Microsoft

大數據與互聯網 Azure 實務一日營

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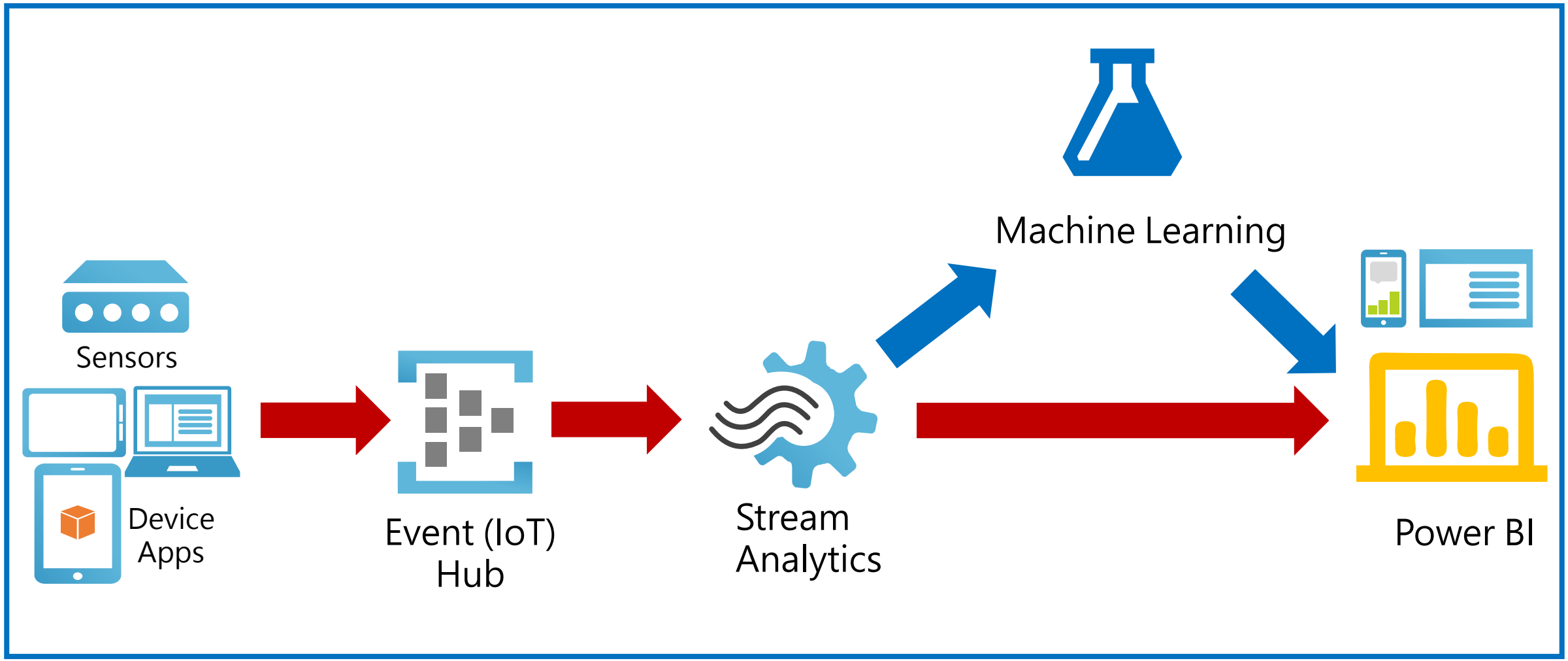
微軟資料平台技術經理

