

APM SYSTEM INSTALLATION

09th September 2009

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1.0	2006 Feb 6th	TL	First version
1.01	2006 Feb 7th	MOS / TL	CrewLogic workstations memory size Miscellaneous amendments
1.02	2006 Feb 10th		Amendment to SITA Workstation paragraph
1.03	2006 Feb 14th	MOS / TL	Wireless use not recommended (§ 2.2.1)
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1.08	2006 Dec 4 th	MOS	Simultaneous Users
1.09	2006 Dec 15 th	MOS	MS OS System for Citrix Users
1.10	2006 Dec 19 th	TL	CrewWeb network flow over the internet
1.11	2007 Jan 29 th	MOS	Oracle SGA RAM
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1.14	2007 Apr 12 th	MOS	Monitor Display Updated information
1.15	2007 May 8 th	BM	Chinese characters management
1.16	2007 May 31 st	MOS	Client Workstations now req Min 1GB Ram
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1.18	2007 Sept 24 th	MOS	Updated Installation Information Request
1.19	2007 Oct 19 th	TL	Standard APM users with Oracle
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1.22	2008 Jun 11th	TL	Architecture and technology overview (§ 1.1 and § 1.2) Installation and update overview (§ 5.1 and § 5.2)
1.23	2009 Jan 22 nd	TL	Hardware requirement updates. Oracle Supervision users privileges.
1.24	2009 Jan 22 nd	MOS	IATA Address Clarification
1.25	2009 Apr 06 th	MOS	Automated Installation Clarification (§ 3.2)
1.26	2009 Aug 24 th	TL	Operating Systems and Oracle Versions update
1.27	2009 Sep 2 nd	MOS	ProfitMaster RAM Requirements

APM SYSTEM INSTALLATION.doc

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1.28	2009 Sep 9 th	MOS	Back Up and Restore Reference for Intabase
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1. INTRODUCTION

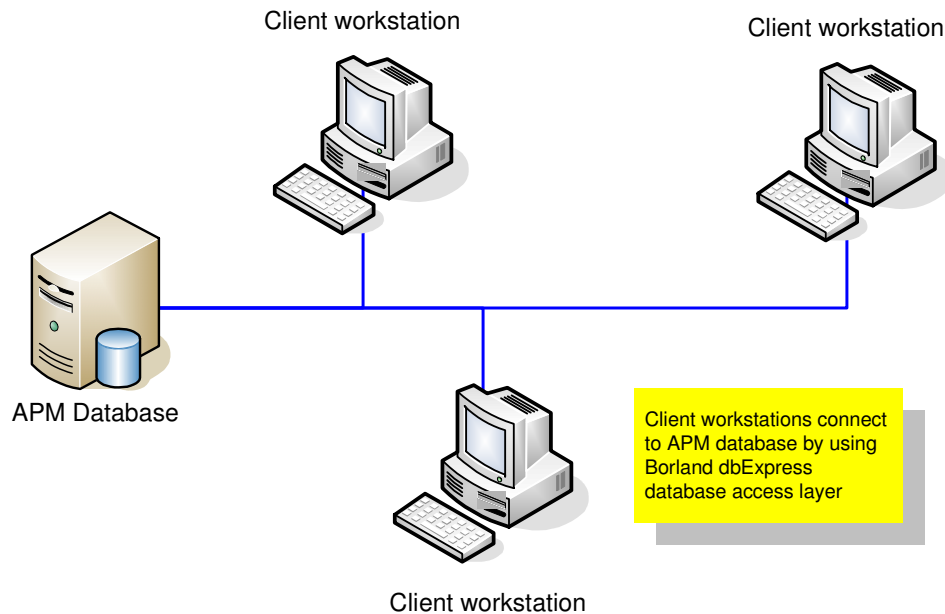
The document covers the following points:

- to list the hardware requirements
- to list the software requirements
- to describe the APM remote maintenance software (XRP)
- to list the information required from the customer
- to provide general information on APM software

