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DB2 Everyplace Version 7

Extending Enterprise Data to Mobile Devices

Alan Carpenter, IBM UK

Last Updated: February, 2001





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DB2 Everywhere

IBM DB2 Family

Hosts

- DB2 UDB for OS/390
- DB2 for VSE & VM
- DB2 UDB for AS/400

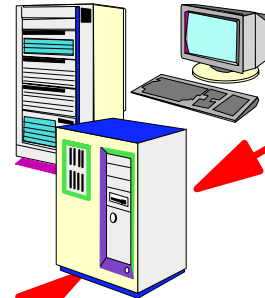


Mainframe, PC and Workstation

DB2 Connect

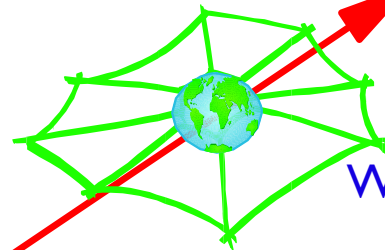
Enterprise

- Win NT/2000, OS/2
- AIX, HP-UX, Solaris
- Linux, NUMA-Q



Workgroup

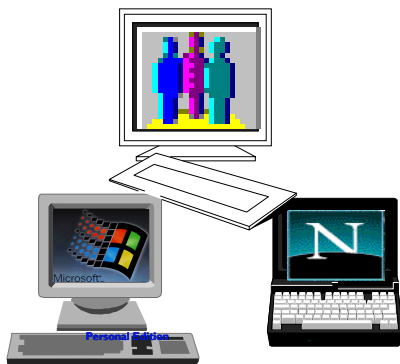
- Win NT/2000
- Linux
- AIX
- Solaris
- HP-UX
- OS/2



Personal

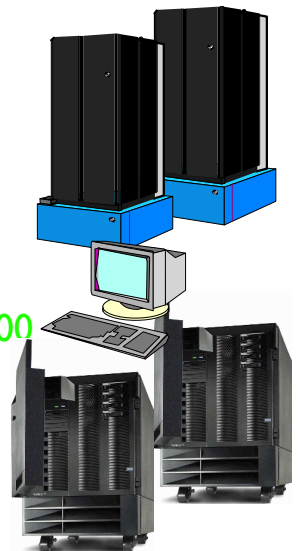
- Win 95, 98
- Win NT/2000
- Linux
- OS/2

Clients



Enterprise - Extended

- AIX
- Solaris
- Win NT/2000
- HP-UX
- NUMA-Q





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DB2 UDB packaging options

- DB2 UDB Packaging Options for Workstation and PC
 - ▶ DB2 UDB Personal Edition
 - For the individual user
 - ▶ DB2 UDB Workgroup Edition
 - For the LAN based department
 - ▶ DB2 UDB Enterprise Edition
 - For additional access to DB2 host data
 - ▶ DB2 UDB Extended Enterprise Edition
 - For parallel computing (SMP, Clusters etc.)
 - ▶ DB2 UDB Universal Developers Edition
 - All versions for all platforms, plus DB2 Connect
 - ▶ DB2 UDB Personal Developers Edition
 - All versions for all platforms (no DB2 Connect)

- Current version is DB2 UDB 7.1 (released June 2000)

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DB2 UDB additional products

- Other DB2 UDB products include:
 - ▶ DB2 Propagator Relational
 - Database replication
 - ▶ DB2 Warehouse Manager
 - Data warehousing
 - ▶ DB2 OLAP Server
 - Multi-dimensional cubes
 - ▶ DB2 Relational Connect
 - Join databases from different vendors
 - ▶ DB2 Net.Data
 - Display DB2 data in a web browser
 - ▶ DB2 Net.Search Extender
 - High speed in-memory searching
 - ▶ DB2 Spatial Extender
 - Maps from relational data

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- EPOC
- Win CE
- Palm OS
- QNX Neutrino
- PocketPC
- Embedded Linux
- Zaurus