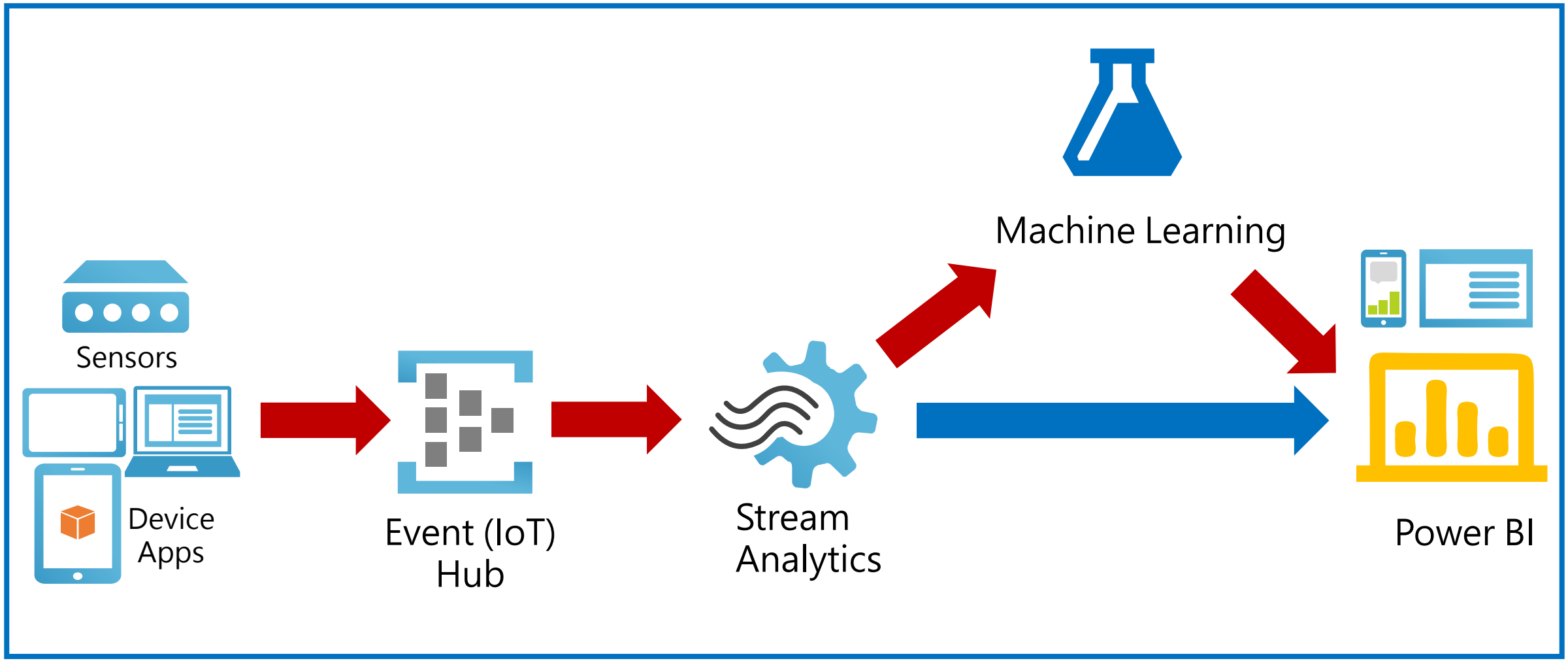
研討會大綱

時間	活動內容	間距
09:30 ~ 11:30	微軟大數據平台 End to End 概要	2 小時
11:30 ~ 12:00	學習建立 Azure 大數據平台服務	0.5 小時
12:00 ~ 13:00	午餐休息時間	1 小時
13:00 ~ 14:00	資料串流分析實作 (互聯網)	1 小時
14:00 ~ 14:15	休息時間	1.5 小時
14:15 ~ 15:30	大數據分析實作	
15:30 ~ 15:45	休息時間	1.5 小時
15:45 ~ 17:30	大數據分析實作	

