OPC UA for OpenVMS

Product Description

QED Systems LLC
www.QEDSystemsLLC.com

West Falls, NY   716.714.5549

Contents

1 OPC UA for OpenVMS

QED Systems provides a native OpenVMS OPC UA interface that enables you to connect your OpenVMS based Alpha or Integrity server to the rest of the controls world and other remote applications.

Many OpenVMS systems have either archaic vendor-supplied interfaces or custom interfaces to communicate with external systems. These interfaces are hard to maintain and update when the external systems are upgraded. Vendor-supplied interfaces have become obsolete and programming knowledge of the custom interfaces is frequently lost. Consequently, upgrading the external technology has become disruptive and costly for the OpenVMS systems as well.
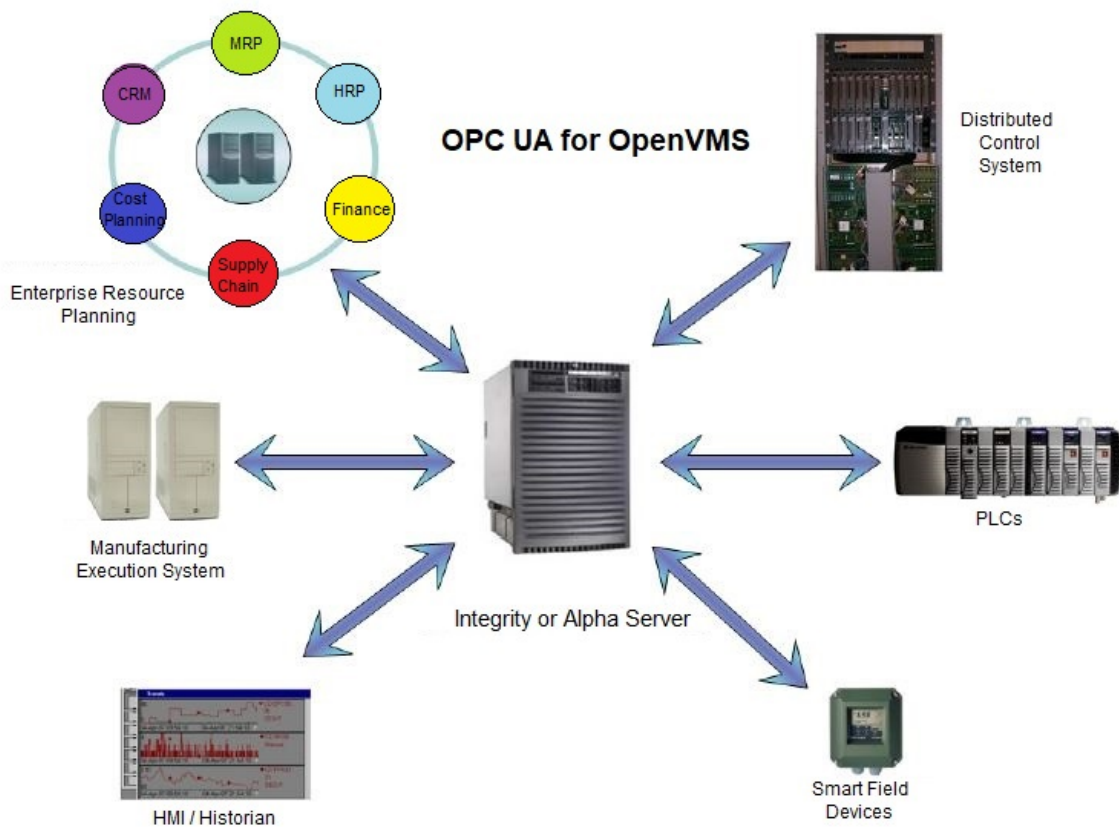
Since OPC has become the industry standard for communication to and from Level 1 systems, OpenVMS users have been left behind. The significant investment and intellectual property of your OpenVMS system has been in jeopardy because there has not been an easy way to join the world of OPC until the arrival of OPC UA (Unified Architecture).