Hosts

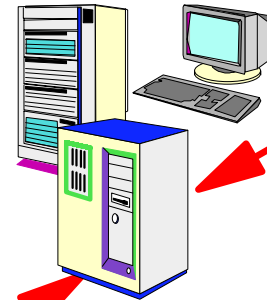
- DB2 UDB for OS/390
- DB2 for VSE & VM
- DB2 UDB for AS/400



DB2 Connect

Enterprise

- OS/2, Win NT/2000
- AIX, HP-UX, Solaris
- Linux, NUMA-Q



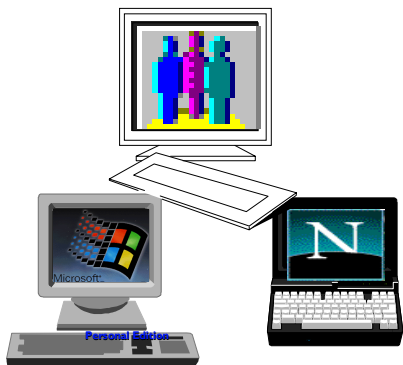
Workgroup

- OS/2
- Win NT/2000
- Linux
- AIX
- Solaris
- HP-UX

Personal

- OS/2
- Win 95, 98
- Win NT/2000
- Linux

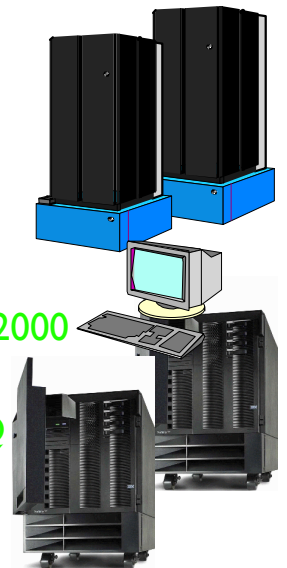
Clients



DB2 Universal Database

Enterprise - Extended

- AIX
- Solaris
- Win NT/2000
- HP-UX
- NUMA-Q





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DB2 Everyplace

DB2 Everyplace

DB2 Everyplace is a small footprint relational database and enterprise synchronization architecture for mobile and embedded devices.

- Easy to use
- Easy to write applications
- Easy to deploy with existing enterprise applications
- Extensible
- Interoperable
- Easy to Manage

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Why a database on mobile devices

- Extend Applications using relational data down to handheld devices
 - ▶ Store
 - ▶ Update
 - ▶ Query
- ✓ Customer Service, Sales Force Automation, Field Productivity
- Appliances, handheld devices, and machines often contain an embedded database with very specific application functionality

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DB2 Everyplace Product Components

Component Name	Description
DB2 Everyplace Database	Database Engine Stores and processes data on mobile and embedded devices
DB2 Everyplace Sync Server	Synchronization Server Synchronizes data between devices and backend data sources
DB2 Everyplace Personal Application Builder (PAB)	Application Development Tool Allows rapid application development





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DB2 Everyplace Packaging

Package	Components Included
DB2 Everyplace Personal Edition	<ul style="list-style-type: none">- Database- Personal Application Builder
DB2 Everyplace Enterprise Edition	<ul style="list-style-type: none">- Database- Personal Application Builder- Sync Server
DB2 Everyplace Enterprise Edition with Unlimited User Feature	<ul style="list-style-type: none">- Database- Personal Application Builder- Sync Server



