

SyncML

A complete solution for Remote Synchronization

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1. Abstract

The popularity of mobile computing can be attributed to its ability to provide ubiquitous access to information. **Ability to access and update information on the fly** is becoming a necessity. The use of applications and information on mobile devices, coupled with the ability to synchronize the updated information with applications and information back at the office, or on the network, is key to the utility and popularity of this pervasive, disconnected way of computing.

SyncML is an industry initiative to develop and promote a single, common data synchronization protocol. Driving the initiative are IBM, Motorola, Nokia, Palm Inc, Psion, Lotus, and Starfish Software. Currently 630 companies worldwide support this protocol.

2. What is SyncML?

A new industry initiative to develop and promote a single, **common data synchronization protocol** that can be used industry-wide for synchronizing different devices and applications over any network

SyncML is the common language for synchronizing different devices and applications over any network.

It defines a common data synchronization protocol for all kinds of mobile devices such as PDAs, portable PCs, Communicators, mobile phones and pagers.

Data synchronization is the process of making two data sets identical. For a mobile device, synchronization applies to the data that the device stores locally.

With SyncML any personal information, such as emails, calendars, to-do lists, contact information and other relevant data, will be consistent, accessible and up to date, no matter where the information is stored.



3. Scenarios

Some common applications where SyncML can be implemented are:

Web-calendar:

A calendar entry made to a mobile device on a business trip is equally available to a secretary in the network calendar. Secretary can also make some meetings/appointments in the calendar. When synchronization takes place, any conflicts with the server is resolved and both the users are updated.

New mobile:

A businessman has kept his calendar and contacts on the company server. Then the businessman buys a new mobile device. The businessman uses the calendar and contacts on the server to synchronize his new mobile.

Mail messages:

A user could read e-mail from either a computer or a mobile phone, and still maintain a consistent, updated record of which messages had been read

vCard- electronic business cards

Synchronizing vCards stored on PDAs with the laptop when they come in the range of each other.

vCard is used in applications such as Internet mail, voice mail, Web browsers, telephony applications, call centers, video conferencing, PIMs (Personal Information Managers), PDAs (Personal Data Assistants), pagers, fax, office equipment, and smart cards.

vCalendar- cross platform scheduling

vCalendar defines a transport and platform-independent format for exchanging calendaring and scheduling information in an easy, automated, and consistent manner. It captures information about event and "to-do" items that are normally used by applications such as a personal information managers (PIMs) and group schedulers. Programs that use vCalendar can exchange important data about events so that you can schedule meetings with anyone who has a vCalendar-aware program.

4. SyncML components

SyncML Client

- **Send the SyncML messages (operations), possibly including payload data.**
- **Receive responses from the SyncML server.**
- **Receive some SyncML messages as commands from the server side.**

Typically, this device is a PC, mobile phone, or PDA.

SyncML Server

- **Issues SyncML "response" messages**
- **Responsible for performing the analysis of the synchronization data**
- **Include a synchronization engine for detection of resolution of conflicts.**