1.1. Architecture overview

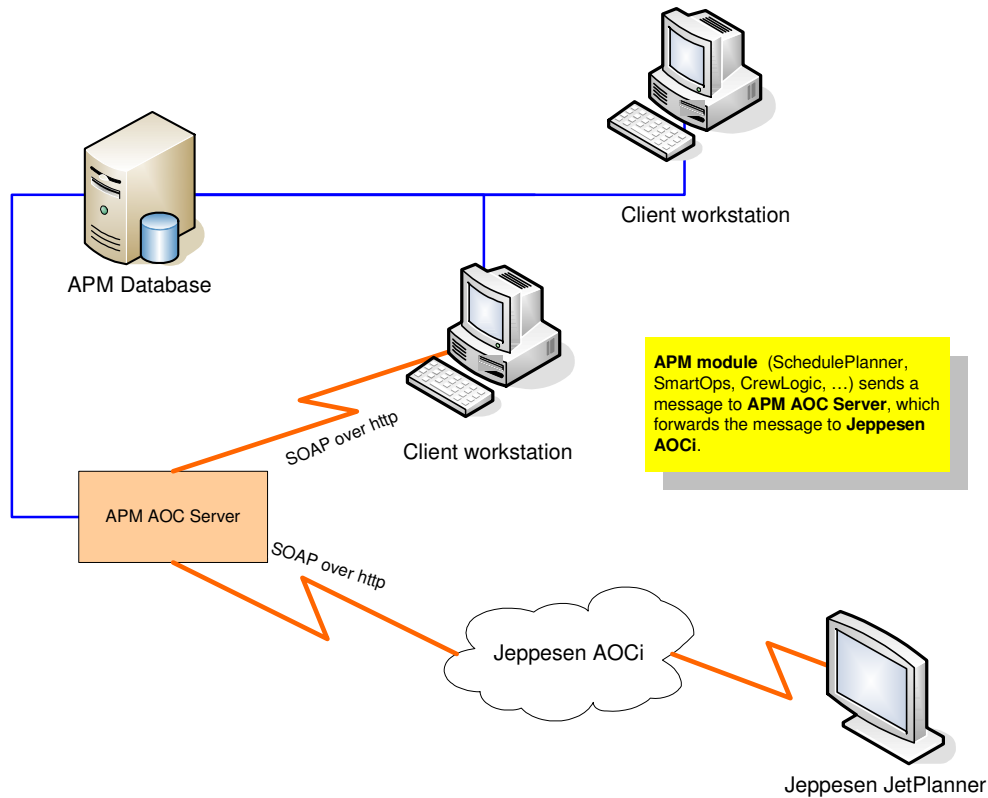
The APM package is an integrated software, implemented through a client-server architecture, where an Oracle or Interbase database server may manage data.

Standard architecture diagram



For clients that purchase the integration services, more sophisticated versions/deployments may also include integration with Jeppesen products and services, and/or an interface to Arinc/SITA network.

Integrated architecture diagram



1.2. Technology overview

Database	Oracle 10g/11g, or Firebird. APM package uses a database only for data storage.
Database access layer	APM modules use Borland dbExpress (ODBC equivalent)
APM modules	Windows 32 bits executables
APM services	Windows 32 bits executables
APM Web application	Windows 32 bits executables or .Net ASP applications
User rights	Stored in APM database and managed by APM applications (independent from the database server platform)

2. HARDWARE REQUIREMENTS

2.1. Database server

Will host and serve the Oracle or Interbase database.

2.1.1. Requirements for Upto 80 Users and a db not exceeding 1.5gb

CPU: 1 processor 3GHz, or 2 processors with 1500 MHz / processor
RAM: 2 GB
Discs: 2 with 20 GB (OS), 50 GB (Oracle) with fast R/W access and I/O, RAID1 or RAID5
OS: Windows 2000 Server with SP4, or Windows 2003 Server with SP1 or higher, or Windows Server 2008 with SP2.
NIC: Gigabit Ethernet is recommended but 100 Mbits full duplex network is sufficient
Network: TCP/IP (standard IPv4)
In case of Oracle, the server must be fully backed up and incorporate a replication for business contingency.

SGA: The SGA setting parameter should be set to a minimum of 730MB. Target sga_target.

