VENDOR ANALYSIS

IR^2

FEDERICO BALESTRI – FINANCIAL MANAGER
STEFANO PETROCCHI – MARKETING MANAGER
MIRCO QUINTAVALLA – OPERATIONS MANAGER
GIULIO SILVESTRI – PROJECT MANAGER

SUMMARY

VENDOR ANALYSIS

This document contains the Vendor Analysis carried out to satisfy IR^2 requirements. We searched for two kind of software: a column-based database that could be easily integrated into a Microsoft Azure environment, and an ERP/CRM solution that could be used as a starting point for the build of our applications. Since the modules required in the IR^2 proposal were very complex, we looked for the solutions that represent the state of the art for the IT industry in the global market.

The development of the remaining modules will be carried out internally, since they are too specific to be implemented using commercial software.

COLUMN DATABASE

Evaluation Criteria

The only type of database taken in account is the column-based database, which stores data by column rather than by row, because this kind of database is optimized for read operations and analytics, that are a very significant part of the requested software. In order to find the most suitable solution, we determined some criteria to evaluate the many solutions.

The most important requirement come from the client itself: since IR^2 uses an Azure-based internal software for business intelligent and data management, the database proposed must be naturally compatible with Azure or very easily integrable with it, so by extension that we looked for solutions written in C# and based on a REST interface. Another important requirement from IR^2 is the avoidance of any data loss, that pushed us into searching solutions that could easily allow data replication. Advanced queries and analytics functionalities in the solution are also considered in the evaluations, since they are required by the client.

Since the system will be used by IR^2 on a daily basis, availability, reliability and response time also constitute important criteria for evaluation. The system should also be able to be exploited for many years for an increasing amount of data, so it should be very scalable. Security is an important criterion as well.

Price is the last criteria we take in account. IR^2 do not provide us a specific monthly budget for licenses, but it is our priority to provide the best cost-effectively solution available in the market.

AZURE DATABASE FOR MARIADB

Description

Azure Database for MariaDB is a relational database service in the Microsoft cloud, based on the MariaDB community edition. The system provides a fast, robust and scalable database server with a well-structured ecosystem of services that allows MariaDB to be versatile and efficient for a wide range of uses cases. Deployed in minutes for transactional or analytical use cases, MariaDB offers high agility without sacrificing key enterprise features including real ACID compliance and full SQL. These capabilities require almost no administration.

Link: https://azure.microsoft.com/it-it/services/mariadb/

Pro:

- Scalable database server with full grained ecosystem of plugins
- Data are easy to locate and query
- Provides a single database interface for SQL functioning

Cons:

- Hard to use, with no integrated GUI and support for developers may be lacking
- Some functions may not be well developed. There can be cases of malformed data
- Not many integrated tools for data visualization

Price: https://azure.microsoft.com/it-it/pricing/calculator/?service=mariadb

1900-3300 € for month (8tb).

CRATEDB

Description

CrateDB is a distributed SQL database built on top of a NoSQL foundation, combining the familiarity of SQL with the scalability and data flexibility of NoSQL. CreateDB is a very flexible document database that can be used in a similar way of column-based one. The system enables developers to use SQL to processes any type of data and perform SQL queries at real time speed. CrateDB can be integrated with Microsoft Azure.

Link: https://crate.io/

Pro:

- SQL with integrated search for data and query versatility
- Very scalable thanks to automatic shards and redistribution of data across the cluster to optimize performance
- Build-in high availability thanks to automatic replication and self-healing

Cons:

- More suitable for IoT application
- Many SQL advanced function are not implemented, and tutorials are lacking
- No analytical tool already integrated

Price: Starts at 30’000 € at year + Azure costs

APACHEHBASE IN AZURE HDINSIGHT

Description

Apache HBase is a NoSQL open source database based on Apache Hadoop and modelled after Google BigTable. HBase offers casual access to data and strict consistency for huge quantity of data. The database is organized by families of columns. Designed to support queries of massive data sets, HBase is optimized for read performance.