1.1 OPC Unified Architecture (OPC UA)

OPC was developed as an open standard for communication between process systems. Originally developed on Microsoft technologies, including COM and DCOM, the standard was restricted to use by Microsoft-based systems. The OPC Foundation addressed this limitation by re-inventing the standard as a platform-independent, state-of-the-art communication protocol: OPC Unified Architecture (OPC UA). OPC UA is being embraced at all levels, from smart field instrumentation to enterprise-wide management systems, such as SAP and other ERP systems. With OPC UA for OpenVMS, your applications are now open to the growing list of systems that have emerged with this new standard.

1.2 OPC UA Comes to OpenVMS

OPC UA is useful in applications where your OpenVMS system serves as a data source to other systems (graphics, historians, Level 1, ERP, etc.) or receives data from other systems (PLC or DCS). Just as in the Microsoft world, OPC UA for OpenVMS connects effortlessly with any other OPC UA interface, from field instrumentation to Level 1 systems, to higher level systems such as MES and ERP. Your OpenVMS system on the plant or shop floor can now be interfaced to your board room or many other locations throughout your facility.

1.3 *OPC UA for OpenVMS* – Product Overview

OPC UA for OpenVMS is provided as component products:

- **OPC UA Client for OpenVMS** - The Client can be integrated into any existing architecture that you have in place for applications where your OpenVMS system needs to gather data from an OPC source (PLC, DCS, etc.). Integration is via a library of API calls that can be integrated into your code to replace your old communication interface.
- **OPC UA Server for OpenVMS** - The Server can be integrated into any existing architecture that you have in place. It is useful for applications where your OpenVMS system serves as a data source to other systems (graphics, historians, Level 1, ERP, etc.). The Server is integrated via a library of API calls. Data structures are customized and configured to a user's specific application to allow simple and complex data to be accessed. Once your data is connected to the Server, the Server will take care of sending it in the appropriate format and at the proper rate to any OPC UA Client needing the data.
- **OPC UA Client and Server for OpenVMS** – Both the OPC Client and Server can be installed on your system and work together as needed where your system serves as both a data source and a data sink.
- **OPC UA Connector for OpenVMS** – If you have an older system, running a pre v8.4 version of OpenVMS, your system can be connected to an OPC UA server via the OPC UA Connector. This software allows you to connect your legacy applications to the world through our OPC UA Client for OpenVMS with minimal impact and footprint on your legacy system.
- **OPC UA Portal for OpenVMS*** – If you have an older system, running a pre v8.4 version of OpenVMS, your system data can be exposed to an OPC UA client via the OPC UA Portal. This software allows you to expose your legacy system data to the world through our OPC UA Server for OpenVMS with minimal impact and footprint on your legacy system.

By using **OPC UA for OpenVMS**, you enable your OpenVMS applications to interface with other systems on your networks. Changes in other systems no longer require a rewrite of your OpenVMS communications interface. OPC UA for OpenVMS will connect seamlessly to the new system through that product's OPC UA interface.

1.4 Capabilities of *OPC UA for OpenVMS*

OPC UA for OpenVMS is designed to meet the needs of any applications running in your OpenVMS environment and to connect your system to all other systems that need to exchange data with it.

	Feature	Limit or Constraint
Client	Number of OPC UA Clients per node	16
Client	Number of Servers that can connect to one OPC UA Client	8
Client	Number of user application connections[*] per OPC UA Client	32
Client	Number of tags[**] per OPC UA Client	32,000
Client & Server	Data types that can be configured	Digital, Byte, Integer (2, 4, 8 byte), Floating Point (4, 8 byte), String, and custom structures
Server	Number of OPC UA Servers per node	8
Server	Number of Clients that can connect to one OPC UA Server	Unlimited
Server	Number of devices[***] per OPC UA Server	32
Server	Number of tags[**] per device	10,000

[*] A user application connection is typically a single program running on OpenVMS.