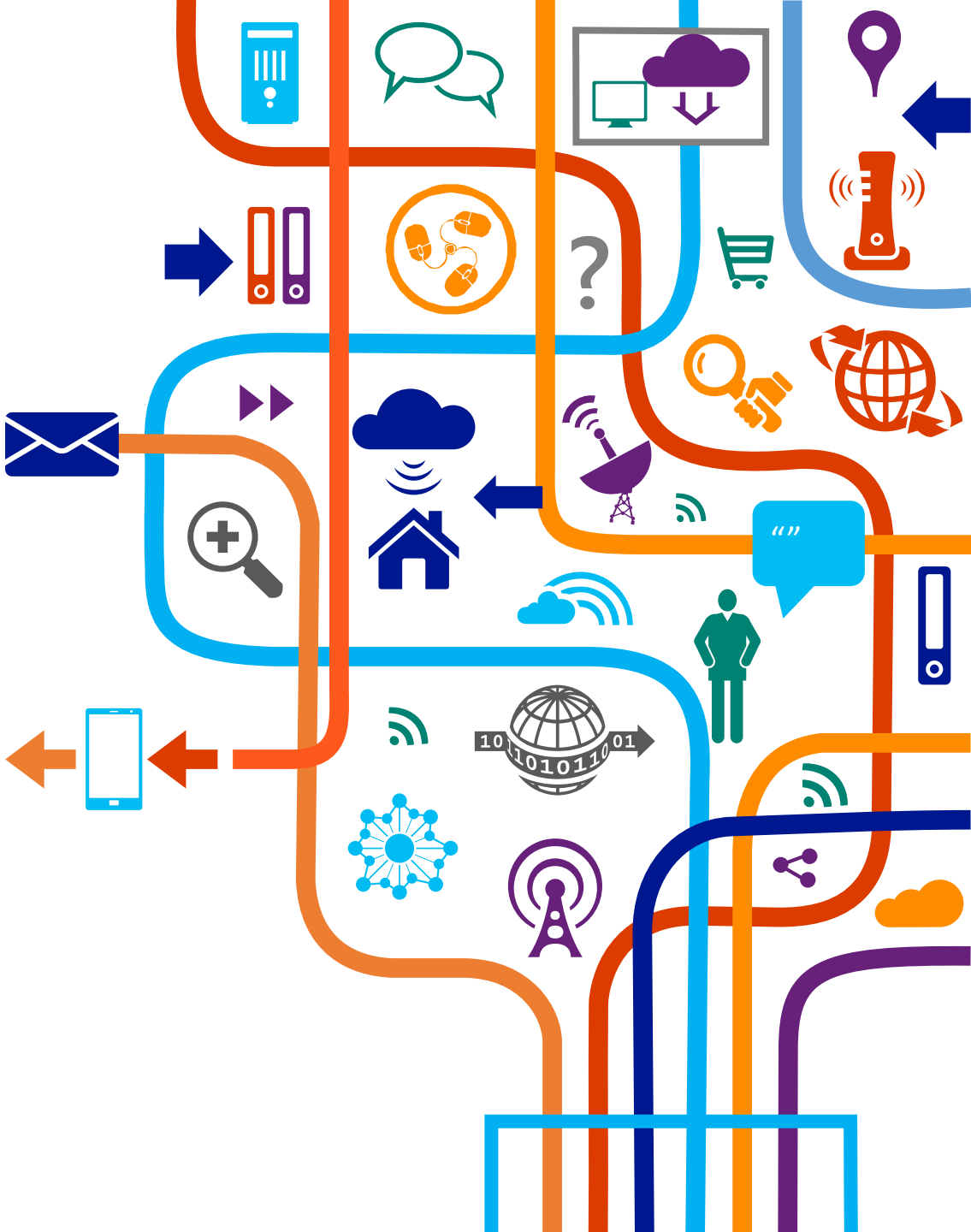
即時分析 (Hot Path)



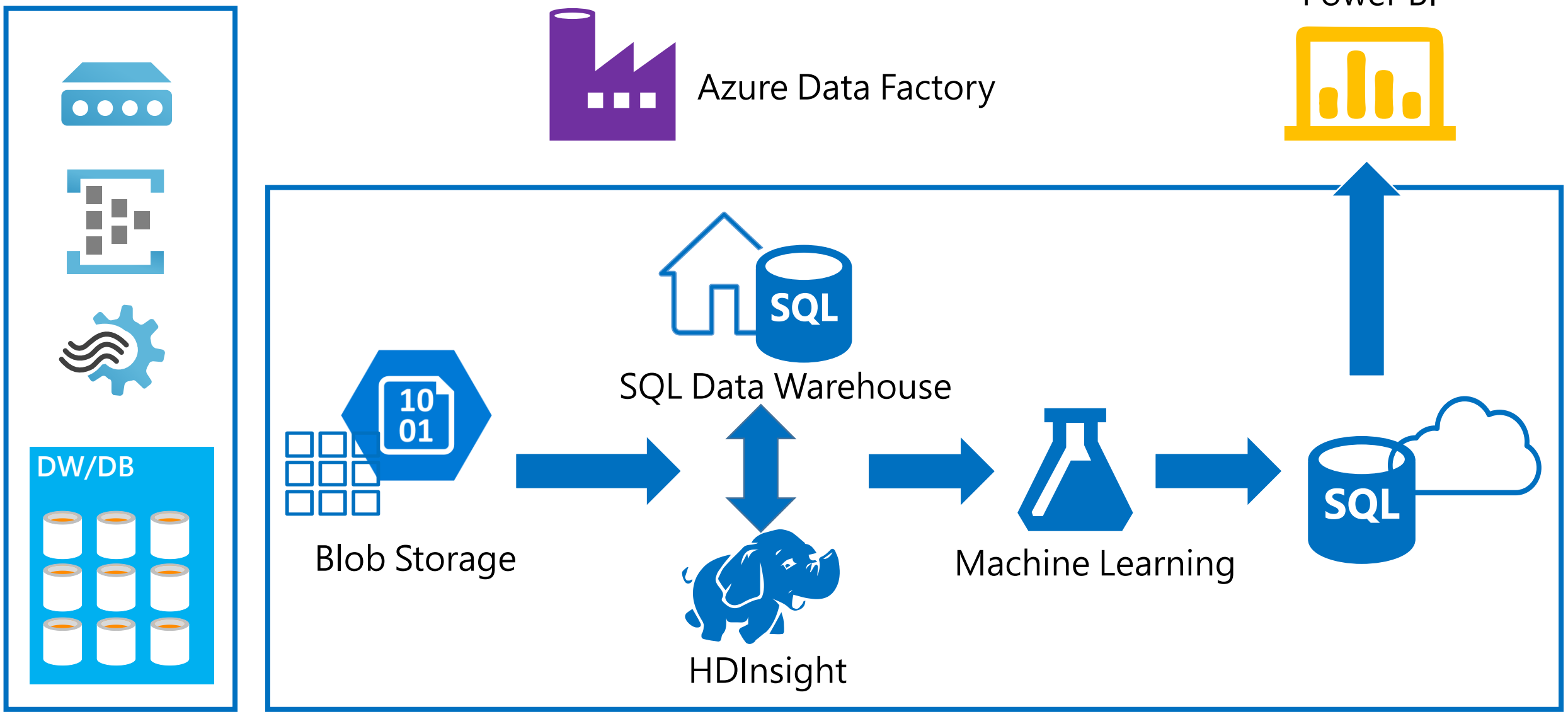
即時分析 (Hot Path)