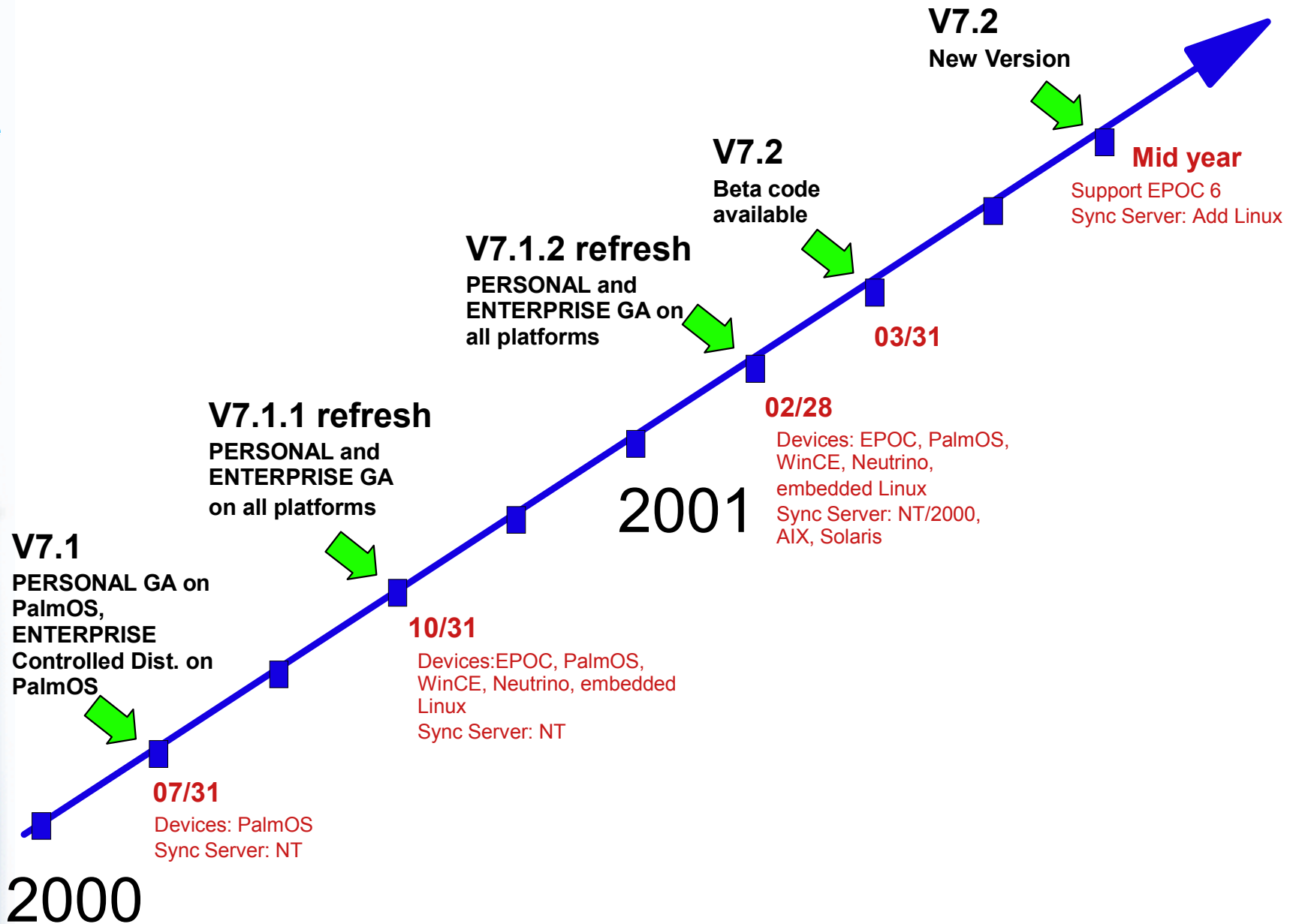


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DB2 Everyplace time line





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The DB2 Everyplace Solution

- ▶ Client Platforms
 - Symbian, EPOC, Palm OS, Windows CE/ Pocket PC, QNX Neutrino, embedded Linux, Linux, Win32
- ▶ Server Platforms
 - Windows NT/2000, (AIX, Solaris, Linux)
- ▶ Sync Server
 - Sync Server adapters allow access to multiple backend databases.
 - HTTP-based synchronization well suited to both wireline and wireless networks.
- ▶ Application Development
 - Personal Application Builder
 - Can also be done using C/C++ and Java with industry standard tools

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DB2 Everyplace Component Overview