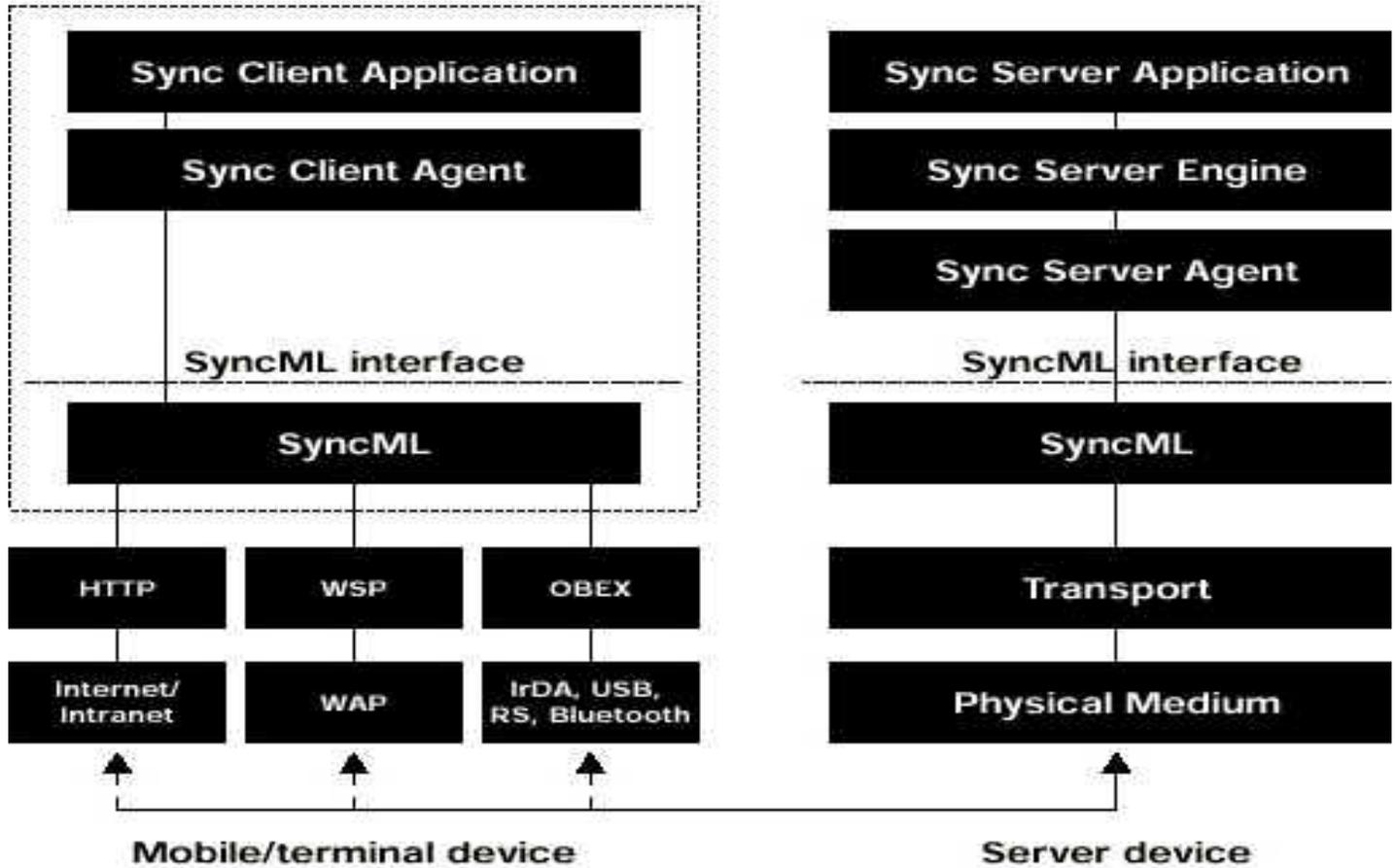
XML based representation protocol

- The messages are represented as XML documents.
- A SyncML Message is a well-formed, but not necessarily valid, XML document.
- The SyncML format also can be identified as a MIME content type.
- Based on a request/response command structure or on a push command structure.

Synchronization protocol

- **Supports 1-way synchronization from client to server**
- **Supports 1-way synchronization from server to client**
- **Supports 2-way synchronization between client & server**
- **Supports server alerted sync**

5. SyncML Architecture:



6. Characteristics of SyncML protocol

- **Synchronization protocol must work effectively over wireless and wired networks.**
 - a) Network latency should be restored.
 - b) To minimize the bandwidth requirements, protocol must allow alternate binary encoding techniques to both data and the synchronization commands.
 - c) Protocol must minimize the number of request/response interactions between the device and networked data
 - d) Protocol must ensure that the device and networked data remain consistent even when disconnection occurs and be able to resume when connection is reestablished.
- **Support over multiple transports**

Since wireless networks employ different transport protocols and media, a protocol must work smoothly over HTTP (internet), WSP (Wireless Session Protocol, WAP) and OBEX (Bluetooth, IrDA)
- **Support for arbitrary networked data**

Protocol should support concurrent synchronization with multiple network data repositories. It should permit common data formats represented over the network and also be extensible to new data formats. It should support vCard, vCalendar, iCalendar, Collaborative objects, XML, etc.
- Enable **data access from variety of applications** by providing reference code in common programming language.
- **Resource limitation on mobile device.**

Protocol implementation should fit within the memory footprint of the common mobile devices and data should also be exchanged should require minimal code to transfer.
- **Build open existing internet and web technologies**
 - a) XML should be used to represent data exchange during a synchronization session
 - b) MIME should be used to register format for data synchronization protocol messages
- **Promote interoperability**

Protocol should be interoperable, synchronizing networked data with any mobile device and synchronizing a mobile device with any networked data

7. Benefits of SyncML protocol

End users:

Instead of using synchronization product for every device, hence the synchronization is limited to the type of network and applications. With SyncML, broader range of devices can be synchronized.

Device Manufacturers:

Device supporting SyncML will be interoperable with many applications, services and technologies.

Service Providers:

They will be able to provide connectivity to wide range of customers.

Application Developers:

With the support of multiple synchronization technologies, an application will be able to support more types of devices and networked data.

8. SyncML products

Currently, following SyncML compliant products are available in the market.

Clients:

Ericsson Client 1
Ericsson Client 2
fusionOne Client v1.0
InfoBank Client
Neosteps Client
Nokia 9210 Communicator
Openwave Client
Samsung Client
Starfish TrueSync Device
Starfish TrueSync Stack for Windows CE
Symbian OS SyncML

Servers:

Ericsson server
fusionOne server
Infobank server
Openwave server
PumaTech server
Starfish TrueSync® Synchronization server

9. Interoperability for SyncML product

SyncML Interoperability is determined through two separate testing processes:

a) Test for conformance

b) Test for interoperability.

