

IOT01/2 - IoT con Azure

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Milano 2015
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Grazie a



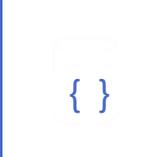
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Agenda

- Microsoft Azure IoT Services
- Azure Service Bus
- Azure Event Hubs
- Azure Stream Analytics
- Demo

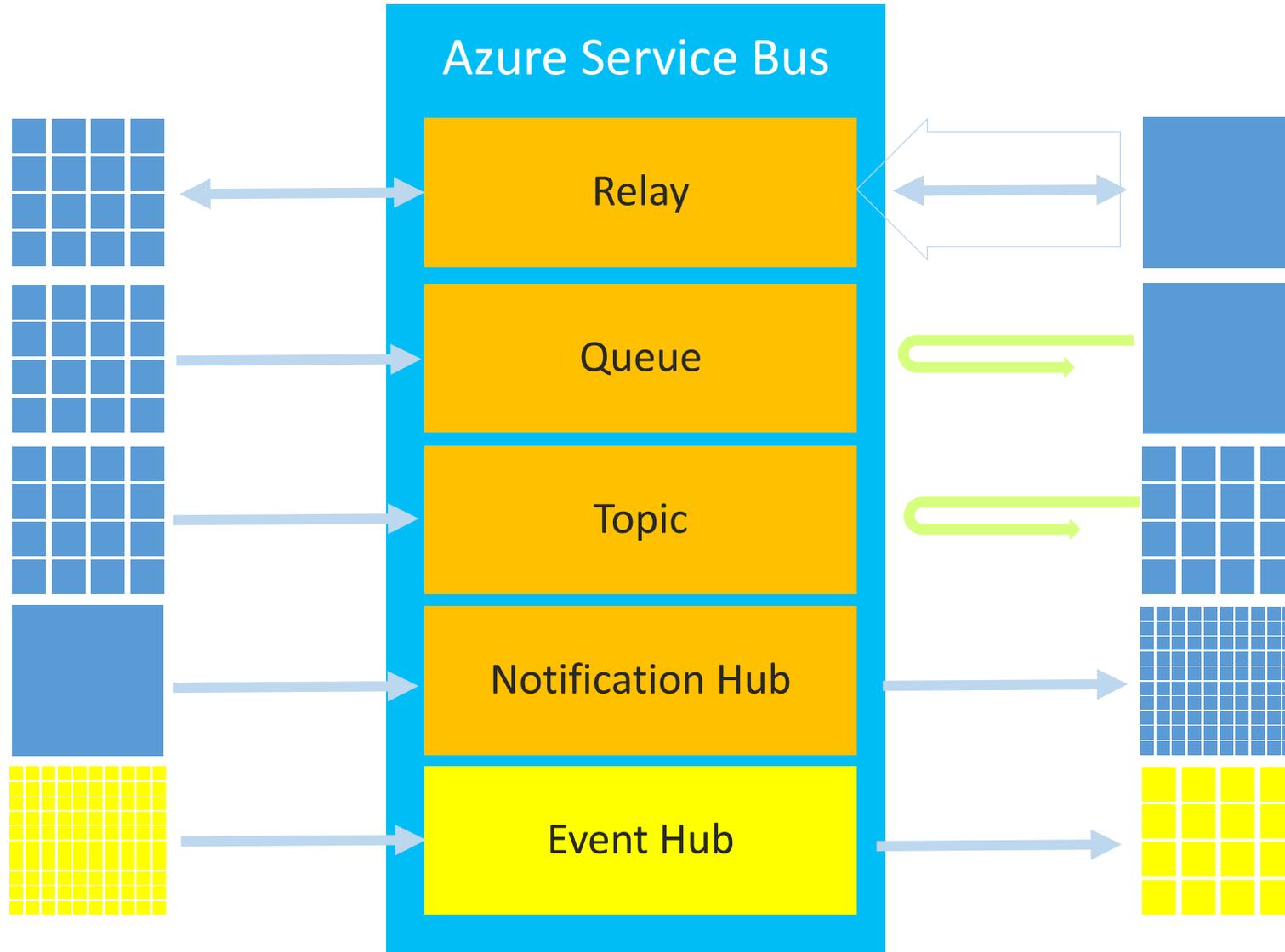
Microsoft Azure IoT services

Producers	Connect Devices	Storage	Analytics	Take Action
	 Event Hubs	 SQL Database	 Machine Learning	 Azure Websites
	 Service Bus	 Table/Blob Storage	 Stream Analytics	 Power BI
	 External Data Sources	 DocumentDB	 HDInsight	 Notification Hubs
		 External Data Sources	 Data Factory	 Mobile Services
				 BizTalk Services



