without any other code change

## When running LLMs it is also possible to:

- Use different generation parameters (sampling types, etc.)
- Optimize for chat scenarios by using the chat mode
- Load LoRA adapters and dynamically switch between them without recompilation
- Use draft models to accelerate generation via Speculative Decoding

Check out our [Python](#) and [C++](#) samples.

# Generate Images using Diffusers



2024 | Updates are [here](#).

Post your questions [here](#).

Read the documentation [here](#).

GenAI Cheat Sheet

## 1a. Convert and optimize Models from Hugging Face



Use the optimum-intel package to convert and optimize models

```
pip install optimum-intel[openvino]
```

Download and convert a model to the OpenVINO IR format while keeping full model precision

```
optimum-cli export openvino --model stabilityai/stable-diffusion-xl-base-1.0  
--weight-format fp16 ov_SDXL
```

[Recommended] Download, convert the model, and compress weights to the int4 precision

```
optimum-cli export openvino --model stabilityai/stable-diffusion-xl-base-1.0  
--weight-format int4 ov_SDXL
```

A full list of conversion options is [here](#).

## 1b. Convert and optimize Models from Model Scope ModelScope

Use modelscope and optimum-intel packages to convert and optimize models

```
pip install modelscope optimum-intel[openvino]
```

Download the required model to a local folder

```
modelscope download --model AI-ModelScope/stable-diffusion-xl-base-1.0  
--local_dir model_path
```

[Recommended] convert the model and compress weights to the int4 precision (can use int8 & fp16)

```
optimum-cli export openvino -m model_path --task text-generation-with-past  
--weight-format int4 ov_SDXL
```

## 2. Run model using OpenVINO™ GenAI

In Python:

```
import openvino_genai as ov_genai  
pipe = openvino_genai.Text2ImagePipeline(model_dir, "GPU")  
image_tensor = pipe.generate(prompt)
```

In C++:

```
#include "openvino/genai/image_generation/text2image_pipeline.hpp"  
int main(int argc, char* argv[]) {  
    ov::genai::Text2ImagePipeline pipe(models_path, "GPU");  
    ov::Tensor image = pipe.generate(prompt);  
}
```

Use CPU or GPU as devices without any other code change

## When generating images, it is also possible to:

- Alter parameters (width, height, iterations) and compile models for static size
- Load LoRA adapters (in safetensor format) and dynamically switch between them
- Generate multiple images per one request

Check out our [Python](#) and [C++](#) samples.

# Processing speech by Whisper



2024 | Updates are [here](#).  
Post your questions [here](#).  
Read the documentation [here](#).

GenAI Cheat Sheet

## 1a. Convert and optimize models from Hugging Face



Use the optimum-intel package to convert and optimize models

```
pip install optimum-intel[openvino]
```

Download and convert the model to the OpenVINO format while keeping full model precision

```
optimum-cli export openvino --trust-remote-code --model openai/whisper-base  
ov_whisper
```

Optimization sample is available [here](#). Pre-converted Models are [here](#)

## 1b. Convert and optimize models from Model Scope ModelScope

Use modelscope and optimum-intel packages to convert and optimize models

```
pip install modelscope optimum-intel[openvino]
```

Download the required model to a local folder

```
modelscope download --model AI-ModelScope/whisper-large-v3-turbo  
--local_dir model_path
```

[Recommended] convert the model

```
optimum-cli export openvino -m model_path  
--task automatic-speech-recognition-with-past ov_whisper
```

## 2. Run model using OpenVINO™ GenAI

In Python:

```
import openvino_genai as ov_genai  
pipe = openvino_genai.WhisperPipeline(model_dir, "CPU")  
#Pipeline expects normalized audio with Sample Rate of 16kHz  
raw_speech = read_wav(...)  
result = pipe.generate(raw_speech)
```

In C++:

```
#include "openvino/genai/whisper_pipeline.hpp"  
  
int main(int argc, char* argv[]) {  
    ov::genai::WhisperPipeline pipe(model_path, "CPU");  
    //Pipeline expects normalized audio with Sample Rate of 16kHz  
    ov::genai::RawSpeechInput raw_speech = read_wav(...);  
    auto result = pipe.generate(raw_speech, config);  
}
```

Use CPU or GPU as devices without any other code change

## When running Whisper models, it is also possible to:

- Translate transcription to English
- Predict timestamps
- Process Long-Form (>30 seconds) audio

Check out our [Python](#) and [C++](#) samples.



# Analyzing images with VLMs



2024 | Updates are [here](#).  
Post your questions [here](#).  
Read the documentation [here](#).

GenAI Cheat Sheet

## 1a. Convert and optimize VLMs from Hugging Face



Use optimum-intel package to convert and optimize models

```
pip install optimum-intel[openvino]
```

Download and convert a model to the OpenVINO IR format while keeping full model precision

```
optimum-cli export openvino --model openbmb/MiniCPM-V-2_6  
--trust-remote-code -weight-format fp16 ov_MiniCPM-V-2_6
```

[Recommended] Download, convert the model, and compress weights to the int4 precision

```
optimum-cli export openvino --model openbmb/MiniCPM-V-2_6  
--trust-remote-code -weight-format int4 ov_MiniCPM-V-2_6
```

A full list of conversion options is [here](#).

## 1b. Convert and optimize VLMs from Model Scope



Use modelscope and optimum-intel packages to convert and optimize models

```
pip install modelscope optimum-intel[openvino]
```

Download the required model to a local folder

```
modelscope download --model OpenBMB/MiniCPM-V-2_6 --local_dir model_path
```

[Recommended] convert the model and compress weights to the int4 precision (or int8 or fp16)

```
optimum-cli export openvino -m model_path --task image-text-to-text  
--weight-format int4 ov_MiniCPM-V-2_6 --trust-remote-code
```

## 2. Run model using OpenVINO™ GenAI

In Python:

```
import openvino_genai as ov_genai  
pipe = ov_genai.VLMPipeline(model_dir, "GPU")  
#read images to OV Tensors  
rgbImages = read_images(...)  
print(pipe.generate(prompt, images=rgbImages, max_new_tokens=100))
```

In C++:

```
#include "openvino/genai/visual_language/pipeline.hpp"  
#include <iostream>  
  
int main(int argc, char* argv[]) {  
    ov::genai::VLMPipeline pipe(model_dir, "GPU");  
    //Read images into vector of OV Tensors  
    std::vector<ov::Tensor> rgbImages = read_images(...);  
    std::cout << pipe.generate(prompt, ov::genai::images(rgbImages),  
                                ov::genai::max_new_tokens(100));  
}
```

Use CPU or GPU as devices without any other code change

## When running VLMs, it is also possible to:

- Use different generation parameters (sampling types, etc.)
- Optimize for chat scenarios by using chat mode
- Pass multiple images to a model

Check out our [Python](#) and [C++](#) samples.