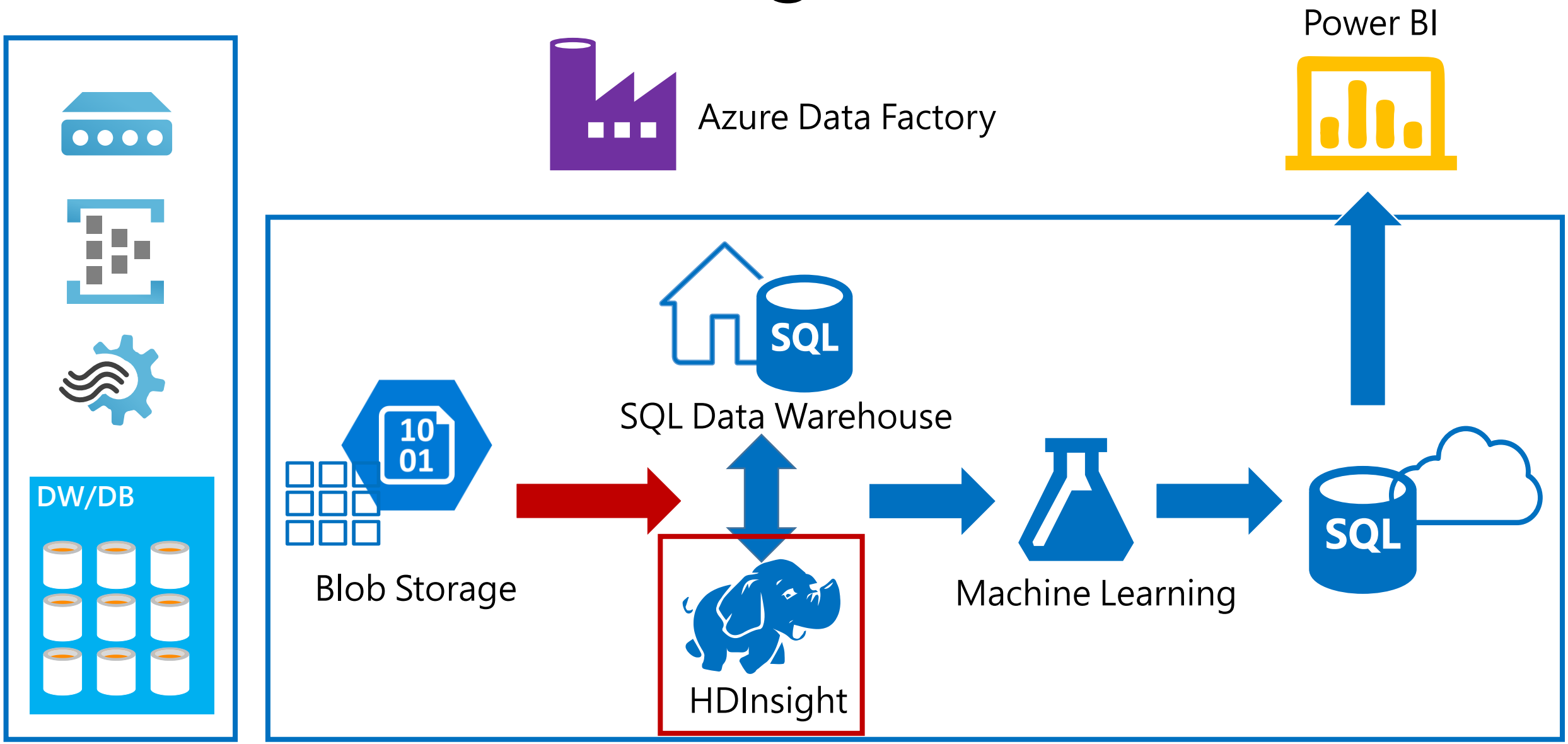
休息時間



大數據分析 (Cold Path)



大數據分析 - HDInsight



大綱

1. 載入資料
2. 運用 HIVE
   a) 透過 Ambari Portal
   b) 透過 Visual Studio 2015
3. 調教 HDInsight
4. 執行 MapReduce 範例

載入資料

命令列公用程式	圖形化用戶端	將 Azure Blob 儲存體掛接為本機磁碟機	開發 SDK
• Azure 命令列介面 • Azure PowerShell • AzCopy • Hadoop 命令	• Microsoft Visual Studio Tools for HDInsight • Azure 儲存體總管 • Cloud Storage Studio 2 • CloudXplorer • Azure Explorer • Cyberduck	• Azure Data Factory • Apache Sqoop	•.NET •Java •Node.js •PHP •Python •Ruby

https://azure.microsoft.com/zh-tw/documentation/articles/hdinsight-upload-data/

HIVE Table in HDInsight

Use EXTERNAL tables when:

- The data is also used outside of Hive. For example, the data files are read and processed by an existing program that doesn’ t lock the files.
- Data needs to remain in the underlying location even after a DROP TABLE. This can apply if you are pointing multiple schemas (tables or views) at a single data set or if you are iterating through various possible schemas.
- You want to use a custom location such as ASV.
- Hive should not own data and control settings, dirs, etc., you have another program or process that will do those things.
- You are not creating table based on existing table (AS SELECT).

Use INTERNAL tables when:

- The data is temporary.
- You want Hive to completely manage the lifecycle of the table and data.

3 Most Common Patterns

	ETL	Reporting	Ad-Hoc / Exploratory
Typical Properties	Single pass on source data Full table analysis Process raw data Multi stage Could involve large joins Long running No column statistics	Single data source to feed many reports Data may be refined Batch pattern common	Refined data source Ad-hoc / unpredictable query patterns Variety of tools