[**] Tags may consist of individual data points, such as analog or digital values, or may be more complex types such as strings or custom data structures.

[***] A device is a user defined logical grouping of tags

1.5 System Requirements for *OPC UA for OpenVMS*

 OPC UA for OpenVMS runs on any Alpha or Integrity platform that is running OpenVMS 8.4 Update 5 or newer.

System Parameter	Requirement
Hardware	Alpha®/ Integrity®
OpenVMS Version	8.4 Update 5 (or newer)
NOTE: Older systems (Alpha and VAX) can be connected to OPC UA for OpenVMS via separate products, OPC UA Connector for OpenVMS and OPC UA Portal for OpenVMS. You must have an Itanium/Integrity Server running OpenVMS 8.4 Update 5 (or newer) as a part of the system.	

2 OPC UA Server for OpenVMS

OPC UA Server for OpenVMS provides data sourcing capabilities for the applications on your OpenVMS system. The destination of the data does not matter – any OPC UA client application can connect to and access data as needed.

OPC UA Server for OpenVMS is designed to minimize the amount of engineering and software development that is required to integrate it into your current program space. If your data stores are well organized and easily accessed, the integration effort can be relatively quick. Even in those cases where data storage in your applications is less than ideal, we can still connect your data to OPC UA in less time than it would take to implement a new or upgraded proprietary interface.

Figure 1 shows the architecture for the **OPC UA Server for OpenVMS**. The yellow box shows the programs that comprise the server. The orange box represents all of your existing applications and their data storage mechanisms – global common areas, databases, files, and others. These two worlds are connected together by the blue objects in the figure – the User Application and the Server Configuration File.
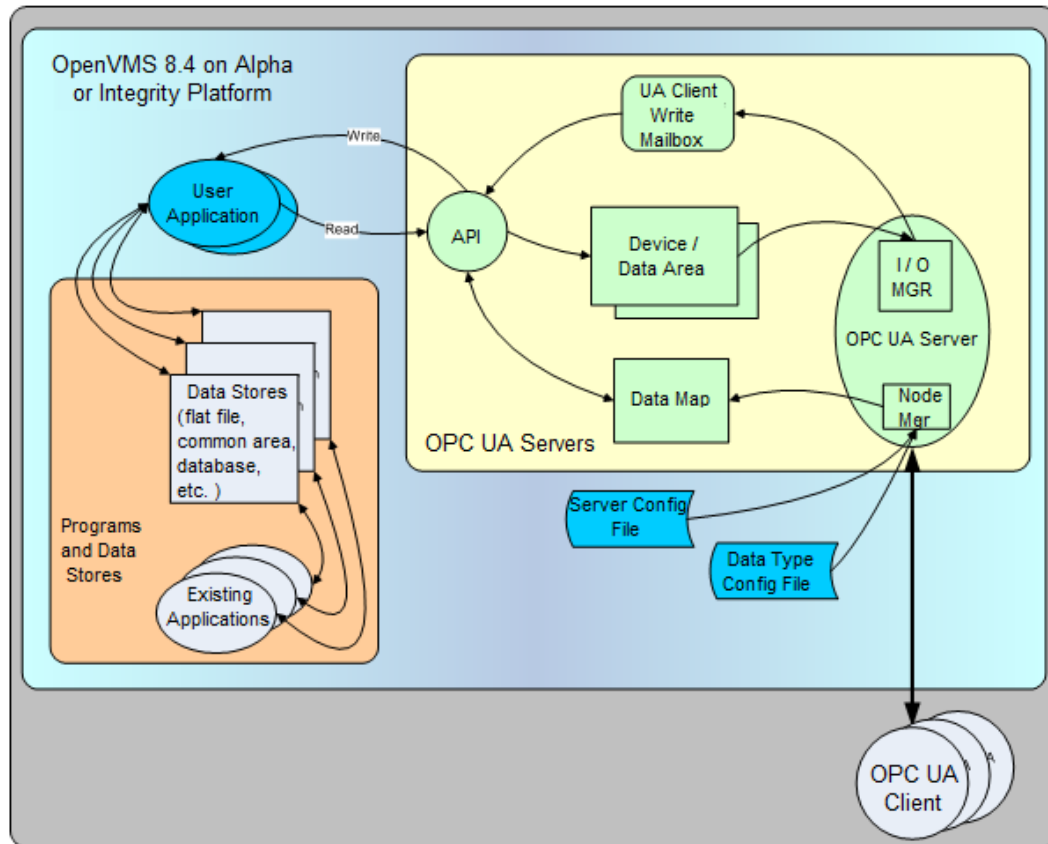