HDInsight HBase is offered as a managed cluster that is integrated into the Azure environment. The clusters are configured to store data directly in Azure Storage, which provides low latency and increased elasticity in performance and cost choices.

Link: https://docs.microsoft.com/it-it/azure/hdinsight/hbase/apache-hbase-overview

Pro

- Suitable for managing huge quantity of data and doing analytics reports
- Automatic and configurable shards of tables
- Strictly consistency reads and writes

Cons

- Performance for write operations are low
- Few commands already implemented in HBase
- Pricey

Price: https://azure.microsoft.com/it-it/pricing/details/hdinsight/

Approximately 4700 € per month (8tb).

COSMOSDB AND CASSANDRA API

Description

Azure Cosmos DB is Microsoft's globally distributed, multi-model schema-less database service. It's global distributed, providing always availability and low latency. Cosmos DB provides the possibility of using Cassandra API, that can be used as the data store for apps written for Apache Cassandra (one of the most known column-based dbms). Cassandra excels at scaling writes as well as reads.

Link: https://docs.microsoft.com/it-it/azure/cosmos-db/cassandra-introduction

Pros

- No operations management
- Open Source standard
- Ability to use existing Cassandra code and tools

Cons

- Cost is high
- Querying the database require practice: heavy learning curve
- Global distribution is not actually required by our costumer

Price: https://azure.microsoft.com/it-it/pricing/details/cosmos-db/

Approximately 5600 € per month (8tb)

FINAL SELECTION:

Our final selection fell on Apache HBase in Azure HDInsight, because of its already implemented advanced analytics functionalities and natural ability to handle huge amount of data. MariaDB and CosmoSDB, being all based-on Azure, offer similar properties in terms of security but none of them provide naturally the same advance services of HDInsight. Considering the many requirements and the complexity of the modules to develop in order to satisfy the client needs, HBase with HDInsight offered the best choice in terms of cost-effectiveness for the functionalities already implemented in the system. CrateDB is not considered a good choice because of it's not natural integration with Azure and its limited functionalities.

Final ranking is contained in the following table. Each vote is assigned in a range between 0 and 5.

The weight assigned to security is very low because all Azure based database offers similar feature in terms of security.

	WEIGHT	AZURE DATABSE FOR MARIA DB	CRATE DB	APACHE HBASE IN AZURE HDINSIGHT	COSMOSDB AND CASSANDRA API
AZURE INTEGRATION	0.2	5.0	3.5	5.0	5.0
AVOID DATA LOSS	0.2	4.0	2.8	4.5	4.0
ANALYTICS	0.15	2.5	3.2	4.8	3.1
AVAILABILITY	0.1	3.7	3.0	4.2	4.9
RELIABILITY	0.1	4.5	4.1	4.8	3.0
SCALABILITY	0.1	4.0	2.4	4.5	4.5
SECURITY	0.05	3.5	2.0	3.5	3.5
PRICE	0.1	4.2	3.5	3.0	2.4
RANK		**3.99**	**3.14**	**4.445**	**3.92**

ERP/CRM

EVALUATION CRITERIA

Considering the complexity and many functionalities of the software modules required by the client, we looked for advanced solutions that could also offer some CRM capabilities. In according to IR[2] requirements, the system should be fully compatible with Microsoft Azure and provide some advanced analytical and forecasting tools. Another important criterion for evaluation is the possibility to perform granular but efficient search by keyword of the documents. Moreover, the system should be able to visually represent the data in many forms (Tag Clouds, histograms) and expose a user-friendly graphical interface. Price is the last criteria we take in account.

MICROSOFT DYNAMICS 365

Description

Microsoft Dynamics 365 is a modular, cloud-based enterprise resource planning (ERP) system with advanced customer relationship management (CRM) capabilities. Dynamics 365 helps companies make better decisions based on data-driven insights and recommendations. Companies can operate more efficiently by automating and optimizing manual tasks with intelligent workflows.