Optimizations	• Partition! Aligning query patterns to partitions. • CBO helps all cases, e.g. table level rules. • Increase Tez container size for very large joins. • Tweak Tez properties if you're not getting enough reducers. • Use HS2 for multi-stage.	• Consider ORCFile if one table feeds many reports. • Ensure map joins, tune if necessary. • Considering tuning the container release timeouts up a bit. • Use HS2 for multi-stage queries.	• Use columnar storage. • Requires interactive setup. • Multiple queues necessary until LLAP. • Pay attention to default queues, AMs per queue and pre-warming. • Tez grouping min/max size commonly tuned here. • Disable hybrid grace join (still maturing)

Apache Hive: Basic Layering

Component	Implementation	Additional
Connectivity	HiveServer2	Security: Apache Ranger
SQL / Planner / Optimizer	Apache Hive + Calcite	Governance: Apache Atlas
Execution Engine	Apache Tez	Management: Apache Ambari
Columnar Storage Format	ORCFile, Parquet	
Filesystem	HDFS, WASB, ADLS	

“Connection Pooling”: Summary

Setting	Recommended	HDI Default	Note
hive.server2.tez.initialize.default.sessions	true	Not Enabled	I/E
hive.server2.tez.default.queues	“default” or a custom queue	Not Enabled	I/E
hive.server2.tez.sessions.per.default.queue	= max concurrent queries	Not Enabled	I/E
hive.prewarm.enabled	true	Not Enabled	I
hive.prewarm.numcontainers	1-5	Not Enabled	I
tez.am.session.min.held-containers	1-5	Not Enabled	I
tez.session.am.dag.submit.timeout.secs	600+	300	I/E
tez.am.container.idle.release-timeout-min.millis	30000+	10000	I/E
tez.am.container.idle.release-timeout-max.millis	60000+	20000	I/E

I = Use for Interactive, E = Use for Multi-Stage ETL

“Not Enabled” settings not appropriate to enable for pure batch.