Figure 1 -- OPC UA Server Architecture

The User Application is a program that is developed by you or by us that allows OPC UA for OpenVMS to know how to access your data in the appropriate data stores. The User Application makes use of a set of library calls through the server's Application Program Interface (API). The User Application will extract data from the current applications' data stores and send it to the server via the API calls. OPC UA Server will handle it from there, assuring that data make it to the final destination in the external OPC UA client.

The Server Configuration File is an XML data file that the OPC UA server uses to know what data are to be sourced from your applications. This file is developed from a template that is provided with the server, and can be developed by you or by us. Development of the Server Configuration File can generally be completed in about 8 hours.

2.1 Client Requirements

In order for **OPC UA Server for OpenVMS** to communicate with a client, the client must be an OPC UA client. If your client application is OPC DA, HDA, or other older OPC technology, you can use an OPC UA wrapper that will make the client OPC UA enabled.

3 OPC UA Client for OpenVMS

OPC UA Client for OpenVMS provides data access capabilities for the applications on your OpenVMS system. The source of the data does not matter – any OPC UA Server application can be connected to and data accessed as needed. A single OPC UA Client can connect with up to eight OPC UA Servers.

Figure 2 shows the OPC UA Client architecture. The yellow box shows the OPC UA Client application. The OPC UA Client includes an API that is used to connect the Client to your programs (shown in orange on the diagram).
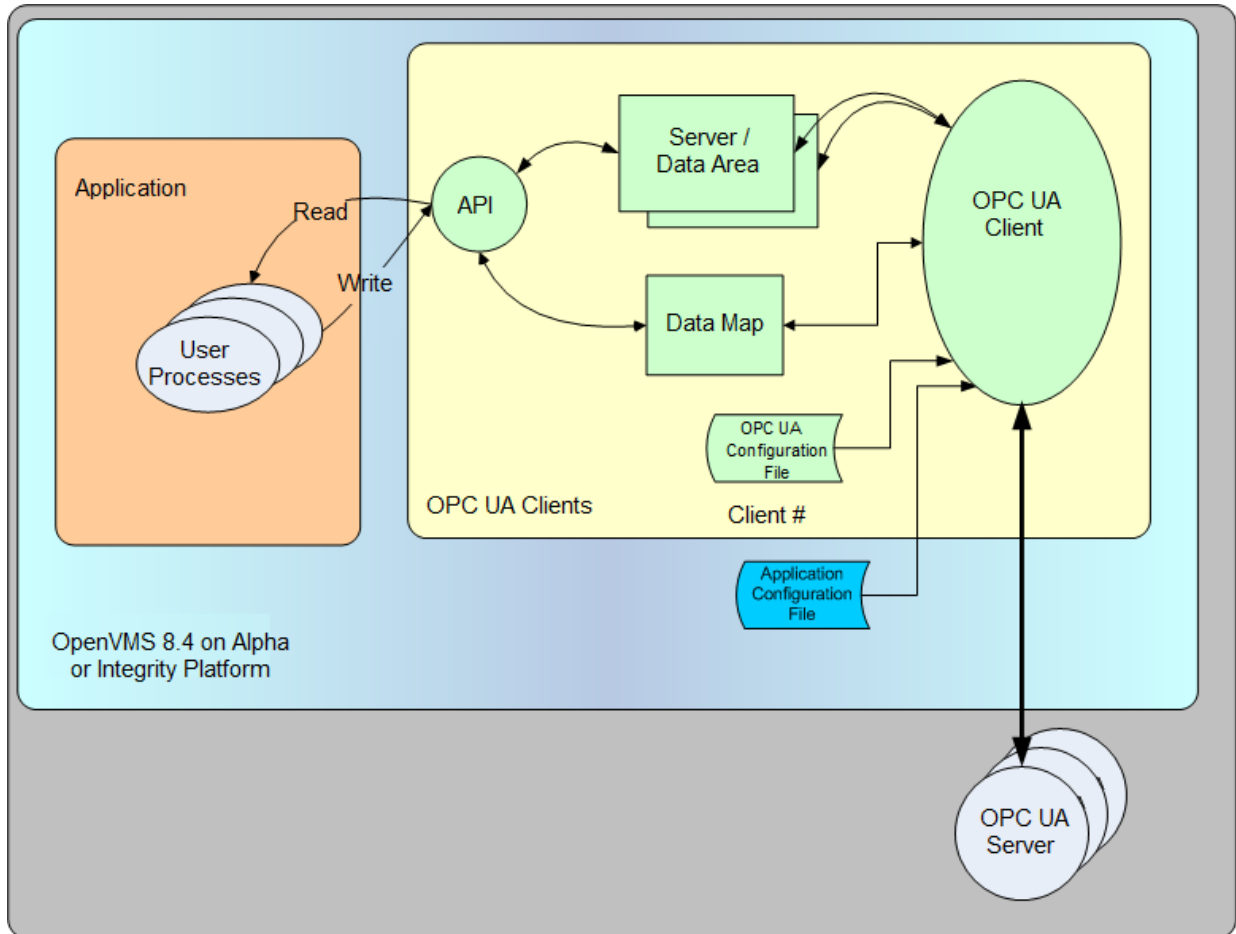

Figure 2 -- OPC UA Client Architecture

3.1 Server Requirements

In order for **OPC UA Client for OpenVMS** to communicate with a server, the server must be an OPC UA server. If your server application is OPC DA, HDA, or other older OPC technology, you can use an OPC UA wrapper that will make the server OPC UA enabled. The wrapper consists of a server-side module that allows the UPC UA Client to connect to any existing COM-based OPC Server.

4 OPC UA Connector for OpenVMS

OPC UA Connector for OpenVMS provides applications running on pre-OpenVMS 8.4 system with access to OPC UA. The OPC UA Connector product provides connectivity to any OPC UA Server through an OPC UA Client for OpenVMS running on an OpenVMS 8.4 node.