- DB2 Everyplace database on device to manage data
 - ▶ Smallest mobile relational database available (app.150KB); designed for minimum storage use
 - ▶ High performance design using main memory database techniques & advanced indexing
 - ▶ Industry standard database interfaces for C/C++ and JAVA
 - ▶ Easy application development using standard SQL and off-the-shelf application development tools
 - ▶ Globalized for major languages

- DB2 Everyplace Synchronization Server
 - ▶ Bi-directional synchronization of DB2 Everyplace to DB2 Universal Database
 - ▶ HTTP-based synchronization well suited to both wireline and wireless networks
 - ▶ Open Architecture: Adapters can be written to access any data source ; JDBC adapter in development
 - ▶ Supports SyncML Framework therefore interoperable with SyncML-based clients
 - ▶ Centralized administration through the Mobile Devices Administration Center

- Personal Application Builder
 - ▶ Enables application development without writing a single line of code.
 - ▶ Ships with DB2 Everyplace sample applications with source code and PAB project file
 - ▶ Extensible design based on XML/XSL to enable application development for other platforms in the future.

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Rich Relational Database Functionality

- Programming interfaces supported:
 - ▶ DB2 Call Level Interface (CLI) / ODBC subset
 - ▶ Java DataBase Connectivity (JDBC) driver for Java applications on all platforms (including Visual Age Micro Edition J9 JVM for Palm OS)
- Provides the functionality needed on the mobile device
 - ▶ Data Definition Language (DDL)
 - CREATE TABLE, DROP TABLE
 - CREATE INDEX, DROP INDEX
 - ▶ Data Manipulation Language (DML)
 - INSERT, DELETE, UPDATE (records)
 - SELECT (records), Scrollable Cursor, JOIN
 - GROUP BY, ORDER BY
 - ▶ Expression and Aggregate Functions
 - ▶ Multiple-column primary key, foreign key, and scrollable cursors
 - ▶ Datatypes: small integer, integer, decimal, char, varchar, BLOB, date, time
 - ▶ Microdrive and Compact Flash Card Support
- Developer sample applications and utilities
 - ▶ Query-by-example interactive database table viewer
 - ▶ Database Import and Export utilities
 - ▶ DB2 Everyplace sample applications with full source C/C++ code
- Languages supported
 - ▶ Chinese - Simplified, Chinese - Traditional, English, French, German, Italian, Japanese, Korean, Spanish





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DB2 Everyplace Sync Server

- Efficient two way synchronization
 - ▶ Synchronizes with DB2 Universal Database on all platforms
 - ▶ Incremental Updates using DB2 Universal Database DataPropagator data replication technology
 - ▶ JDBC support will enable synchronizing to any backend database

- High Availability
 - ▶ Minimizes system impact by using log data for capturing changes via DPropR

- Centralized administration
 - ▶ Grouping and management of users
 - ▶ Grouping of data subscriptions into mobile applications
 - ▶ Zero administration for devices
 - ▶ Handles distribution of data, files, and applications
 - ▶ Access control for device users based on insert, update, delete privileges

- Interoperable, Extensible and Open Architecture
 - ▶ SyncML based for data interchange
 - ▶ Published APIs

- Optimized for wireless
 - ▶ Uses WAP WBXML for encoding and decoding messages

- Scalability
 - ▶ Works with any JAVA Application Server (such as WebSphere) to communicate with clients and scale the connection capacity