Then system also takes a modern approach to ERP functionality by incorporating artificial intelligence (AI), machine learning and mixed-reality (a hybrid of reality and virtual reality) tools for businesses.

Link: https://dynamics.microsoft.com/it-it/

Pros

- Extensive CRM functionality
- Integration with Microsoft products
- Modular and flexible pricing options
- Advanced-search functionalities

Cons

- Difficult to navigate for beginners
- limited mobile app features

Price: 2300 € per month (Sales, Marketing and Sales/Marketing insight modules)

ODOO

Description

Odoo is a comprehensive open-source enterprise resource planning (ERP) software made up of an integrated suite of business modules, including customer relationship management (CRM), e-commerce, accounting, billing, inventory management, project management, warehouse management, financial management, manufacturing and purchasing. These modules aim to efficiently and seamlessly communicate with each other to exchange information. Moreover,

Odoo software is highly customizable and can be integrated with other systems.

Link: https://www.odoo.com/it_IT/

Pros

- Modular system
- Customizable free and open-source Community version

Cons

- Difficult to navigate for beginners
- Steep learning curve

Price:

- Odoo Community is a free basic plan that includes one app, e.g., CRM.
- Odoo Enterprise: 28 € per user, per month, + cost of application (12€ per month)

INFOR

Description

Infor ERP is a robust suite of enterprise resource planning (ERP) applications designed to help distribution and manufacturing companies run core business operations. Its main ERP offering includes CloudSuites: software suites having its own unique set of features offering visibility into several business facets, like CRM. In addition, the solution's analytics accelerate processes using preconfigured dashboards, key performance indicators (KPIs), reports and other tools that help users take advantage of Infor's functionality in the shortest time possible. Companies can also drill down into analytics information to take appropriate action after gaining insight.

Link: https://www.infor.com/it-it

Pros

- Industry-leading analytics
- Top-notch support

Cons

- Subpar Excel functionality
- Slow loading time
- Running reports and background tasks can consume large amounts of IT resources, slowing operations for other users

Price: One-time licence: 800 $/users + 200 $/year

SALESFORCE

Description

Salesforce Customer 360 is an integrated cloud-based CRM platform that provides customers the option of purchasing individual solutions that best fits their business needs. This review will focus on the Salesforce Sales Cloud software. Salesforce Sales Cloud helps companies' sales teams efficiently manage their pipeline in order to close deals quickly. Sales reps can track their interactions with each prospect, create quotes and contracts, and analyse revenue generated and other metrics. Sales managers can rely on the software to monitor each rep's performance and guide them into exploring new sales territories.

Link: https://www.salesforce.com/it/

Pros

- Scalable pricing tiers
- Robust search functionality
- Sales forecasting and analytics

Cons

- Initial learning curve for new users
- Poor integration with Microsoft Products

Price:

- Essentials – $25 per user, per month
- Professional – $75 per user, per month
- Enterprise – $150 per user, per month
- Unlimited –$300 per user, per month

FINAL SELECTION

The software that we decide to use to carry out the development of our applications is Microsoft Dynamics 365. Even if its cost is high, its natural integration with Azure and all the other Microsoft products and its advanced ERP and CRM capabilities lead us to chose it. This software will be used as a starting point for our solutions, integrating and expanding its functionalities without compromising of functional depth.

	WEIGHT	MICROSOFT DYNAMICS	ODOO	INFOR	SALESFORCE
AZURE INTEGRATION	0.25	5	3.0	2.5	2.5
CRM CAPABILITIES	0.2	4.5	4.0	3.8	4.8
ANALYTICS	0.15	4.0	2.2	4.5	3.7
SEARCH TOOLS	0.1	4.5	3.5	2.8	3.1
DATA VISUALIZATION	0.1	4.4	3.0	3.9	3.2
USER FRIENDLY	0.1	3.0	2.4	2.6	3.0
PRICE	0.1	3.0	4.8	4.0	4.5
RANK		**4.24**	**3.25**	**3.39**	**3.52**