Azure Service Bus

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NAT and Firewall Traversal Service
Request/Response Services
Unbuffered with TCP Throttling

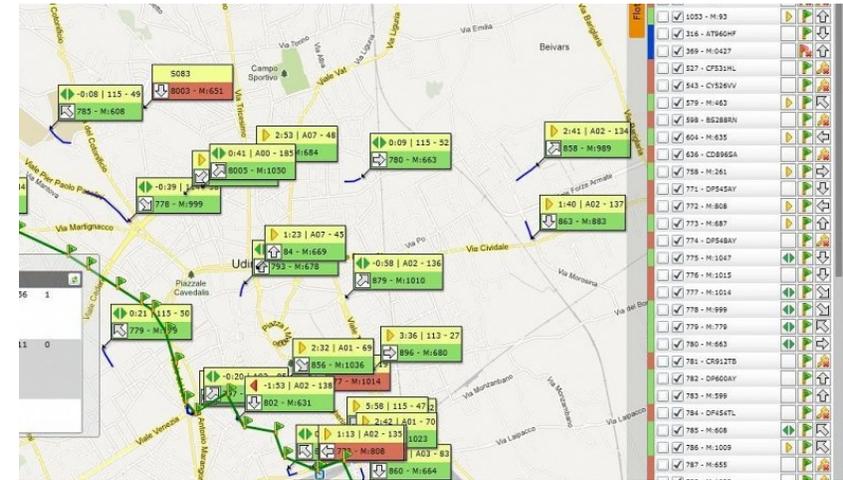
Transactional Cloud AMQP/HTTP Broker
High-Scale, High-Reliability Messaging
Sessions, Scheduled Delivery, etc.

Transactional Message Distribution
Up to 2000 subscriptions per Topic
Up to 2K/100K filter rules per subscription

High-scale notification distribution
Most mobile push notification services
Millions of notification targets

...