2.1.2. Requirements for more than 80 Users (Oracle) or a db exceeding 1.5gb

CPU: 1 processor 3GHz, Intel XEON 5050 Dual Core
RAM: 4 GB Please note the Server must have capacity to expand RAM to 12 GB.
Discs: 1 with 80 GB (OS), 1 with 80 GB (Oracle) with fast R/W access, 1 with 80 GB (database backup) and 1 with 80 GB (Redo file). Please note where RAID is used please check with your Oracle Technical Service Support for specifications.
OS: Windows 2000 Server with the latest SP, or Windows 2003 Server with the latest SP, or Windows Server 2008 with SP2. The Windows OS must be compatible with Oracle 10g/11g.
NIC: Gigabit Ethernet is recommended but 100 Mbits full duplex network is sufficient
Network: TCP/IP (standard IPv4)

SGA: The SGA setting parameter should be set to a minimum of 730MB. Target sga_target.

Please note these Hardware specifications are approximations and consultation should be made with your Oracle Technical Service Support prior to any installation.

Please note that any third party supporting software such as Citrix/MS Terminal Services or connected networks must be specified and improved to cope with anticipated data loads.

References

http://www1.euro.dell.com/content/topics/global.aspx/alliances/en/oracle_cc

http://www.dell.com/downloads/global/solutions/e1wo_150.pdf

2.1.3. Installation

The installation of the Database Server (Hardware assembly, Operating system) and any remote access (Citrix/Terminal Services) is under the responsibility of the customer.

2.1.4. Performance Benchmark

Once the Server is installed a test should be conducted using the Benchmark function in APM Settings to test system response times. Users should expect response rates with 25 seconds for a 'Write pass' test on the pre stored 4000 records. If users do not receive these results an investigation should be conducted to improve configuration and hardware response rates.

Typical Response rates on a Live DB using Oracle is as follows,

Test initialise :	10 seconds
Write pass 1 :	19/20 seconds
Write pass 2 :	18/23 seconds
Write pass 3 :	19/19 seconds

2.2. Network

2.2.1. General

Requirements are TCP/IP under Ethernet 100Mbps full duplex. The switch configuration between the server and workstations must be multi-speed 1000/100Mbps.

APM Technologies SA operates on all types of local networks. Regarding access from distant networks, the network lines have to be sized according to the function type of the application and according to the utilisation based on the number of clients. The supported protocol is TCP/IP.

Warning : APM do not recommend the use of Wireless Networks due to the limitation of network card capacity.

2.2.2. Email integration

APM software has email capability using integration with Microsoft Outlook, therefore POP3 is not a mandatory protocol but Outlook should be installed on each workstation with a valid email account.

2.3. Client Workstations

The APM standard modules (APM Settings, SchedulePlanner, SmartOps etc) will be run locally on Windows workstations.

2.3.1. Requirements

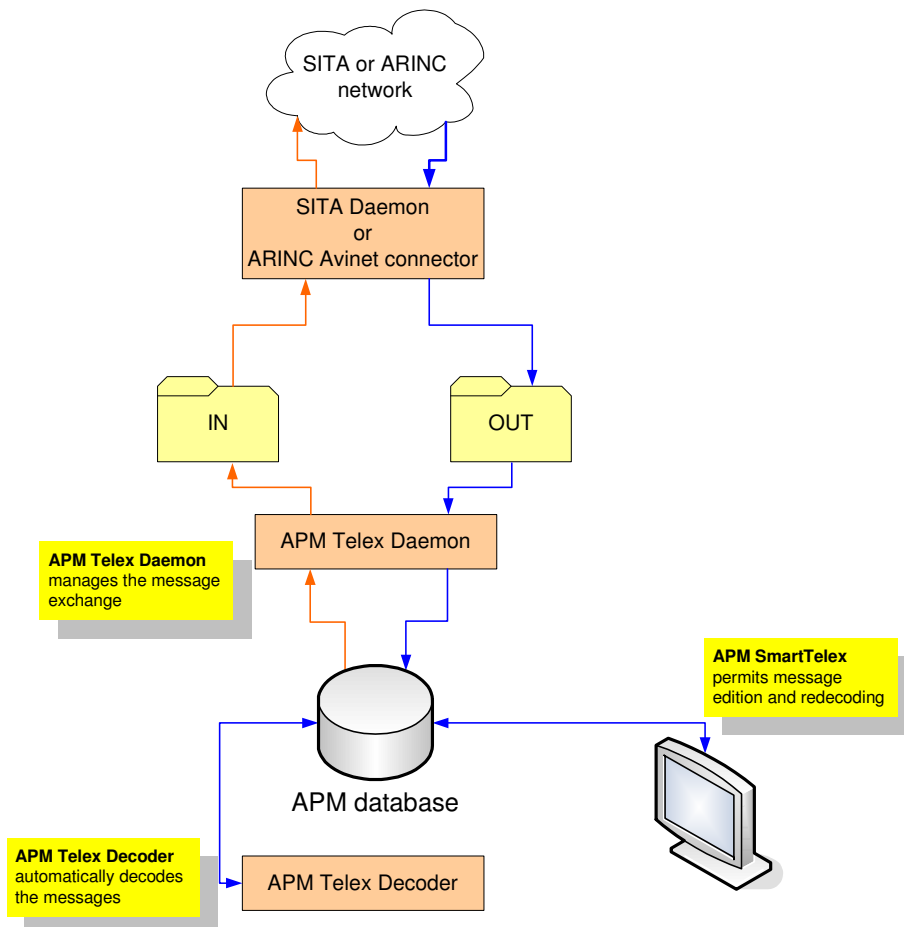
CPU:	1 processor with 1 GHz or more At least 2 GHz for workstations running Crewlogic.
RAM:	At least 1 GB for workstations. At least 2 GB for workstations running Crewlogic and ProfitMaster At least 512mb for SmartTelex and TelexDaemon.
DISKS:	1 with 20 GB or more
NIC:	100 Mbps full duplex Ethernet
Network:	TCP/IP (standard IPv4)