Figure 3 shows a typical OPC UA Connector for OpenVMS architecture. A user process running on a legacy node utilizes the OPC UA Connector API to access an OPC UA Client running on an OpenVMS 8.4 node. The Connector API establishes a connection between the legacy application and the OPC UA Connector. The connector spins up an OPC UA Proxy process and passes the network connection from the legacy application to the created proxy processes. The proxy process is the conduit for passing requests and data between the legacy application and the OPC UA Client for OpenVMS.
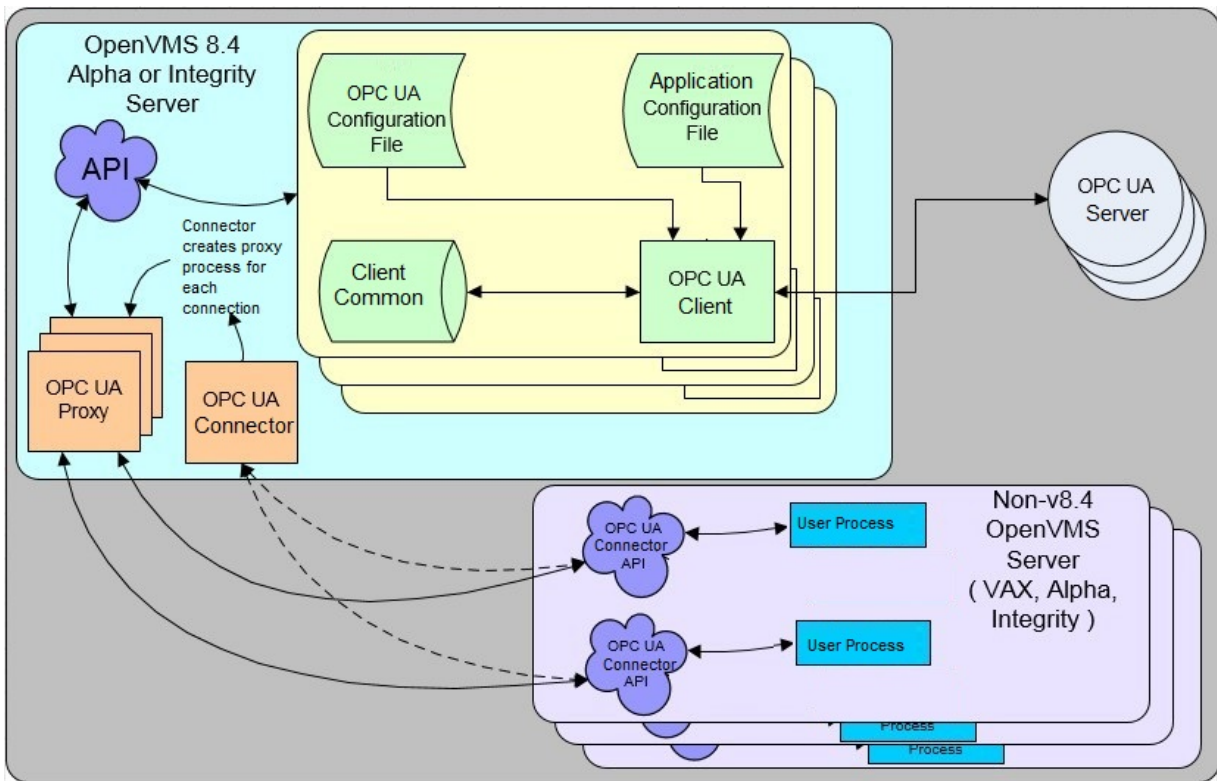

Figure 3 -- OPC UA Connector Architecture

Migration of applications between the legacy system and an OpenVMS 8.4 node with the OPC UA Client for OpenVMS installed does not require any OPC UA specific modifications. The OPC UA Connector API mirrors the OPC UA Client API. Migration requires recompiling using the OPC UA Client for OpenVMS include files and relinking against the OPC UA Client for OpenVMS API library.

5 OPC UA Portal for OpenVMS*

OPC UA Portal for OpenVMS provides applications running on pre-OpenVMS 8.4 system with access to OPC UA. The OPC UA Portal product provides a way to expose data stored on legacy systems to any OPC UA client through an OPC UA Server for OpenVMS running on an OpenVMS 8.4 node.

