Link Software
Making relations work

eLINK 2004
Validated Architecture

Prepared by: *Link Software*
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1. SERVER CONFIGURATION

Typical Infrastructures per number of Users

Introduction

Up to 50 users, eLINK can be installed on a single server housing the database, the Application Server and the Web Server.

Above 50 users it is recommended to have a separate database server with optimised disk access.

Above 200 users, the Web Server and Application Server can be run on as many different servers as is required for performance and redundancy requirements.

These numbers obviously depend upon the processing power and disk speed of the server. At the time of writing a standard 2 GHz Pentium server was considered.

Distributing the workload on two or more servers has the double advantage of better performance and a redundancy in case of failure of one of the servers.

	< 50 users	50 – 200 users	> 200 users
Web Server + Application Server	Pentium III 2GHz 512 MB RAM	Pentium III 2GHz 1 GB RAM	n x Pentium III 1 GB RAM
Database		Pentium III 1GHz	Pentium III 1GHz 1 GB RAM

Illustration			
Web Server + Application Server			
Database			

Software Requirements

Web Server

The eLINK Engine **eLink.dll** is installed on the Web Server. The eLINK Engine complies with the ISAPI standard for Web Server extensions. It is crucial that the Web Server caches the ISAPI extension module between successive requests.

eLINK has been extensively tested on the following Web Servers:

- Microsoft IIS 4.0, IIS 5.0 or IIS 6.0
- Apache 2.0.48
- Other web server that support ISAPI extensions: Sambar, OmniHTTP

Application Server

The COM+ Application Server must run on Windows NT, Windows 2000, Windows XP or Windows 2003.

Database

LINK is designed to work with several databases (Remote Database Management Systems - RDBMS): InterBase 6, Firebird 1.5, Microsoft SQL Server 7 or 2000, and Oracle 8i.

		Firebird 1.5	InterBase 6	MS SQL 7.0, 2000	Oracle 8.0.5
OS DataBase Server	Win 95/98	X	X	—	—
	Win NT	X	X	X	X
	Win 2000	X	X	X	X
	Win XP	X	X	X	X
	Win 2003	X	X	X	X
	Unix	X	X	—	X
	Linux	X	X	—	X

For installations with more than 20 users Interbase or Firebird are not recommended.

Laptops use eLINK Mobile

eLINK Mobile is the set-up for stand-alone installation on laptops running on Windows 95, 98 or ME.

Adapting the Hardware to the expected workload

CPU needs	The different tiers of eLINK do not consume the same amount of processing power. If the Application Server consumes 3, generally speaking the RDBMS will consume between 2 (Oracle) and 10 (Interbase) and the eLINK Engine on the web server will consume approximately 2. On a typical 2 GHz Pentium-based server, eLINK running Oracle will be able to generate approx. 300 pages / minutes.
Memory needs	The Application Server will run comfortably with 128 MB available to the LINK Server process. The eLINK Engine requires around 3Mb RAM per user on the Web Server. The database server can benefit hugely from large amounts of memory (see below).
Database Performance	Disk performance (> 10.000 rpm) and mirroring (RAID) are the key factors for a reliable and high-performance database installation. The performance difference between different RDBMS is very significant. If InterBase 6 performance is rated 1, Microsoft SQL Server 2000 will be at approximately 3 and Oracle 8i at 5. The Database Server benefits highly from fast hard disks, preferably in RAID configuration for improved reliability, and large amounts of memory (512 MB or 1 GB on Oracle or SQL Server database). InterBase and Firebird are unable to benefit from large amounts of memory, which explains their rather poor performance. For installations with more than 20 users, InterBase and Firebird are not recommended.

Continuous Operation and Security Issues

Continuous Operation

eLINK users rely on the server availability. One can implement a strategy that minimizes the risk of a system failure, from an *ad hoc* low-cost solution like using two web servers and users having to switch IP address if a problem occurs, up to a solution like 'Web Server Director' (Radware – 40.000€) that implements an IP switching solution in case of web server failure.

Security and Proxy Caching

If eLINK is to be accessed from the Internet, outside the company, it is common practice to protect data from unauthorised access or use. Solutions like VPN (Virtual Private Network) and SSL (Safe Socket Layers) to secure and encrypt the data transfer on the Internet between the client and the server are readily available.

Important Note

Servers upstream of the Web Server should not ignore expiration information sent with the generated web pages.

eLINK generates dynamic web pages to display information contained in the database. The same request, posted one second later, may potentially give a different content. It is crucial that there is no caching of these dynamic generated web pages.

eLINK creates HTML pages with an "expires" date equal to its delivery date, coupled with a Max cache-Age=0 in the header of the page.

If any element in the system (i.e. the Browser, Proxy, Web server, etc.) does not properly respect these instructions, the user may get out-of-date data or irrational behaviour.