Planner / Optimizer: Summary

Setting	Recommended	HDI Default
hive.auto.convert.join.noconditionaltask.size	1/3 of -Xmx value	Auto-Tuned
hive.cbo.enable	true	true
hive.tez.container.size	1-2 GB for small VMs 4-8 GB for production systems	Auto-Tuned
hive.tez.java.opts	-Xmx value must be 80-90% of container size	Auto-Tuned
tez.grouping.min-size	Decrease for better latency Increase for more throughput	16777216
tez.grouping.max-size	Decrease for better latency Increase for more throughput	1073741824
tez.grouping.split-waves	Increase to launch more containers, decrease for better multi-tenancy	1.7
yarn.scheduler.minimum-allocation-mb	1GB is usually fine	Auto-Tuned

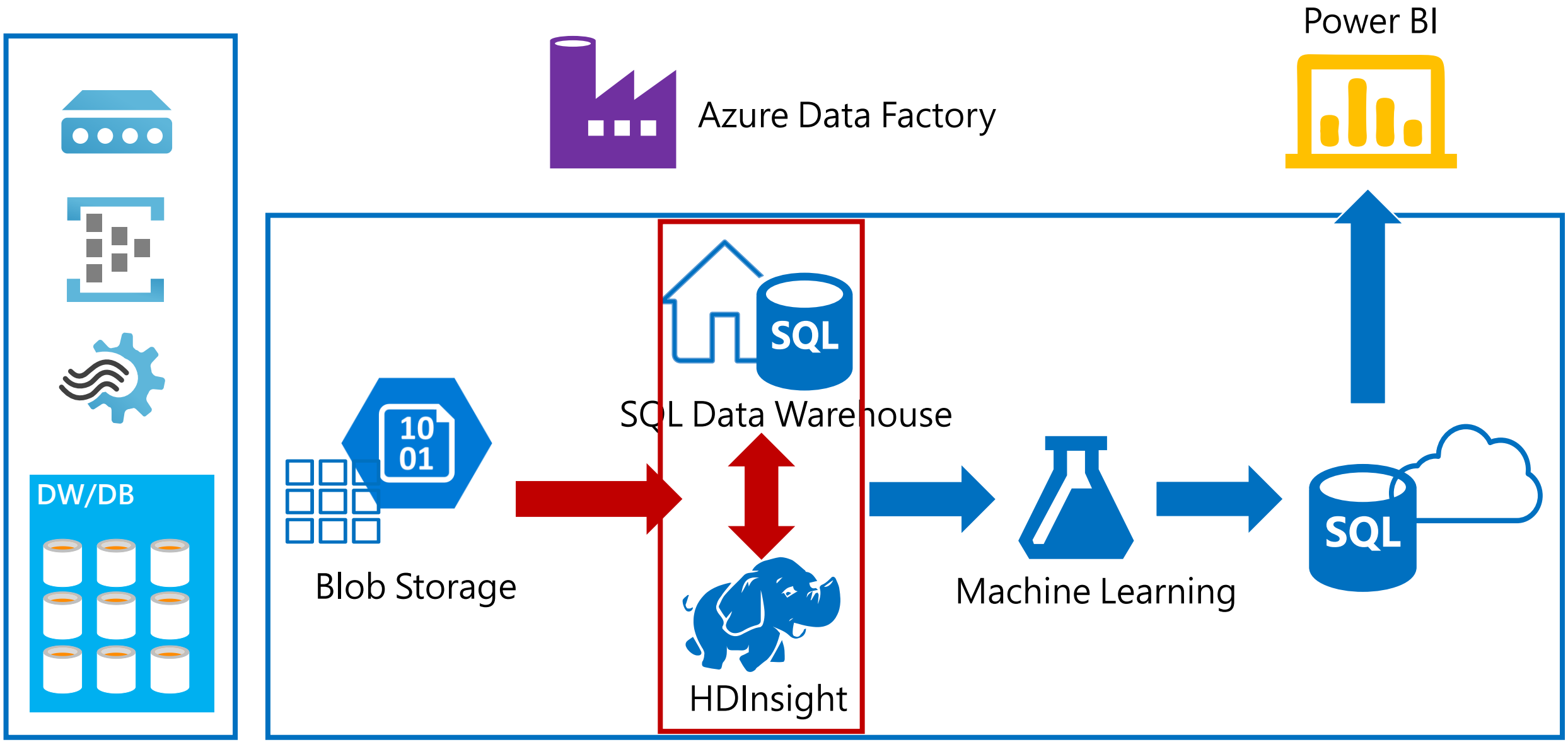
Execution: Summary

Setting	Recommended	HDI Default
tez.am.resource.memory.mb	4GB upper bound for most	Auto-Tuned
tez.session.am.dag.submit.timeout.secs	300+	300
tez.am.container.idle.release-timeout-min.millis	20000+	10000
tez.am.container.idle.release-timeout-max.millis	40000+	20000
tez.shuffle-vertex-manager.desired-task-input-size	Increase for large ETL jobs taking too long	Unset / Default
