



The OpenVX™ Kernel Import Extension

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Version 1.0 (Provisional), 8th March 2018

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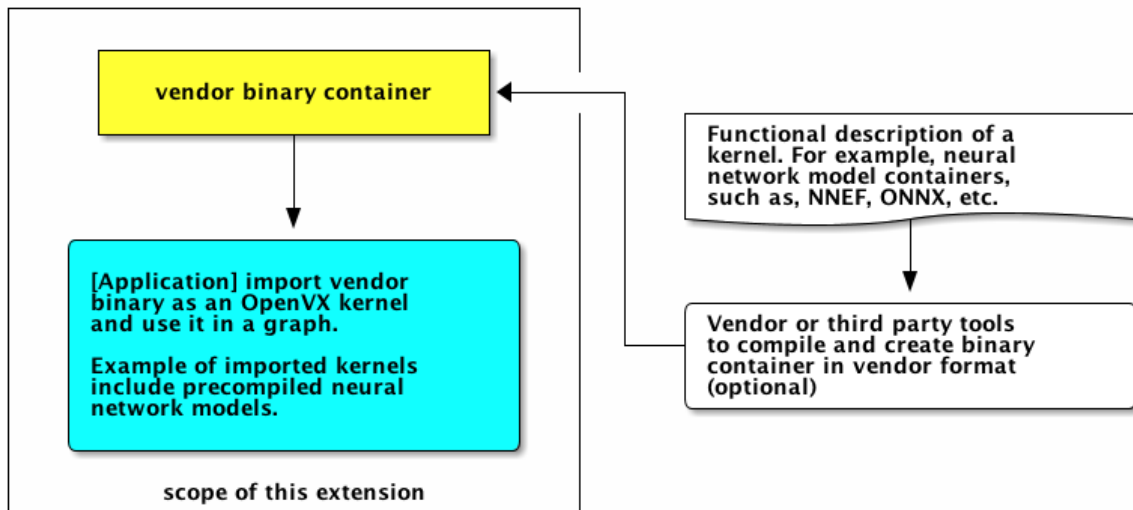
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1. Purpose

This document details an extension to OpenVX 1.2, and references some APIs and symbols that may be found in that API, at

<https://www.khronos.org/registry/OpenVX/specs/1.2/html/index.html>.

Provide a way of importing an OpenVX kernel from a vendor binary specified by URL.



The name of this extension is `vx_khr_import_kernel`.

1.1. Example: AlexNet graph

In order to use a neural network in OpenVX graph, one may to use the process outlined below:

- Import a pre-trained neural network kernel into the context from a vendor binary specified by URL. Use the `vxImportKernelFromURL` API to import the neural network kernel.
- Create an OpenVX graph that will use the imported neural network kernel.
- Create tensor objects for all neural network parameters (i.e., both input and output)
- Instantiate a neural network node into the graph using the `vxCreateGenericNode` and `vxSetParameterByIndex` APIs.
- Use the `vxVerifyGraph` API to verify and optimize the graph.
- Run the OpenVX graph in a loop

```

#include <VX/vx_khr_import_kernel.h>

void AlexNet( vx_size batchSize )
{
    // create OpenVX context
    vx_context context = vxCreateContext();

    // import neural network kernel
    const char * type = "vx_xyz_folder"; // XYZ's kernel binary container
    const char * url = "/assets/alexnet/"; // folder with AlexNet binary
    vx_kernel nn_kernel = vxImportKernelFromURL(context, type, url);

    // create input and output tensor objects
    vx_size input_sizes[] = { 224, 224, 3, batchSize };
    vx_size output_sizes[] = { 1, 1, 1000, batchSize };
    vx_tensor input = vxCreateTensor(context, 4, input_sizes, VX_TYPE_UINT8, 0);
    vx_tensor output = vxCreateTensor(context, 4, output_sizes, VX_TYPE_INT16, 8);

    // create OpenVX graph
    vx_graph graph = vxCreateGraph(context);

    // add neural network instance as a node in the OpenVX graph
    vx_node node = vxCreateGenericNode(graph, nn_kernel);
    vxSetParameterByIndex(node, 0, input);
    vxSetParameterByIndex(node, 1, output);
    vxReleaseNode(&node);

    // verify graph
    vxVerifyGraph(graph);

    // process graph with one batch at a time
    while( userGetNextJobInput(input) == VX_SUCCESS )
    {
        // execute the graph to run AlexNet
        vxProcessGraph(graph);

        // consume the output from AlexNet
        userConsumeOutput(output);
    }

    vxReleaseGraph(&graph);
    vxReleaseTensor(&input);
    vxReleaseTensor(&output);
    vxReleaseContext(&context);
}

```

2. The Kernel Import API functions

2.1. vxImportKernelFromURL

Import a kernel from binary specified by URL.

Declaration in VX/vx_khr_import_kernel.h

```
vx_kernel vxImportKernelFromURL(  
    vx_context context,  
    const vx_char * type,  
    const vx_char * url  
);
```

Parameters

context

[in] OpenVX context

type

[in] Vendor-specific identifier that indicates to the implementation how to interpret the **url**. For example, if an implementation can interpret the **url** as a *file*, a *folder* a *symbolic label*, or a *pointer*, then a vendor may choose to use "vx_<vendor>_file", "vx_<vendor>_folder", "vx_<vendor>_label", and "vx_<vendor>_pointer", respectively for this field. Container types starting with "vx_khr_" are reserved. Refer to vendor documentation for list of container types supported.

url

[in] URL to binary container.

Return Value

- On success, a valid `vx_kernel` object. Calling `vxGetStatus` with the return value as a parameter will return `VX_SUCCESS` if the function was successful.

An implementation may provide several different error codes to give useful diagnostic information in the event of failure to create the context.

Description

This function imports a kernel object from a URL.

The name of kernel parameters can be queried using the [vxQueryReference](#) API with [vx_parameter](#) as **ref** and [VX_REFERENCE_NAME](#) as **attribute**.

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