2. CLIENT CONFIGURATION

Software

Supported Browser	The following browsers have been extensively tested with eLINK: • **Internet Explorer 5.0, 5.5 and 6.0** • **Mozilla**
Security Settings	It is recommended to add the eLINK web server as a "Trusted Site" in the web browser. All ActiveX components are signed and certified by Link Software.
Laptops with eLINK Mobile	eLINK Mobile is a standard eLINK set-up with the following additional features: • Nomad Replication add-on for synchronising a child database with the central parent database. • replacement for the COM+ Application Server to allow it to run on Windows 95, 98 and ME.

Hardware

Recom-mended hardware	Any **PC** running Internet Explorer 5.0 and upward or Mozilla with proper LAN or Internet connection (>=56Kb). Any **MAC** running IE 5.5 and upward with proper LAN or Internet connection (>=56Kb). For details on the validation of eLINK with Mac, please see Appendix 6.
Laptops with eLINK Mobile	Laptop PIII > 500MHz, 256Mb RAM minimum.

3. INTEGRATION WITH OTHER APPLICATIONS

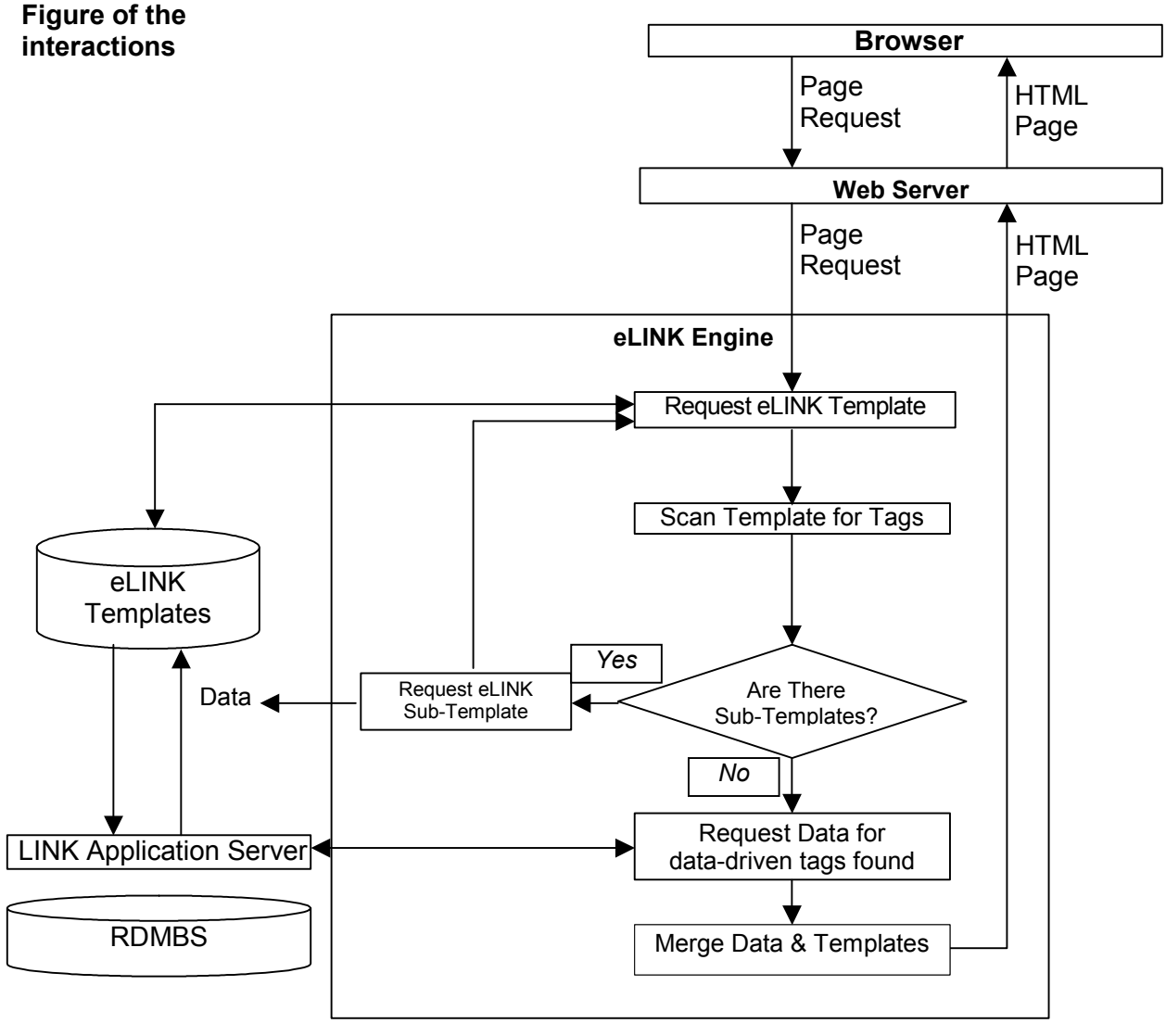
MS-Office	eLINK is interfaced with Office 97/2000/XP/2003.
MS-Outlook/ Exchange	eLINK is interfaced with • Outlook 2000 / XP / 2003 • Exchange 5.5 or 2000 The Exchange Synchroniser runs on an Windows NT or 2000. The Outlook Add-In object requires Outlook 2000, XP or 2003. For more information about these integrations, please refer to page 13.
Lotus Notes	The Lotus Notes mail integration requires Lotus Notes R5 or R6. The following versions have been validated: • Lotus Notes R5.0.11 (July 2002) • Lotus Notes R6.0.1 (February 2003)
Other mail systems	eLINK accesses all POP3/SMTP mail servers and namely • Notes mail server • Eudora • Netscape Mail Server
PDA's can be synchronised via Outlook	The Outlook Add-In features a full synchronisation of Contacts, Tasks and Appointments. Any PDA that can synchronise with Outlook can therefore be synchronised with eLINK.

