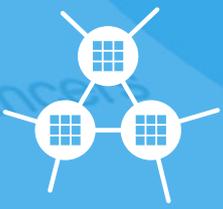


SpreadSheetSpace

Technology, Provisioning, and Functionalities

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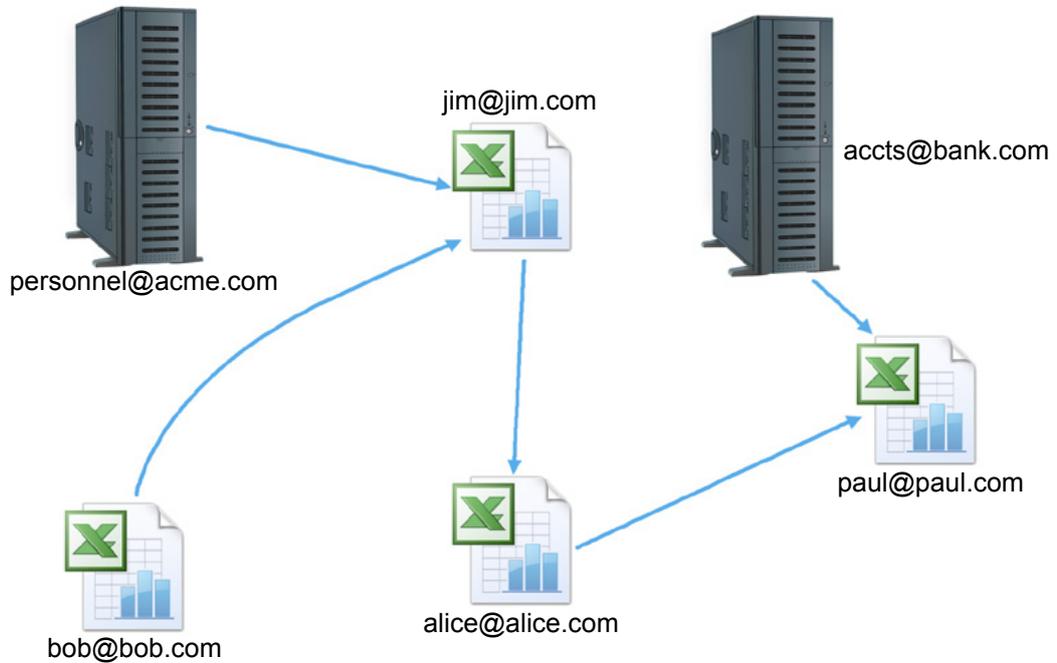




SpreadSheetSpace Services

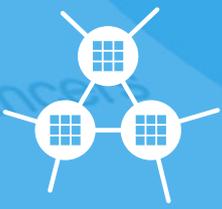
Summary

SpreadSheetSpace leverages a new proprietary technology called *Sharing through Synchronization* to provide three functionalities called *Share*, *Link* and *Sync*.



Technology

Sharing through Synchronization denotes the fact that the user spreadsheets reside and are processed in the user administrative domains, and never leave such administrative domain unencrypted. SpreadSheetSpace keeps the user spreadsheets synchronized so that the users perceive the presence of a single shared spreadsheet. Synchronization takes place through the exchange of encrypted messages which are unreadable outside the user administrative domains. End to end asymmetric cryptography ensures that no one, including SpreadSheetSpace, can look at the content of these messages ever.



Functionalities

SHARE

Share allows users to co-edit the same spreadsheet in the same way as they can do on Google Docs. Co-editing, which leverages spreadsheet synchronization, works both in real time, when the users edit the spreadsheet simultaneously, and in deferred mode, when the users edit the spreadsheet at different times.

Two distinctive characteristics make **Share** unique and distinguish it from Google Docs sharing and from the other Cloud based approaches, namely:

- the fact that **Share** works with Excel and not with a surrogate of Excel as it happens in Web based spreadsheets, and
- the fact that **Share** supports full information security.

The use of Excel, which is a recognized standard, directly derives from the fact that the spreadsheets reside and are processed in the user systems. The users work on Excel and just activate the Share functionality when they need it.

Information security is guaranteed by the fact that the shared spreadsheets never leave the user administrative domains, as all data exchanges take place over end-to-end encrypted channels protected by a Public Key Infrastructure (PKI).

LINK

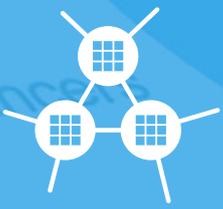
Link supports Excel-to-Excel linking over a network. In particular:

- it allows Excel users to expose spreadsheet elements (i.e., ranges, tables and whole sheets) to other users;
- it allows Excel users to link to spreadsheet elements exposed by other users to display them in their spreadsheets and use them to prepare personalized calculations and presentations.

Why should one need SpreadSheetSpace to send data to other people? Why is an email attachment not enough? Here is the answer: **Link** targets the very frequent case in which the exposed data evolves over time. In such a case, sending a spreadsheet over email only provides a snapshot of the data in evolution, taken at the moment at which the message is sent. At each update, then, the user exposing data must send the data again to all targets to maintain synchronization.

Unfortunately, the probability that a user fails to update some of the targets is not negligible. Incomplete synchronization leads to an inconsistency known as the Multiple Versions of the Truth problem. Different users may end up working on different versions of the same data, possibly leading to unexpected consequences.

Link provides automatic synchronization of Excel files, thus eliminating the need of manual synchronization. The data exposed by the source users can be referred to as the Single Version of the Truth. All the spreadsheets work directly on the latest version of the data exposed by the source spreadsheet which appears in their spreadsheet.



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SYNC

Sync transforms Excel into a Software Platform client and gives spreadsheet users the possibility to create presentations based on Software Platform data which evolves over time. Through **Sync**, Software Platforms administrators expose internal tables to spreadsheet users so as to allow them to display such tables in their spreadsheets and create live personalized calculations and presentations based on them.

Sync is similar to **Link**. The difference is that while **Link** enables Excel-to-Excel connection, **Sync** enables Software Platform-to-Excel connection.

Why do one need **Sync** to connect Excel to a Software Platform considering that Excel is already able to issue SQL commands and through them, to access Software Platforms data natively? Here is the answer: **Sync** provides control, scalability, and security.

- It provides control as it leaves Software Platform Administrators the task of configuring the exposition of internal Software Platform tables and of giving/revoking access rights to such tables to single Excel users.
- It provides scalability, as it excludes direct access to Software Platforms from Excel. Instead of processing user requests, Software Platforms just keep a synchronized copy of the exposed tables in the Spreadsheet Space, so as to avoid direct interaction between Excel spreadsheets and Software Platforms.
- It provides security, as it decouples spreadsheet access from Software Platform access. Excel spreadsheets do not need to be given Software Platform credentials as they only access the tables explicitly exposed to them by the Software Platform administrator over the SpreadSheetSpace.

Provisioning

The SpreadSheetSpace functionalities are provided both as a **public service** over the Internet, in which case the public SpreadSheetSpace Cloud server takes care of synchronization, and as a **private service** in the enterprise cloud, in which a private SpreadSheetSpace server is installed as a product in the enterprise administrative domain.

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