Client: SMB/CIFS client to update with the latest APM executable from the server
 DISPLAY: at least 15" but preferably 17" monitors
 1280x1024 or more with 65K of colours (16 bits)

2.4. Supplementary deployments

2.4.1. SITA/ARINC Integration

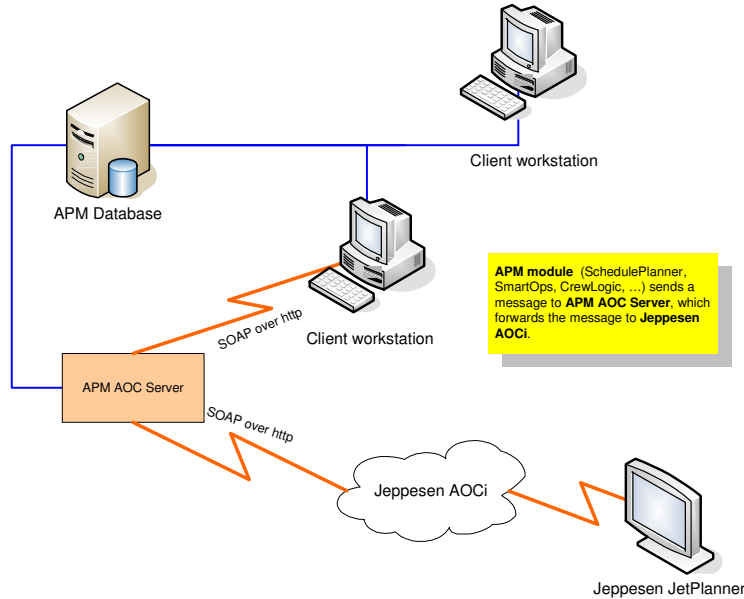
APM can both send and receive "SITA" messages, through an interface, called **APM Telex Daemon**, which can be connected to the **SITA Daemon** or the **ARINC Avinet Connector**. The **APM Telex Daemon** allows dispatching and receiving messages in IATA telex format (MVT, SSM, ASM, ...). With the goal of abstraction, an interface on two levels has been implemented; APM software exchanges messages through a "File Type" interface. The SITA/ARINC interface should preferably be set up **on a dedicated client pc** and used for no other purpose. It is the responsibility of the customer to provide and pay for IATA addresses required for Operations and Scheduling Messages.



The standard APM applications (SchedulePlanner, SmartOps, ...) exchange information with the SITA or ARINC network through the APM database and the **APM Telex Daemon**.