tez.min.partition.factor	Increase for more reducers Decrease for fewer	0.25
tez.max.partition.factor		2.0
tez.shuffle-vertex-manager.min-task-parallelism	Set if reducer counts are too low, even with min-src-fraction	Unset / Default
tez.shuffle-vertex-manager.min-src-fraction	Increase to start reducers later Decrease to start reducers sooner	0.2
tez.shuffle-vertex-manager.max-src-fraction		0.4
hive.vectorized.execution.enabled	true	true
hive.mapjoin.hybridgrace.hashtable	true = safer, slower; false = faster	false

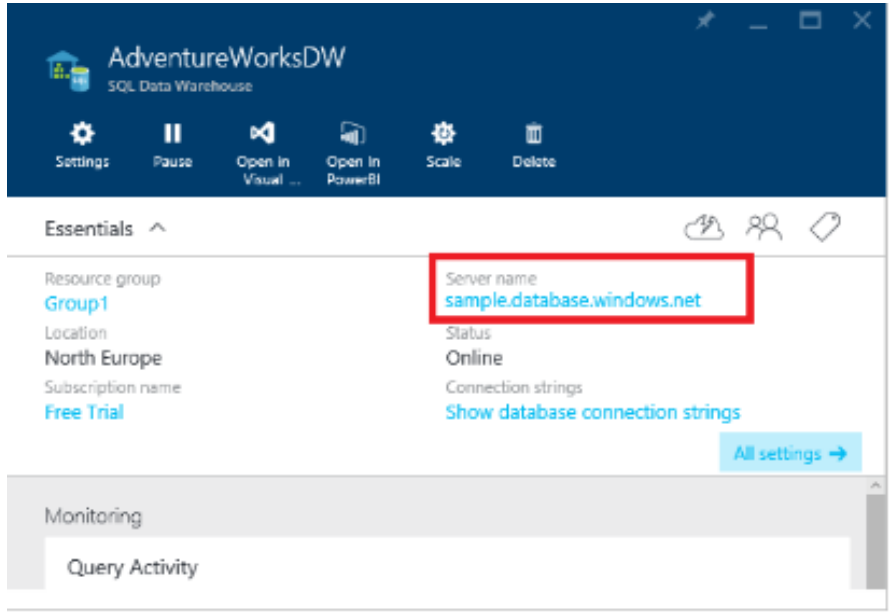
Summary: Storage

Setting	Recommended	HDI Default
orc.compress	ZLIB (space) or snappy (Speed)	ZLIB
orc.stripe.size	Only increase for large cells like documents	67,108,864
orc.bloom.filter.columns	Create bloom filters for columns commonly used in point lookups	N/A

大數據分析 - SQL DW


Power BI
Azure Data Factory
DW/DB
SQL
SQL Data Warehouse
10
01
Blob Storage
HDInsight
Machine Learning
SQL

Azure SQL DW 連接方式



https://azure.microsoft.com/zh-tw/documentation/articles/sql-data-warehouse-connect-overview/

Azure SQL DW 資料移轉

1. Azure Data Factory (ADF) 複製
2. Integration Services
3. bcp

最佳化資料移轉:

最佳化資料匯出
- 資料壓縮
- 多個檔案

最佳化資料傳輸
- ExpressRoute 專線
- Azure 匯入和匯出服務
- AZCopy 公用程式

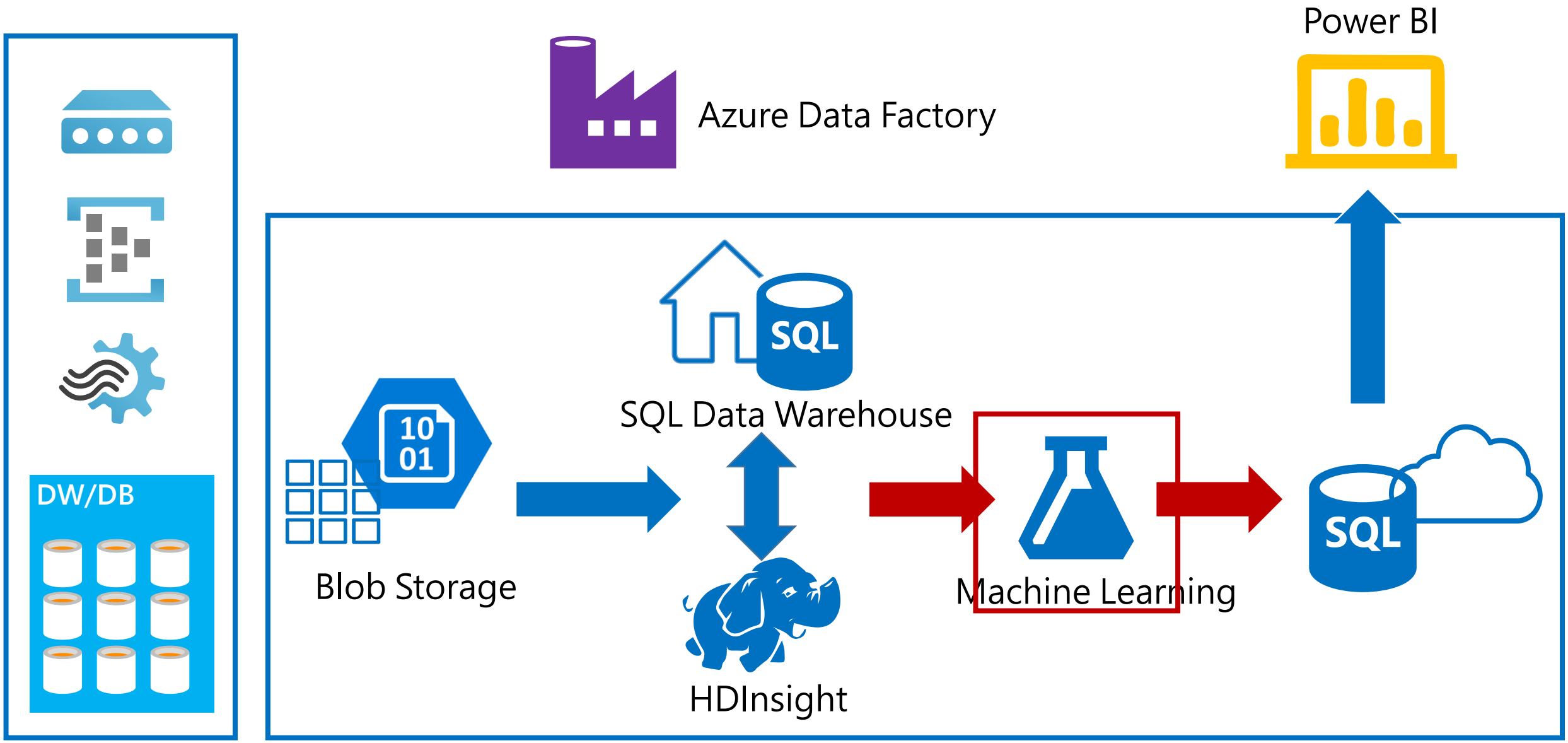
最佳化資料載入
- PolyBase

Azure SQL DW 最佳做法

1. 利用暫停和調整來降低成本
2. 暫停或調整之前先清空交易
3. 維護統計資料
4. 將 INSERT 陳述式群組為批次
5. 使用 PolyBase 將資料快速載入及匯出
6. 載入並查詢外部資料表
7. 雜湊分散大型資料表

1. 不要過度執行資料分割
2. 將交易大小最小化
3. 使用最小的可能資料行大小
4. 針對暫時性資料使用暫存堆積資料表
5. 將叢集資料行存放區資料表最佳化
6. 使用較大的資源類別來改善查詢效能
7. 使用較小的資源類別來增加並行存取
8. 使用 DMV 對查詢進行監視和最佳化

大數據分析 - Azure ML



大數據分析 - Power BI