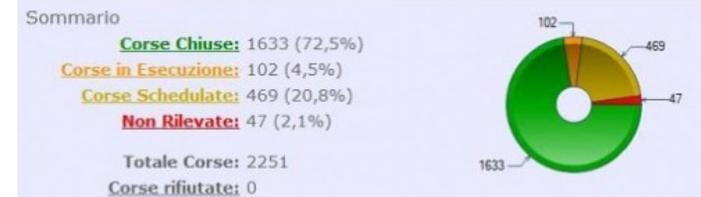
Intelligent Mobility and Connected Car



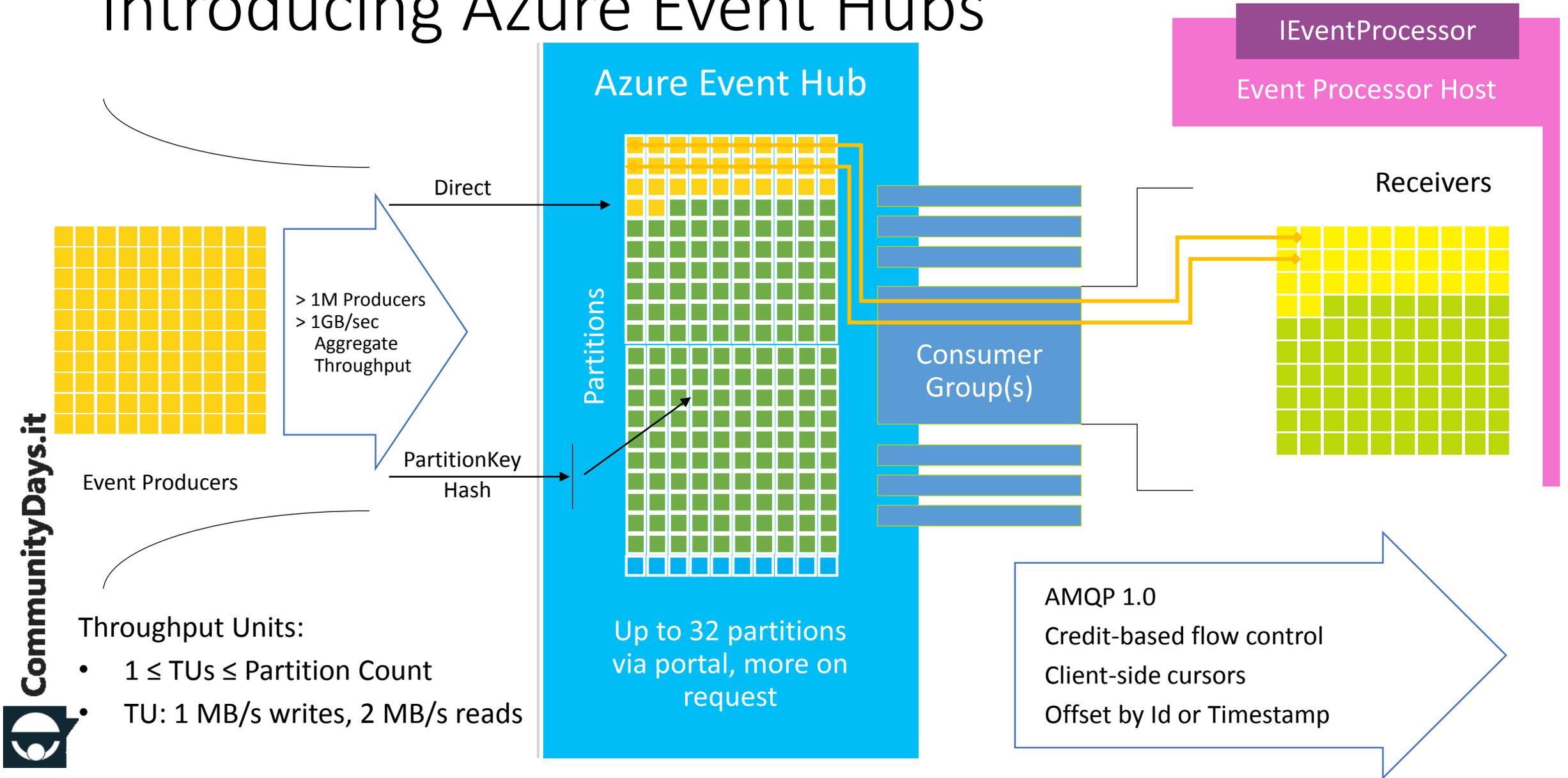
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Introducing Azure Event Hubs



- Throughput Units:
- $1 \leq \text{TUs} \leq \text{Partition Count}$
 - TU: 1 MB/s writes, 2 MB/s reads

Event Hubs - Overview

- Event Hubs is a highly scalable ingestion system that can process millions of events per second, enabling your application to process and analyze the massive amounts of data produced by your connected devices and applications.