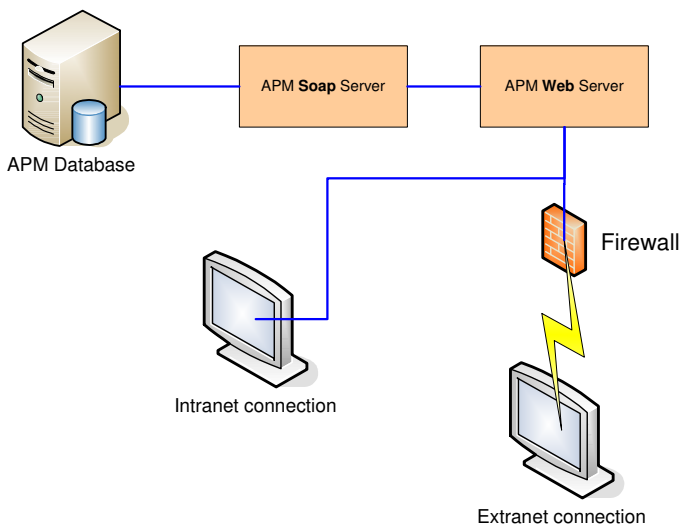
2.4.2. Jeppesen Integration

APM software can be integrated with Jeppesen products and services, such as Ops Control and JetPlanner. This integration uses SOAP (Simple ObjectAccess Protocol) protocol and requires a Soap Server Software to be installed. The Database server usually hosts this software.



2.4.3. APM Web Applications

APM provides Web applications (WebCockpit/WebOps and CrewWeb), which require Soap and Web servers' installation. This software is usually hosted by a dedicated workstation (see requirements in paragraph 2.3.1), but may be hosted by the Database server PC. APM supports MS WebBrowsers.



2.4.4. Terminal Server Specifications

The following RAM is required on the Server hosting the Terminal Server.

RAM: 512 MB or more allocated to the server.
 At least 256MB for each user running an APM application, excluding CrewLogic.
 At least 512MB for each user running Crewlogic.

Additional information can be found at the MS Server Tech Centre

<http://technet2.microsoft.com/windowsserver/en/technologies/featured/termserv/default.mspx>

Terminal Server Licensing.

Please check with your Microsoft Distributor to obtain a license key for the server.

Client PC's Licensing for Terminal Server

If your operating system is MS2003 you do require a Terminal Server Client License for each PC. The customer must purchase this license.

If your operating system is MS2000 you do NOT require a Terminal Server Client License for each PC. Check with your MS Account Manager for up to date information.

3. SOFTWARE REQUIREMENTS

3.1. Database server

Operating system: Windows 2000 Server with SP4, or Windows 2003 Server with SP1, or Windows Server 2008 with SP2

Database software: Oracle (10g or 11g), or Interbase 7.5 or higher, or Firebird 1.5

Citrix Users: Please note Customers wishing to deploy APM Modules with a Citrix farm should use Windows 2003 Server with SP1 or later as recommended by Citrix.

The installation of the Database Server (hardware assembly, operating system) is under the responsibility of the customer and the purchase of appropriate database. The customer must also purchase remote access and operating system licenses.

A folder should be shared across the network by the users of APM software modules, with the goal of upgrading workstation executables when a new release is delivered on server. APM software applications support standard Microsoft networking.

3.1.1. Backup policy

Data replication on a separate server is recommended and twice daily back up procedures in line with good computing practice.

3.1.2. Backup and Restore policy

Intabase Databases must be Restored on a weekly basis to avoid db corruption. At absolute minimum this procedure must be done every month by the Airline's IT personnel. Refer to the current edition of the APM Document titled 'APM Database System Maintenance'.

3.1.3. Manual purge

If needed, a manual purge may be completed on the database for archiving.

3.1.4. Database size

The client should expect 8 to 15 MB per aircraft per year for projections on the database size.

3.1.5. Database user maintenance Database size

The client should expect 8 to 15 MB per aircraft per year for projections on the database size.

3.1.6. Simultaneous Users

As at the 11th June 2008 the amount of tested simultaneous users using the APM database is 137 Users.