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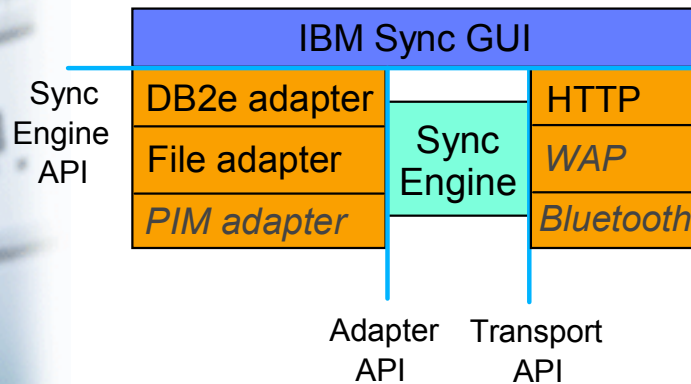
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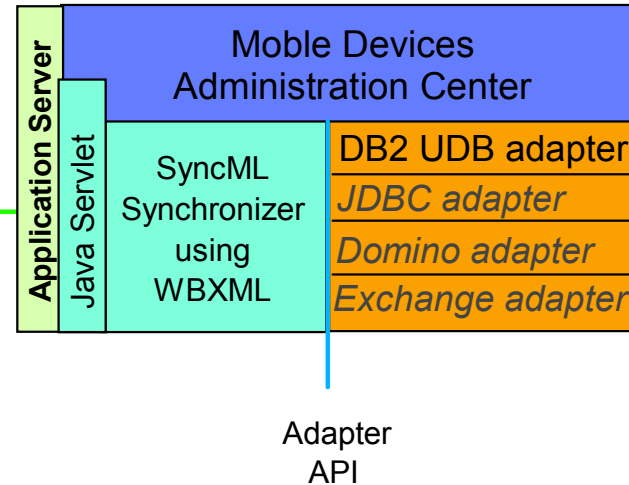
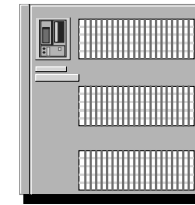
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Sync Server Design Overview

