DATA SHEET

AMQP

Protocol Adapter

AT-A-GLANCE

- AMQP is one of the the most widely used protocols for moving IIoT data to the cloud
- Secure, one-way transfers of AMQP messages
- Protects IIoT and OT assets and enables secure cloud connectivity
- Seamless integration with Owl data diodes

ABOUT THE PROTOCOL

- Supports client to broker or client to server architectures
- Publish and subscribe and response or request communication methods
- Advanced messaging services

Secure Transfer of AMQP Messages

As demands rise for connected systems and cloud connectivity, industrial organizations are leveraging one of the most widely used protocols for cloud-based data, Advanced Message Queuing Protocol (AMQP). AMQP provides open communications, however once communications are opened, they need to be secured. Owl has developed an AMQP Protocol Adapter that allows AMQP two-way traffic to be sent over secure, one-way data diodes. The proxies allow Owl's hardware-enforced data diodes to securely transfer AMQP traffic across the Operational Technology (OT) network boundary to the cloud, corporate data centers, Security Operations Centers (SOC), remote monitoring centers, or anywhere, with no risk of threats entering back into the source network. The AMQP Protocol Adapter combined with a data diode integrates with Amazon Web Services (AWS), AZURE, and other common private clouds, while maintaining the confidentiality, integrity, and availability of OT systems and AMQP messages.

AMQP

AMQP is an open standard application layer protocol adapter for message-oriented middleware. The AMQP Protocol Adapter, paired with data diodes, provides a secure, hardware-enforced, one-way transfer of AMQP messages across network boundaries to a range of destination delivery points. The AMQP Protocol Adapter seamlessly integrates with data diodes placed between IIoT networks and the cloud to securely transfer messages to untrusted destinations.

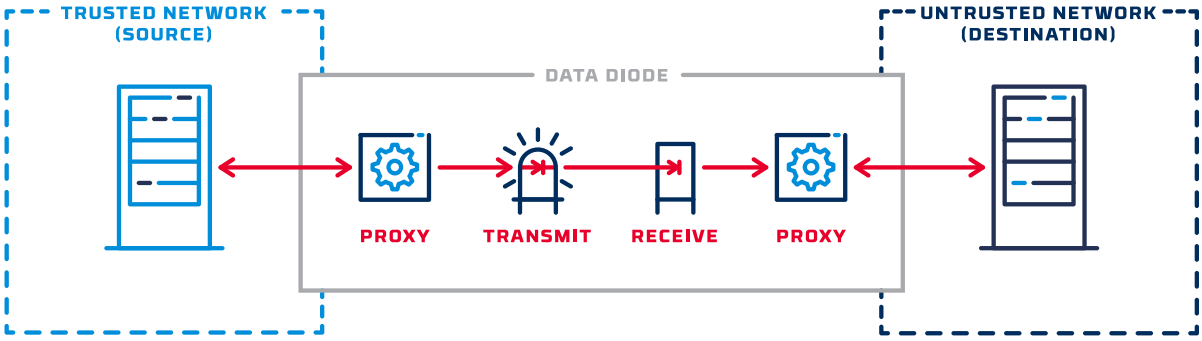
Brokers and Encryption

AMQP requires the use of a central broker to deliver messages. The role of a broker is to receive all messages, filter all messages based on topic, determine who is subscribed to each message, and deliver those messages to subscribed clients. The broker acts as a middle-man and all messages must pass through them to reach their destination. Most AMQP brokers allow the use of Transport Layer Security (TLS) to encrypt AMQP communications to the cloud or end destination. The Owl AMQP Protocol Adapter supports TLS communication to cloud based or external brokers. The AMQP Protocol Adapter works with RabbitMQ, the most commonly used broker.

One-Way In A Two-Way World

A successful one-way data transfer of AMQP messages requires meeting the expectations of a two-way world. AMQP is inherently a two-way connection. A majority of network traffic involves some sort of acknowledgment or two-way connection in order to function. The “secret sauce” of data diodes paired with AMQP is in providing a one-way transfer, with a true separation between source and destination networks, while maintaining simultaneous two-way communications with both the source network and the destination network to avoid disruption. This is accomplished through using proxies that run on each side of a data diode.