Figure 4 shows a typical OPC UA Portal for OpenVMS architecture. Data server applications running on a legacy node utilize the OPC UA Portal API to connect with an OPC UA Server running on an OpenVMS 8.4 node. The Portal API establishes a connection between the processes and the OPC UA Portal. The portal spins up an OPC UA Proxy process and passes the network connection from the data server application to the created proxy processes. The proxy process is the conduit for passing updates and data between the legacy application and the OPC UA Server for OpenVMS.
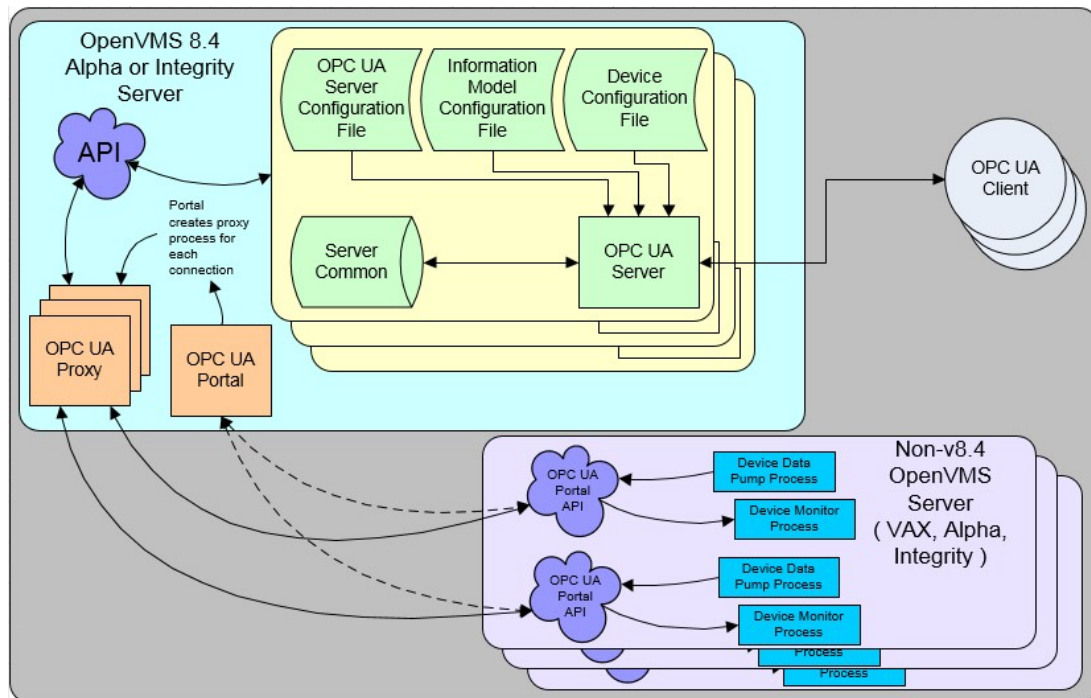

Figure 4 -- OPC UA Portal Architecture

Migration of the data server applications between the legacy system and an OpenVMS 8.4 node with the OPC UA Server for OpenVMS installed does not require any OPC UA specific modifications. The OPC UA Portal API mirrors the OPC UA Server API. Migration requires recompiling using the OPC UA Server for OpenVMS include files and relinking against the OPC UA Server for OpenVMS API library.

NOTE: The OPC UA Portal is a planned product that has not yet been implemented. Please let us know if you have an application requiring this functionality.

6 OpenVMS Programming Services

We are intimately familiar with OpenVMS and do a variety of OpenVMS projects. Our OPC UA for OpenVMS was developed as a product as we saw the need to provide industry-standard communication capability to applications running under OpenVMS.

In addition to the development of the User Application module, QED Systems LLC can offer you engineering support to assist you with any other software development you may need to integrate your existing applications into the OPC UA for OpenVMS environment. Please let us know if you are interested in these services and we can provide you with a proposal.

7 Affiliations

QED Systems LLC is a VMS Software Inc. Independent Software Vendor partner.

8 Contacting QED Systems LLC

For more information, including a price quotation, please contact Brian Segulin at brian.segulin@qedsystemsllc.com or by phone at 716-714-5549. You can find more information about QED Systems LLC online at [www.qedsystemsllc.com.](http://www.qedsystemsllc.com)

8.1 Trial Licenses

Trial license are available for all our OPC UA for OpenVMS products. Please contact Brian Segulin at brian.segulin@qedsystemsllc.com to request a license or through the website at www.qedsystemsllc.com.