3.1.7. Required Oracle APMADMIN user

In order to administrate and support the system, APM will need a user "APMADMIN" having the following grants:

- GRANT BACKUP ANY TABLE TO APMADMIN WITH ADMIN OPTION
- GRANT UNLIMITED TABLESPACE TO APMADMIN WITH ADMIN OPTION
- GRANT CONNECT TO APMADMIN WITH ADMIN OPTION
- GRANT DBA TO APMADMIN WITH ADMIN OPTION
- GRANT EXP_FULL_DATABASE TO APMADMIN WITH ADMIN OPTION
- GRANT IMP_FULL_DATABASE TO APMADMIN WITH ADMIN OPTION

APM does not include the Oracle license with its software and as such the installation of the Oracle software remains under the responsibility of the customer. However APM can sell an Oracle license if the customer wishes to purchase a license from APM and in this case APM will assist the customer with the Oracle Installation.

3.1.8. Standard APM users with Oracle

When running APM with Oracle, the standard APM Oracle users will be created with the following procedure :

- CREATE USER "**UserName**" PROFILE DEFAULT IDENTIFIED BY **Password** DEFAULT TABLESPACE USERS ACCOUNT UNLOCK;
- GRANT ROLE_APMUSER TO "**Username**";

3.1.9. Supervision users with Oracle

When running APM with Oracle, you can define "Supervision" users, who can create, alter and delete database users from ApmSettings module. These "Supervision" users will be created with the following procedure :

- CREATE USER "**UserName**" PROFILE DEFAULT IDENTIFIED BY **Password** DEFAULT TABLESPACE USERS ACCOUNT UNLOCK;
- GRANT ROLE_APMUSER TO "**Username**";

In addition, the following system privileges will be granted to "Supervision" users:

- ALTER USER
- CREATE USER
- DROP USER
- GRANT ANY ROLE
- SELECT ANY DICTIONARY

3.1.10. Oracle database character set

The APM Oracle database must be created with the "**AMERICAN_AMERICA.WE8MSWIN1252**" character set.

3.1.11. Interbase Firebird details

As APM does not sell the Interbase license, as such the installation of the Interbase software remains under the responsibility of the customer. APM will install the Firebird software on demand from the client. In order to administrate and support the system, APM will need (login/password) a user "SYSDBA".

3.2.3. Network flow between workstation and Db server

Here are some examples of network flow, when launching usual processes:

Application	Process	Workstation -> Server (bytes)	Server -> Workstation (bytes)
SP-SO-CL...	Opening application and connecting to database	~13'500	~700'000
SP-SO-CL...	Loading whole Airport table	~7'000	~180'000
SP-SO-CL...	Weekly A/C Report (10 tail numbers, one week)	~90'000	~500'000
SP	Loading Graphical Display (10 tail numbers, one week)	~40'000	~1'500'000
SP-SO-CL...	Flight Statistics (10 tail numbers, one week)	~150'000	~4'800'000

SP = SchedulePlanner, SO = Smartops, CL = CrewLogic

3.2.4. CrewWeb network flow over the Internet

Here are some examples of flow between Apm CrewWeb and client browser, when launching usual processes:

Process	Client Browser -> CrewWeb Web Server (bytes)	CrewWeb Web Server -> Client Browser (bytes)
Getting Welcome page, after login	~9'000	~87'600
Getting Flight Program page	~7'500	~16'200
Getting Flight Program Pdf Report page	~11'000	~85'000
Getting Flight Program Detail page	~7'500	~13'500

3.2.5. Memory usage

The APM standard applications (SchedulePlanner, SmartOps, ...) use each approximately 40 Mbytes of memory on the workstation. The Soap and Web servers (APM WebCockpit, APM CrewWeb, ...) use each between 2 and 15 Mbytes on the server, depending on the amount of simultaneous requests.

3.3. Web and Soap Servers TCP Ports numbers

APM suggests making the APM Web and Soap servers to listen on the following TCP ports ranges :

APM ITOC Soap Server :	6024
APM WebOps/Cockpit Soap Server :	6022
APM WebOps/Cockpit Web Server :	8082
APM CrewWebPlus Soap Server :	6026
APM CrewWebPlus Web Server :	8086

4. REMOTE MAINTENANCE

At least one PC must be dedicated to the remote maintenance of APM software. This PC(s) need(s) an Internet access for APM's **XRP2 Client Software** (supplied free of charge as part of the Modules Rental Fee) remote maintenance tool, that uses **ftRealVNC** (subversion of VNC) and **OpenSSL** to encrypt data flow between the customer's site and APM XRP server (located in Geneva).

It is necessary that TCP port 6600 is open in output to Internet to enable XRP to operate.