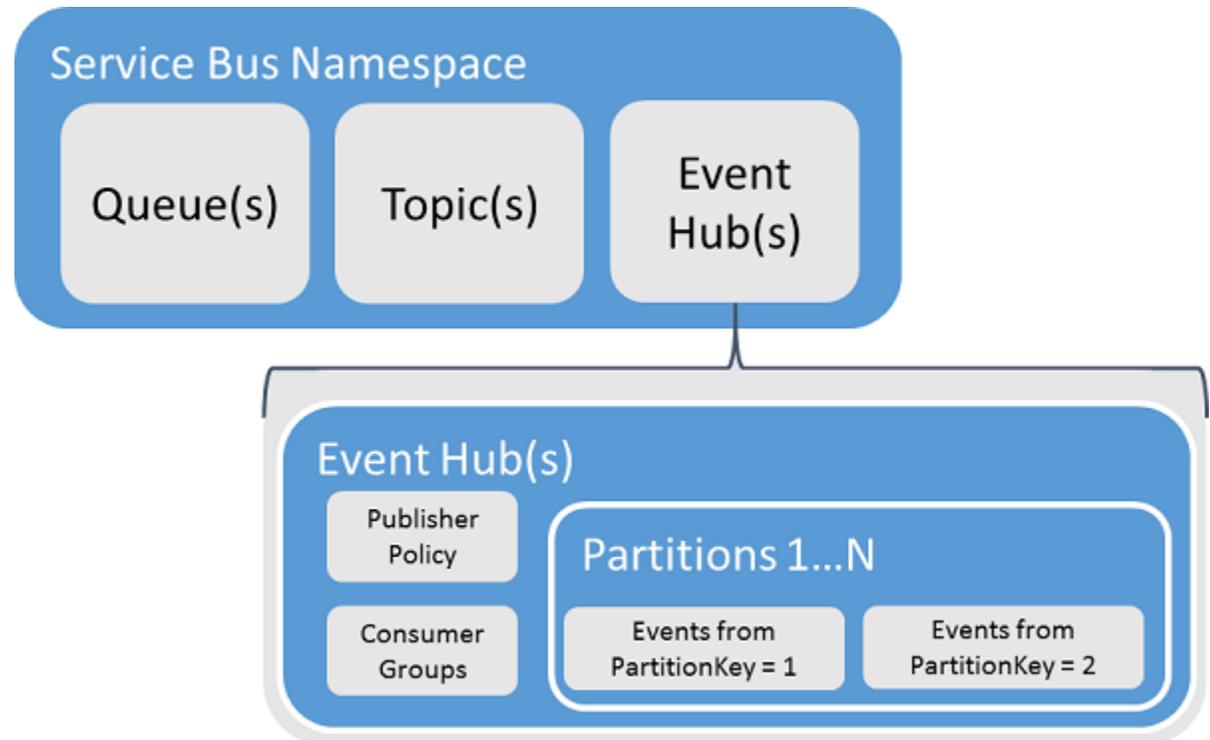


- The Azure Event Hubs capability differs from Service Bus topics in that it is strongly biased towards high throughput and event processing scenarios.



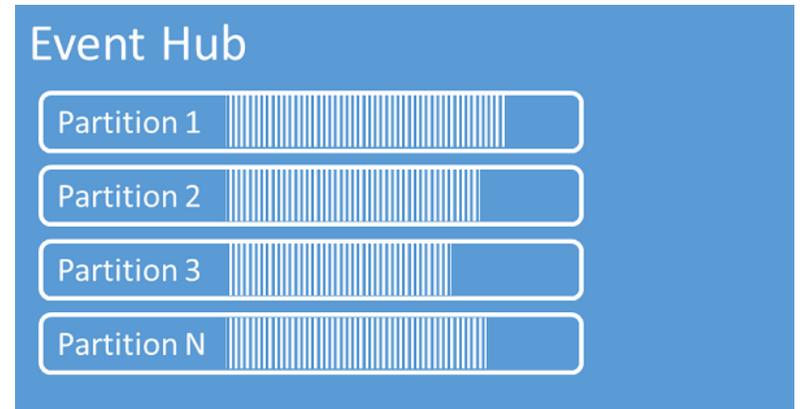
Event Hubs - Overview

- An Event Hub is created at the namespace level in Service Bus, similar to queues and topics. Event Hubs uses AMQP and HTTP as its primary API interfaces.



Event Hubs - Partitions

- Event Hubs provides message streaming through a partitioned consumer pattern.
- A partition is an ordered sequence of events that is held in an Event Hub. As newer events arrive, they are added to the end of this sequence. A partition can be thought of as a “commit log.”
- The number of partitions is specified at the Event Hub creation time and must be between 8 and 32.
- Segmentation of event stream for scale-out.