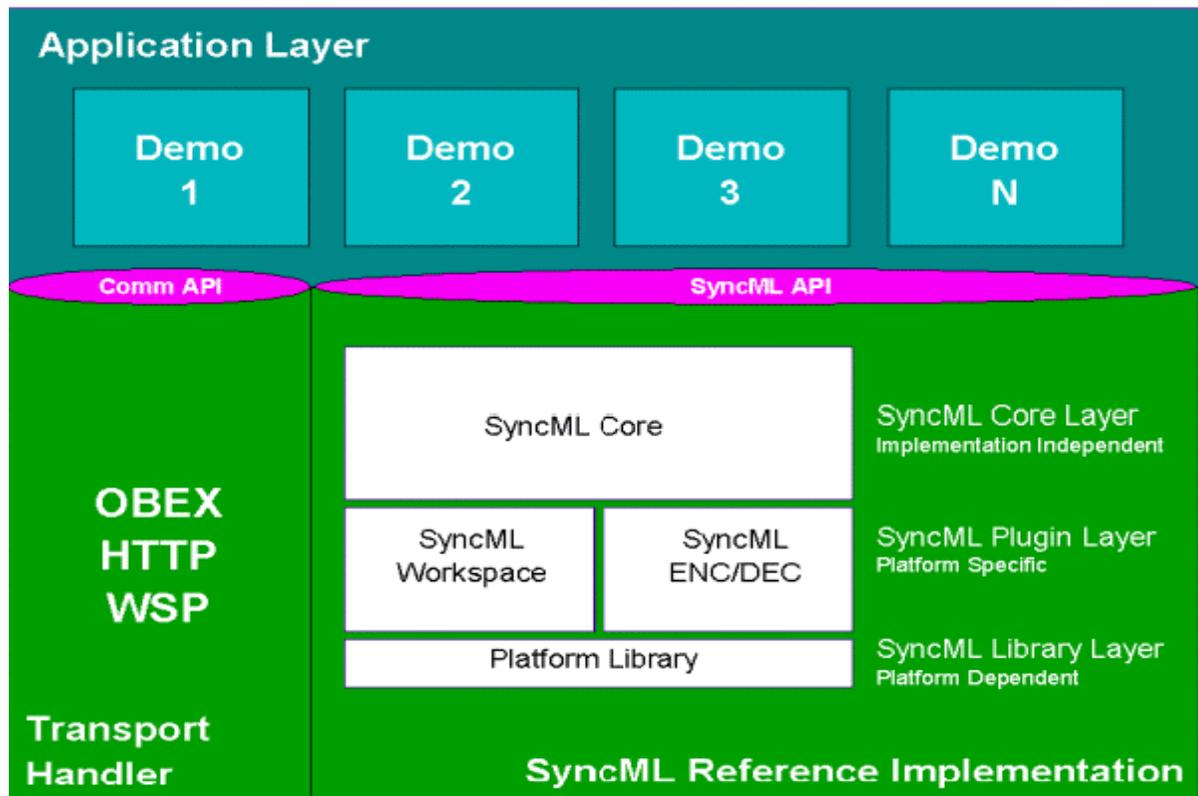
A product is deemed SyncML-compliant only if it has completed both tests. We must successfully complete the SyncML Conformance Testing process before going for Interoperability.

SyncML Interoperability Committee (SIC) is comprised of representatives of the SyncML Sponsor companies. The SIC is responsible for organizing and defining the SyncML Conformance and Interoperability Testing processes, and for providing appropriate specifications and tools.

Interoperability testing takes place at the SyncFest events.

10. About SyncML Toolkit for developers

The SyncML Reference Toolkit is structured in three layers:



- The SyncML Core implements the SyncML API, which is exposed to the application. This core layer is platform-independent, and includes the modules SyncML Manager, SyncML Command Builder, and SyncML Command Dispatcher.
- An underlying platform-dependent plug-in layer is used to provide functionality to the core modules.
- The third layer, a "library layer," encapsulates the platform-specific library functions, such as simple memory allocation and string handling. The two layers above use these functions. Separating this layer from the others makes the upper layers more portable.

To complement the functions defined by the SyncML API, the application using the SyncML Reference Toolkit has to provide implementations for callback functions. These callbacks handle incoming synchronization commands. The SyncML Reference Toolkit when parsing a SyncML document calls them.

Communication functions are not part of SyncML itself, thus avoiding redundant implementation efforts. Instead, the application takes advantage of existing transport layer functionality on the individual platforms. However, a communication toolkit supporting HTTP, OBEX, and WSP protocols is complementary with the SyncML Reference Toolkit, in order to make it easier to develop SyncML-enabled software.

11. DCM Roadmap for SyncML

DCM Technologies is working on its first SyncML product, which will run over Bluetooth. The product will be used to synchronize PocketPC PC Outlook data with MS-Outlook and Lotus Notes on PC.

The first version due in August 2001 will have 1-way synchronization initiated from PocketPC to PC.

DCM has further planned for 2-way synchronization, SyncML conformance and participation in SyncFest organized by SIG.

DCM will also expand the scope on different OS like LINUX, PalmOS and other popular mail clients.
