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Vortex OpenSplice

Python DDS Binding



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1. Background

1.1 Python

Python Software Foundation's Python™ is an interpreted high-level programming language for general purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability and a syntax that allows programmers to express concepts in fewer lines of code, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.

Why people use Python:

- Web and Internet development
- Desktop GUIs
- Scientific and Numeric applications
- Software Development
- Business Applications
- Education

Python is consistently near the top of any list of most popular programming languages and in 2018 is expected to be the second most in demand by employers after Java. The popularity of Python looks set to continue well in to the future as the ability for rapid prototyping is ideal for machine learning which is an area of intense development.

1.2 DDS

The Object Management Group®'s (OMG®) Data-Distribution Service™ (DDS™) standard is a data-centric publish-and-subscribe technology that emerged from the Aerospace and Defense community to address the data distribution requirements of mission-critical systems. It enables scalable, real-time, reliable, high performance and interoperable data exchanges between publishers and subscribers. DDS is designed to address the needs of mission and business-critical applications like financial trading, air traffic control, smart grid management, and other big data applications. It is being increasingly used in a wide range of Industrial Internet applications.

The DDS specification defines:

- A Data Centric Publish Subscribe (DCPS) layer providing a set of APIs that present a coherent set of standardized "profiles" targeting real-time information-availability for domains ranging from small-scale embedded control systems right up to large-scale enterprise information management systems.

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- A DDS Interoperability Wire Protocol (DDSI)

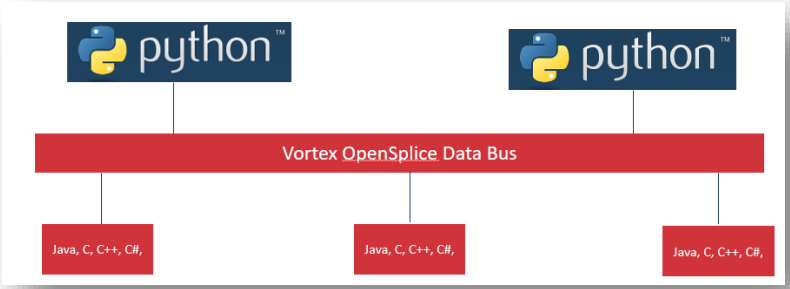
DDS is both language and OS independent. Using standardized APIs helps ensure that DDS applications can be ported easily between different vendor's implementations.

DDS also specifies a wire protocol, the DDS Interoperability Wire Protocol, referred to as DDSI. A wire-level protocol refers to the mechanism for transmitting data from point-to-point. A wire protocol is needed if more than one application has to interoperate. In contrast to protocols at the transport level (like TCP or UDP), the term wire-protocol is used to describe a common way to represent information at the application level. All DDS implementations complying with DDSI will interoperate. The protocol also supports automatic "Discovery" that allows DDS participants to declare the information that they can provide or what data they would like to receive, in terms of topic, type and QoS. The protocol will automatically connect appropriate publishers to subscribers. This significantly simplifies the process of configuring systems with many nodes and many devices exchanging data.

2. Why Python DDS Binding is a Big Deal

2.1 Seamless Integration between Python applications and applications written in C, C++. C# and Java

Vortex OpenSplice provides fast, secure and interoperable data communications infrastructure. This can be used to distribute data between applications written in Python and those written in other languages such as C, C++, C# and Java.



Vortex OpenSplice enables you to reliably scale systems to hundreds or even thousands of applications, distributed across local and wide-area networks. This is especially useful when considering the scalability, rapid prototyping and machine learning that are the key benefits of using Python as a programming language.

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2.2 Benefits

- Seamless Integration between Python applications and other applications implemented in C, C++, C# and Java
- Scalable peer-to-peer data communication
- Dynamic peer discovery
- Robust security with authentication, encryption, and per-topic access control
- Ability to fine-tune application behavior, without coding through Quality of Service parameters
- Available on the plethora of platforms that Vortex OpenSplice supports already given these offer support for the Python package itself as well

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