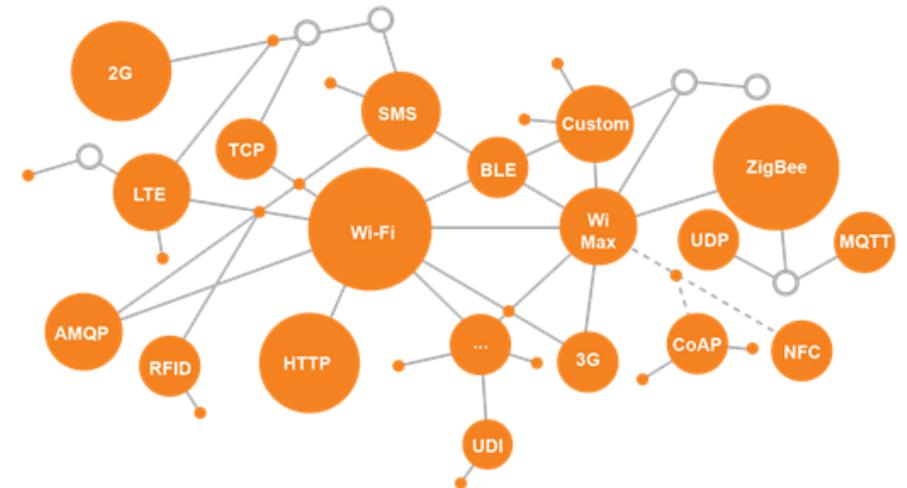


Event Hubs - Event Data

- In the Event Hubs context, messages are referred to as *event data*. Event data contains the body of the event, a user defined property bag, and various metadata about the event such as its offset in the partition and its number in the stream sequence. Partitions are filled with a sequence of event data (max 256kb).
- You can publish an event via AMQP 1.0 or HTTP. Service Bus provides an EventHubClient class that you can use for publishing events to an Event Hub from .NET clients. For other runtimes and platforms, you can use any AMQP 1.0 client such as Apache Qpid.

Event Hubs - What is AMQP 1.0?

- Advanced Message Queuing Protocol (AMQP) is an efficient, reliable, wire-level messaging protocol (OASIS standard) that you can use to build robust, cross-platform, messaging applications. The protocol has a simple goal: to define the mechanics of the secure, reliable, and efficient transfer of messages between two parties.

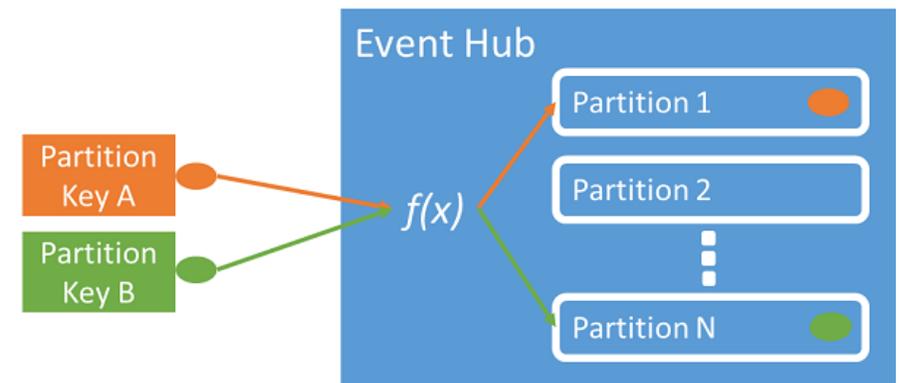


Event Hubs - AMQP or HTTP ?

- The choice to use AMQP or HTTP is specific to the usage scenario. AMQP requires the establishment of a persistent bidirectional socket in addition to transport level security (TLS) or SSL/TLS. This can be a costly operation in terms of network traffic, but only happens at the beginning of an AMQP session. HTTP has a lower initial overhead, but requires additional SSL overhead for every request. For publishers who frequently publish events, AMQP offers significant performance, latency, and throughput savings