The send side proxy communicates with the source network, acknowledging the receipt of packets before extracting the payload, and then sending it across the data diode. On the receive side, the proxy receives the payload, builds a new packet around it using the original protocol, and sends the data on its way over the two-way protocol. In this way, AMQP achieves a one-way transfer in the middle of two, two-way exchanges. This protocol termination also means data diodes protect network privacy by removing all source network routing and IP information when performing a one-way data transfer of AMQP messages.



Technical Specifications

VALIDATED BROKERS

- RabbitMQ

SUPPORTED ON

- OPDS-100
- OPDS-100D
- OPDS-1000
- EPDS

Use Cases

- One-way transfer to Local Broker such as RabbitMQ within the Business network
- One-way transfer to External Broker
- One-way transfer to Cloud Services

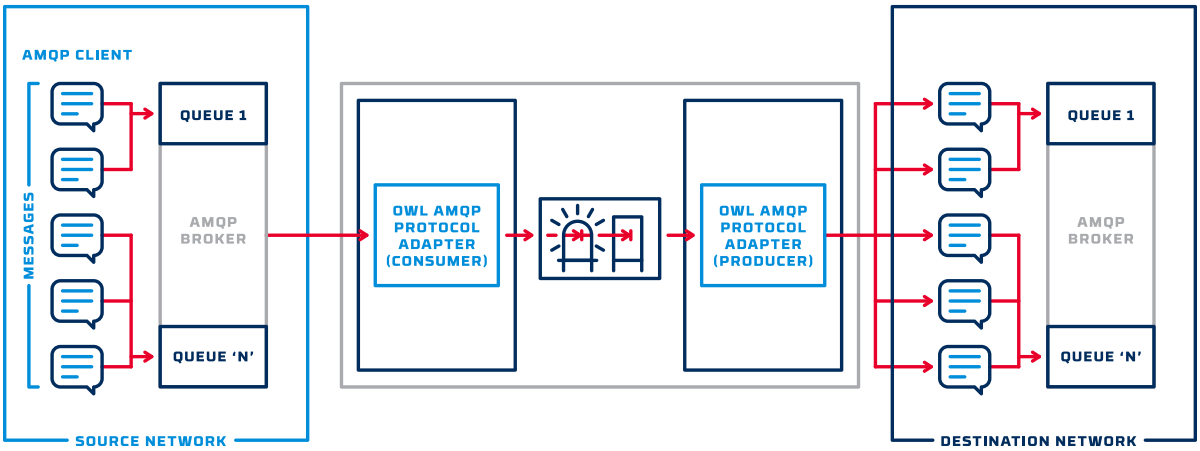
USE CASE

AMQP Protocol Adapter

The Remote Client Producer sends an AMQP message to a third-party broker (most common: RabbitMQ). The source broker consists of an “Exchange” and “Queue”. The Exchange receives messages from a Producer and manages which queue the data should be sent to. The Queue then passes the AMQP message to the Owl AMQP Proxy (Consumer) which moves the payload across the data diode. The Owl AMQP Proxy (Producer) rebuilds the AMQP message and forwards it to a destination third-party broker, usually RabbitMQ or CloudAMQP (RabbitMQ as a service).

The RabbitMQ broker can be installed on the data diode. If significant volumes of data are being transferred, a flanking server is recommended.

1. Messages published to Topic Queues hosted on AMQP Broker
2. Messages consumed by Owl AMQP Protocol adapter and sent across the diode
3. 
4. Messages received across the diode and re-produced by Owl AMQP Protocol Adapter
5. Messages published to respective Queue by Owl Protocol Adapter



OWL Cyber Defense

Owl Cyber Defense Solutions, LLC leads the world in data diode and cross domain network cybersecurity. With a constant focus on customers in the military, government, critical infrastructure, and commercial communities, Owl develops market-first, one-way data transfer products to meet a variety of operational needs, from entry level to enterprise.

For more information on Owl, or to schedule a demo, visit www.owlcyberdefense.com

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