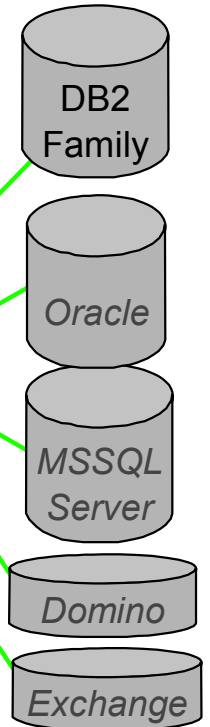
Mobile Devices



Mid-tier Server



Data Sources



Devices

EPOC, Palm OS, Win CE, Neutrino, embedded Linux

Synchronization Server

Windows NT/2000, AIX, Solaris, Linux
NB: DB2 UDB is a pre-req for Sync Server

Data Sources





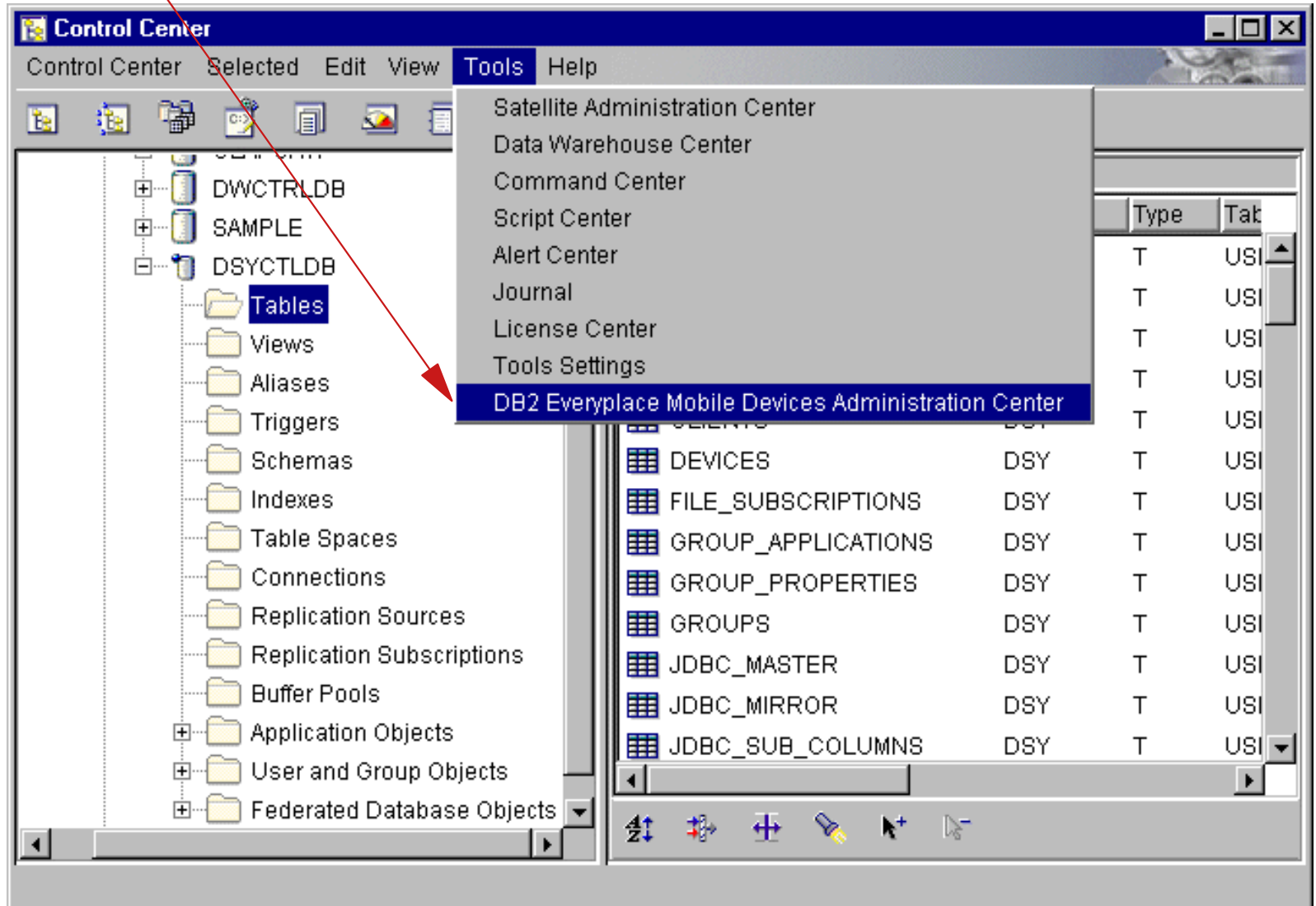
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Starting Sync Server