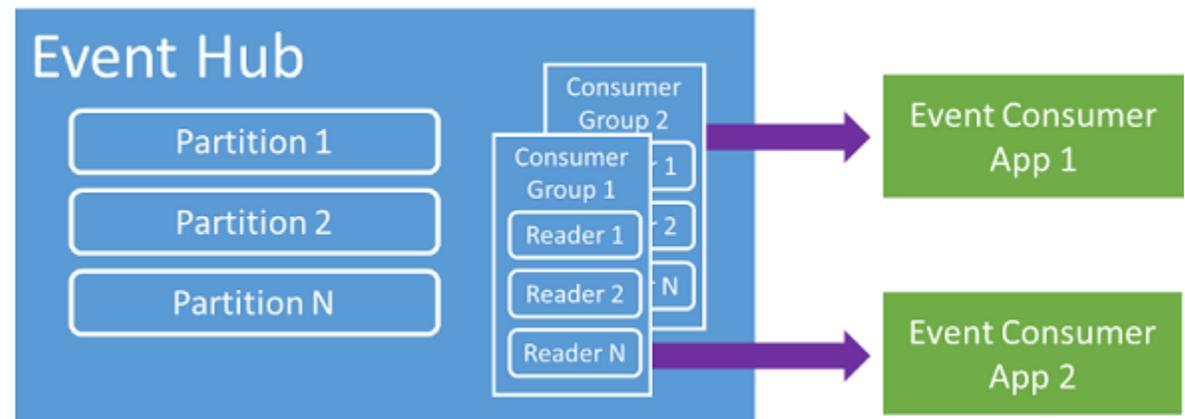
Event Hubs - Partition key

- A partition key is a value that is used to map incoming event data into specific partitions for the purposes of data organization. The partition key is a sender-supplied value passed into an Event Hub. It is processed through a static hashing function, the result of which creates the partition assignment.
- Event Hubs ensures that any and all events sharing the same partition key value are delivered in order, and to the same partition.



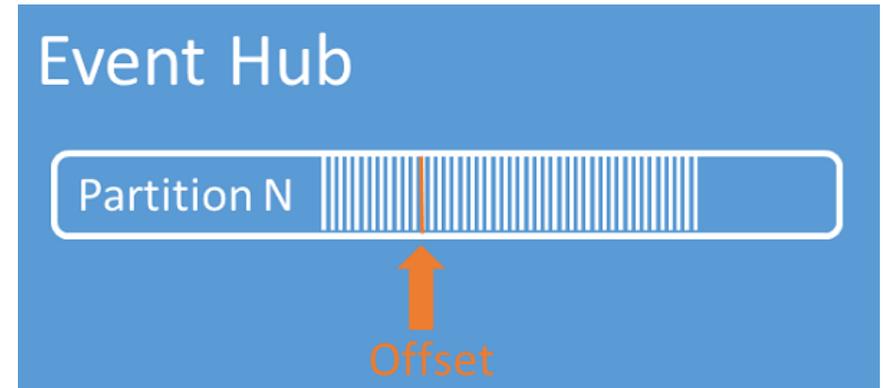
Event Hubs – Consumer Groups

- The publish/subscribe mechanism of Event Hubs is enabled through *consumer groups*. A consumer group is a view (state, position, or offset) of an entire Event Hub. Consumer groups enable multiple consuming applications to each have a separate view of the event stream, and to read the stream independently at its own pace and with its own offsets.



Event Hubs - Stream Offset

- An offset is the position of an event within a partition. You can think of an offset as a client-side cursor. The offset is a byte numbering of the event. This enables an event consumer (reader) to specify a point in the event stream from which they want to begin reading events. You can specify the offset as a timestamp or as an offset value.



Event Hubs - Reading Events

- In order to consume events from an Event Hub, a consumer must connect to a partition. Only a single reader should be active on a partition at any one time within a consumer group. Each event data instance contains important metadata such as the offset and sequence number that are used to facilitate checkpointing on the event sequence.

EventData

- Offset
- Sequence Number
- Body
- User Properties
- System Properties

Event Hubs - Throughput Units

- The throughput capacity of Event Hubs is controlled by throughput units. Throughput units are pre-purchased units of capacity. A single throughput unit includes the following:
 - Write: Up to 1MB per second or 1000 events per second.
 - Read: Up to 2MB per second.
 - Included retention: 84GByte/day (24h at full ingress rate)
- Sending data above this amount results in a quota exceeded exception !
- Throughput units are billed per hour and are purchased ahead of time
- Up to 20 throughput units can be purchased for a Service Bus namespace

Stream Analytics* - Overview

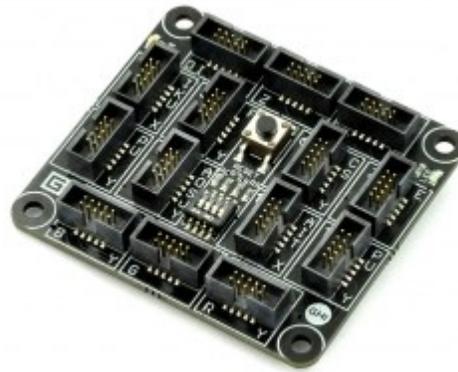
- Real-time business insights
 - Stream Analytics is an event processing engine that helps uncover real-time insights from devices, sensors, infrastructure, applications and data.
- Stream millions of events per second
 - Stream Analytics provides out-of-the-box integration with Event Hubs to ingest millions of events per second. Together, Event Hubs and Stream Analytics let you process massive amounts of real-time data so you can make business decisions in real-time.
- Real-time processing
 - Stream Analytics will process ingested events in real-time, comparing multiple real-time streams or comparing real-time streams together with historical values and models