The customer initiates this connection as and when needed and also closes this connection.

Any Windows operating system can be used for the XRP application but we don't recommend a Terminal-Server configuration. This connection will allow APM to update the client's database structure and/or the modules' Exe files from the APM offices in Geneva.

The APM XRP2 Client software can be downloaded at : <http://www.apmtechnologies.com/XRP/XRP2Setup.exe>

A full description of APM XRP2 software can be provided on demand to APM.

5. INSTALLATION AND UPDATE OVERVIEW

5.1. System Installation Principles

As already stated before, the installation of the Database Server (Hardware assembly, Operating system) is under the responsibility of the customer.

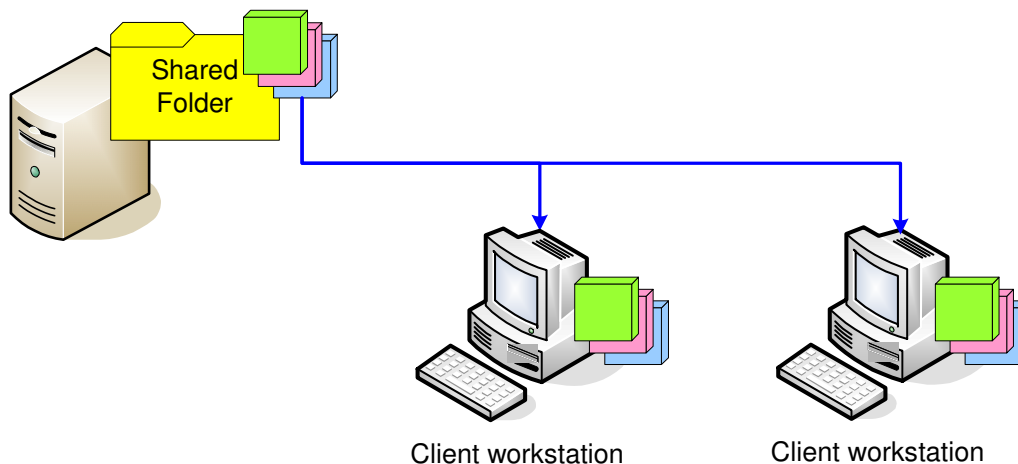
APM technicians implement the APM database structure, using a proprietary tool (named "MonaLisa") created by APM Technologies SA. APM Technologies SA do not use SQL scripts to implement or maintain the APM database. APM technicians also prepare the APM database by filling some dictionary tables (airports, countries, time zones ...). The executable files of APM applications are copied on to a shared folder on the company's network. This shared folder

APM provide a setup program to install APM applications and a database software layer (Borland dbExpress) on client workstations.

5.2. System Upgrade Principles

APM technicians, using the "MonaLisa" tool, upgrade the database structure. No SQL script is used for this update.

The new executable files are copied into a shared folder. When the APM applications are launched on the client workstations, the new executable file are automatically copied from the shared folder on to the workstation's hard drive.



6. Information needed to prepare your database

In order to prepare efficiently your database, APM requires you to provide answers to the following questions :

Question	Answer	APM remarks
Please download the APM XRP software, launch the software and contact APM		Before visiting any customer location to complete an installation APM wish to be sure that the XRP link is functioning
Do you have a Local Area Network (LAN)?		APM recommends a LAN and bandwidth might be minimum of 100 Mbits/s full duplex to work properly
What's kind and which version of Windows would you use to serve APM database?		APM recommends at least windows 2000 server with high speed mass storage (SCSI, SATA). A raid mirroring system might be help to prevent any loose of data.
Where is the location of that server?		Don't forget that link between server and workstations should be at least 100 Mbits/s to work properly.
What's your server configuration?		CPU(s), harddisk(s), harddisk controller, Memory, NIC. Please refer to specifications of your Database engine supplier.
What's your backup policy?		APM recommends to backup your database at least each day.
How many workstation do you plan to use?		Customer is responsible to buy, install pre-required software on workstations and server(s).
Which version of Windows do you plan to use for APM client applications?		APM needs at least Windows 2000 (Pro) with network access by using Microsoft Network Client. A Win domain isn't required.
What's your standard workstation configuration?		APM recommends at least 1 GHz modern CPU, RAM 512 MB, Harddisk 20 GB and LAN 100 Mbits/s full duplex