Option added to tools menu on Control Center



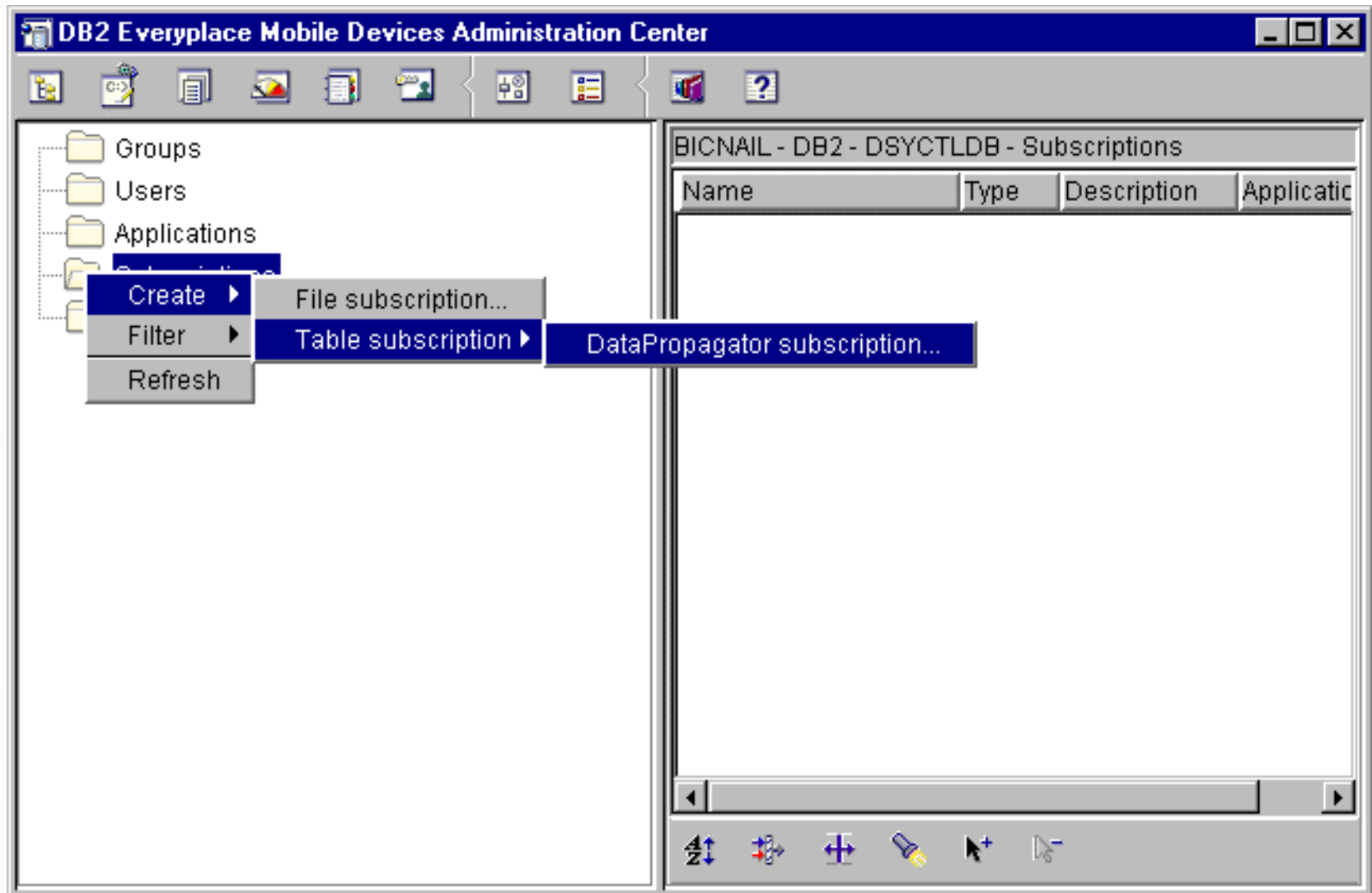


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Mobile Devices Administration Center

- ▶ Use the MDAC to create groups and users
- ▶ Set up synchronization services



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Fast Application Development with Personal Application Builder

- Rapid prototyping capability
- Generates standalone C applications that can access DB2 Everyplace tables without writing a single line of code
 - ▶ Fully supports relational database operations
 - ▶ Database joins on a single form
 - ▶ Supports automatic form creation directly from database table definitions
- Visually create and edit forms by selecting controls from a palette
- One button code generation and compilation
- Global scripting and custom function support
- Integration with Palm OS and GNU Tools for application compiling, testing and debugging
- No Runtime Interpreter therefore no runtime performance penalties
- Complete sample application developed in Personal Application Builder included

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Personal Application Builder Interface

The screenshot displays the DB2 Everyplace Personal Application Builder interface. The main window shows a project tree on the left with the following structure:

- VNApp
 - Tables
 - VNSchedule
 - VNContact
 - VNMedicalRecord
 - VNPerson
 - Palm OS
 - Forms
 - Schedule
 - Patient Information
 - EmergencyContacts
 - Contact Information
 - Medical Records

The Properties window at the bottom left shows the following details for the selected 'New Medical Record' form:

Property	Value
Name	New Medical Record
Caption	New Medical Record
Left	0
Top	0
Width	160
Height	160
Modal	False
Menu ID	
Data source	
Data field	
Link source	
Link field	

The main workspace contains a stack of form windows. The top-most window, titled 'New Medical Record', displays the following form fields:

- Record ID
- Field11.Form7
- Field9.Form7
- Blood Pressure
- Pulse Rate
- Temperature
- Weight
- Comment
- Field12.Form7

At the bottom of the form are 'Save' and 'Back' buttons, and an up arrow icon.