Event Hubs - Connect the Things



Intel Galileo

- Intel® Quark™ X1000
- Win32 / C++
- Qpid Proton - Apache Library



GHI Fez Spider

- 72 Mhz 32-bit ARM7
- .NET MF & Gadgeteer / C#
- Amqp.Net Lite



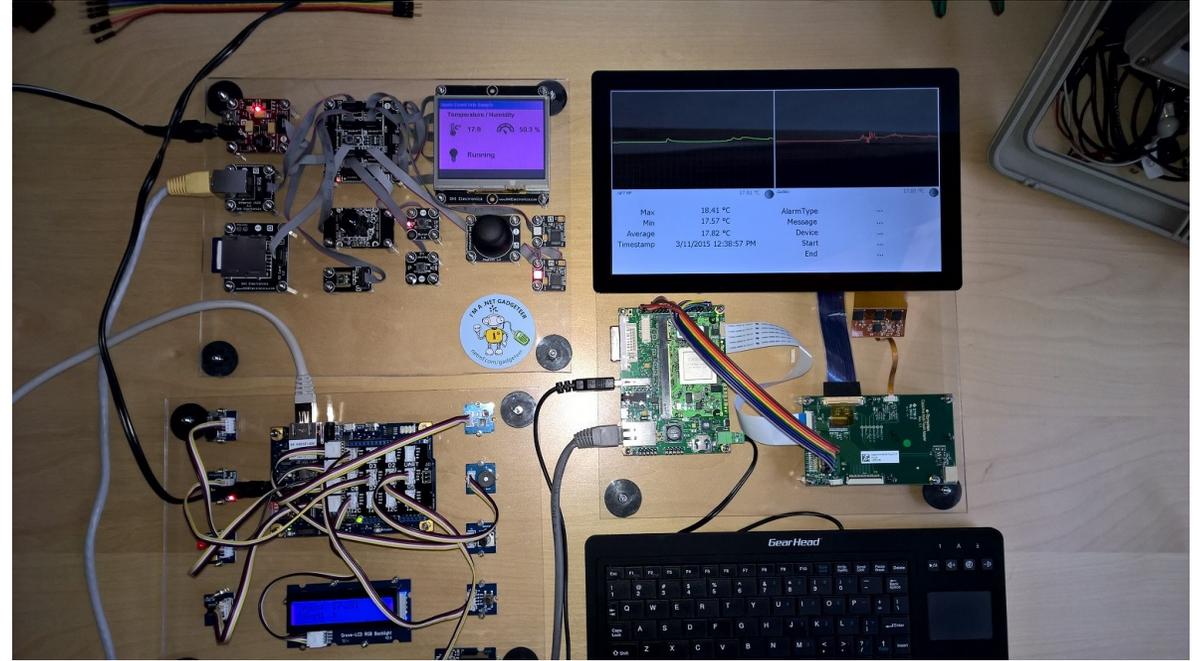
Toradex Colibri T30

- NVIDIA® Tegra™ 3
- .NET CF / WEC2013 / C#
- Amqp.Net Lite



demo

connect things to azure event hub



Event Hubs - pricing

	BASIC	Standard
Ingress events	€0.0209 per million events	€0.0209 per million events
Throughput unit (1 MB/s ingress, 2MB/s egress)	€0.0112/hr (~€9/mo)	€0.0224/hr (~€17/mo)
Publisher policies		✓
Consumer groups	1 - Default	20
Maximum throughput units	20	20
Service Bus brokered connections	100 included	1000 included
Additional Service Bus brokered connections		✓
Message Retention	1 day included	1 day included
Additional storage (up to 7 days)		✓

<http://azure.microsoft.com/en-us/pricing/details/event-hubs/>

Recap

- Stream millions of events per second into multiple applications
- Enable applications to process events with variable load profiles
- Connect millions of devices across platforms
- Available NOW !

Q&A

Tutto il materiale di questa sessione su
<http://www.communitydays.it/>

Lascia subito il feedback su questa sessione,
potrai essere estratto per i nostri premi!

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