<p>Is hyperthreading technology in workstation CPU?</p>		<p>APM products don't work with hyperthreading technology and don't work with more than one CPU in your workstation. If you have Pentium 4 with HT (hyperthreading), please verify that you can disable HT on your bios settings.</p>
<p>What's screen resolution of workstation?</p>		<p>Screen resolution must be at least 1024x1280 with 16 bits colours (64K colours).</p>
<p>Do you plan to use any Office Suite?</p>		<p>Microsoft Office, StarOffice, ...</p>
<p>If you use an Office Suite, which version is installed?</p>		<p>In goal of using mail interaction with APM products, APM needs Microsoft Outlook 2000. APM does not configure your mail client!</p>
<p>Do you plan to use Citrix or Windows Terminal client as workstation?</p>		<p>APM doesn't recommend any remote desktop environment because performance will be degraded.</p>
<p>Is Windows registry accessible by APM user in workstation?</p>		<p>Read/write access to Windows registry is required to APM products: especially HKEY_CURRENT_USER</p>
<p>Are Common Desktop and Common Start Menu enabled in workstation?</p>		<p>APM client setup will install shortcut on Desktop and entries in Programs of Start Menu for all workstation users.</p>
<p>Do you have a DBA (Database Administrator) for Interbase 7.1 or Oracle 9i rel. 2?</p>		<p>Customer is responsible to install and manage database. APM isn't not responsible of backuping Customer database.</p>
<p>Do you have an Internet access point in your network?</p>		<p>APM needs access to your server. This access is required for maintenance and is using Internet. Remote maintenance will be initiated by customer.</p>
<p>What's your Internet connection bandwidth?</p>		<p>APM needs at least 128kbits/s allocated for remote maintenance.</p>
<p>Do you have firewall between your LAN and Internet?</p>		<p>APM needs TCP port 6600 open for outgoing connection (LAN to Internet) because we use SSH (Secure Shell) to encrypt and secure remote maintenance.</p>

<p>What is your security policy?</p>		
<p>Do you have any SITA connection, SITA software.</p>		<p>APM needs two folders: one for incoming SITA messages and one for outgoing SITA messages. SITA software must use these folders to read or write messages. These folders must be accessible by APM Telexdaemon application.</p>
<p>How many environment do you plan?</p>		<p>By example, Test environment and Live environment</p>
<p>Do you plan to interface APM with 3rd party softwares ?</p>		<p>For example, Jeppesen OpsControl, or a reservation system.</p>
	<p>Internally</p>	
<p>Who is in charge of IT?</p>		<p>Contact name, email address and phone number is very useful</p>
<p>Do you project to use Firebird 1.5 or Oracle database engine ?</p>		<p>Customer has to acquire a software license to use Oracle or Interbase software. Firebird is Open Source Software.</p>
<p>Do you provide Internet connection to APM staff during installation at your office?</p>		
	<p>Database preparation</p>	
<p>Please provide the following details to help APM to prepare your database...</p>		
<p>The full Company Name + address</p>		

Which IATA message types do you use for A/C messages ?		
Which IATA 3 letter code designator will you use		
The full details of your Company Fleet		
The IATA/ICAO type for each aircraft type		
The registration of each aircraft		
The Maximum Takeoff Weight of each aircraft and the unit used		
The Fuel Tank capacity of each aircraft type and the unit used		
The pax numbers for SCR requests for each aircraft type		
The range in Nautical Miles of each aircraft type		
The time in minutes for each aircraft type to reach the average top of climb		
The distance in nautical miles for each aircraft type to reach the average top of climb		

<p>The cruise TrueAir Speed of each aircraft</p>		
<p>The altitude for each aircraft type at cruise</p>		
<p>The time in minutes for each aircraft type to descend from the average top of climb to landing</p>		
<p>The distance in nautical miles for each aircraft type to descend from the average top of climb to landing</p>		
<p>The Fuel Burn per Hour in KG's fo each Aircraft Type</p>		
<p>The average turnaround time in minutes for each aircraft type when scheduling a flight</p>		
<p>The minimum turnaround time in minutes for each aircraft type when scheduling a flight in operations</p>		
<p>A Bit Map of your company logo</p>		
<p>The Crew compliment and roles for each aircraft type</p>		