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Other Application Development Tools

- Metrowerks CodeWarrior
 - ▶ <http://www.metrowerks.com/platforms/>
 - ▶ Supports Palm OS, JAVA, and QNX Neutrino

- Microsoft Visual C++
 - ▶ <http://msdn.microsoft.com/cetools/>
 - ▶ Supports Windows Embedded Tools 3.0

- Software Development Kits
 - ▶ EPOC R5 SDK
 - ▶ Palm OS SDK 3.5
 - ▶ Lineo Embedix SDK (embedded Linux) 12/00
 - ▶ Lynuxworks Lynux SDK (embedded Linux) 12/00
 - ▶ QNX Neutrino 2.0 SDK

- Visual Age MicroEdition from OTI
 - ▶ <http://www.embedded.oti.com>
 - ▶ Supports JAVA on Palm OS, QNX Neutrino, and embedded Linux

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DB2 Everyplace Samples

- Samples with source code available
- Visiting Nurse
 - ▶ Installed when DB2 Everyplace installed
 - ▶ Needs to be initialized
 - ▶ Time table, patient details etc
 - ▶ Source code included on Windows machine
- Query by Example (QBE)
 - ▶ Installed when DB2 Everyplace installed
 - ▶ Command line available
 - ▶ Source code included on Windows machine
- Phone
 - ▶ Simple phone list
 - ▶ Source code included on Windows machine

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Manuals

- Installation and Users Guide - 60 pages
 - ▶ Install DB2 Everyplace, use the sample applications
 - ▶ Document number: SC27-0764

- Sync Server Administration Guide - 104 pages
 - ▶ Configuring and maintaining Sync server, configuring communications, managing users
 - ▶ Document number : SC27-0845

- Application Development Guide - 142 pages
 - ▶ Building applications, understanding sample applications and source code, supported SQL statements
 - ▶ Document number : SC27-0765

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Reference URL

- DB2 Everyplace Homepage
 - ▶ www.ibm.com/software/data/db2/everyplace/
- Contains current product information, documentation, white papers, partner information, events, etc.
- Includes product documentation in pdf and html format
- Download DB2 Everyplace V7.1.1 Enterprise Edition
 - ▶ Database Engine, Personal Application Builder, and Sync Server
- Download DB2 Everyplace V7.1.2 Personal Edition
 - ▶ Database Engine and Personal Application Builder

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DB2 Everyplace Resources

- Paul Read, DB2 Support, IBM Hursley
external phone: 44 (0)1962 81 8824
paul_read@uk.ibm.com
- Alan Carpenter, DB2 Support, IBM Warwick
external phone: 44 (0)1926 46 4893
alan_carpenter@uk.ibm.com
- James P Mackie, DB2 Support, IBM Warwick
external phone: 44 (0)1926 46 5237
james_mackie@uk.ibm.com

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Reference: eScholar LLC

- ✓ A data warehousing solution for K-12 education extended to handheld PCs; gives educators easy access to student performance and other relevant data
- ✓ scalable to hold thousands of student records

"...**highly scalable**...we have downloaded thousands of entries without even coming close to taxing its capacity."

Shawn Bay, CEO, eScholar LLC

<http://www.escholar.com/>

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Reference: Mobicomp

- ✓ Sales Force Automation Solutions allows companies to provide accurate and up-to-date information to their sales force on PDAs and WAP phones.
- ✓ Uses DB2 Everyplace as part of its middleware layer.

"Due to the rapid pace of technological change, the lack of clearly established standards and the constant evolution of mobile devices, the use of **leading-edge technology and methodologies, such as DB2 Everyplace** is critical. Our solutions are designed for flexibility and low maintenance costs, so that they can work now and in the future. With our IBM relationship, we look forward to offering a reliable, scalable and most of all, versatile product for our customers."

Carlos Oliveira and António Nestor Ribeiro, Managing Directors, MobiComp

<http://www.mobicomp.com/>

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Final foil

- This is the final foil



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