4. APPENDICES

Appendix 1:

Basic dynamics between Web Server, eLINK Engine and LINK Application Server

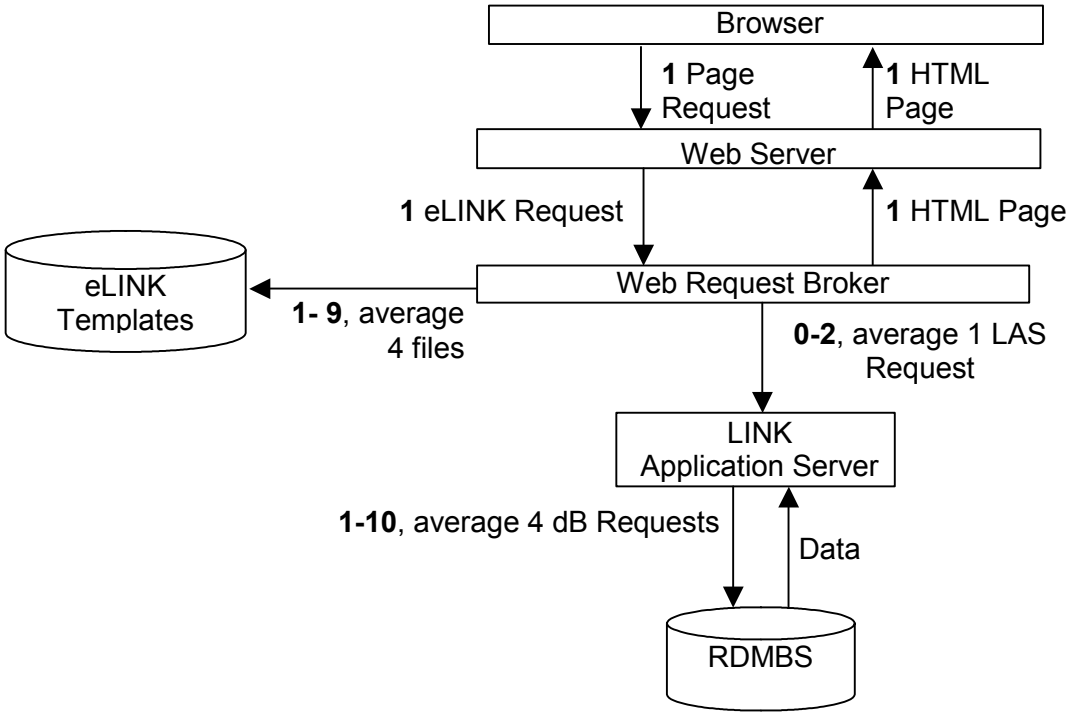
Figure of the interactions



Appendix 2:
Distribution of Tier requests

Figure illustrating tier requests

1 page request generates 1 eLINK request (average 1) that generates 1-9 Html file loading and processing & 0-2 Application Server Requests (average 1) that generates 1-10 dB Requests (average 4): the result is ONE page delivered to the user.



Appendix 3:
Scalability

Scalability Features

eLINK Application Server is a COM+ Server and implements

- Just-In-Time Activation
- Stateless Objects
- Resource pooling

It runs under COM+ (Windows 2000, XP or 2003) or MTS (Windows NT, Microsoft Transaction Server).

How does eLINK manage scalability?

The scalability of the eLINK architecture is ensured by the use of **proxies** at the level of the eLINK Application Servers. Proxies can be considered as “agents that represent users”. There are as many proxies as users.

When a user asks for a page, she/he types a URL and sends requests to the Application Server through the eLINK Web Request Broker & the Web Server. The proxies are then “activated”:

A Request Processor is created for the request. The Request Processor is composed with data, dataset, context and business object class.

eLINK Application Server returns the generated information to the eLINK Web Request Broker and destroys/ recycles the Request Processor. The eLINK Web Request Broker builds the HTML pages and passes them on to the Web Server.

The Request Processors are created on demand and queued (Resource pooling).

The average lifetime of a Request Processor is about 50 ms. During inactivity or overcapacity period of time, request processors can be prepared and cached by the eLINK Application Server to optimise processing time (Life-Cycle Management)

The “on-demand” method allows to optimise the Application Server configuration and to divide the total number of users by an average ratio of 40.

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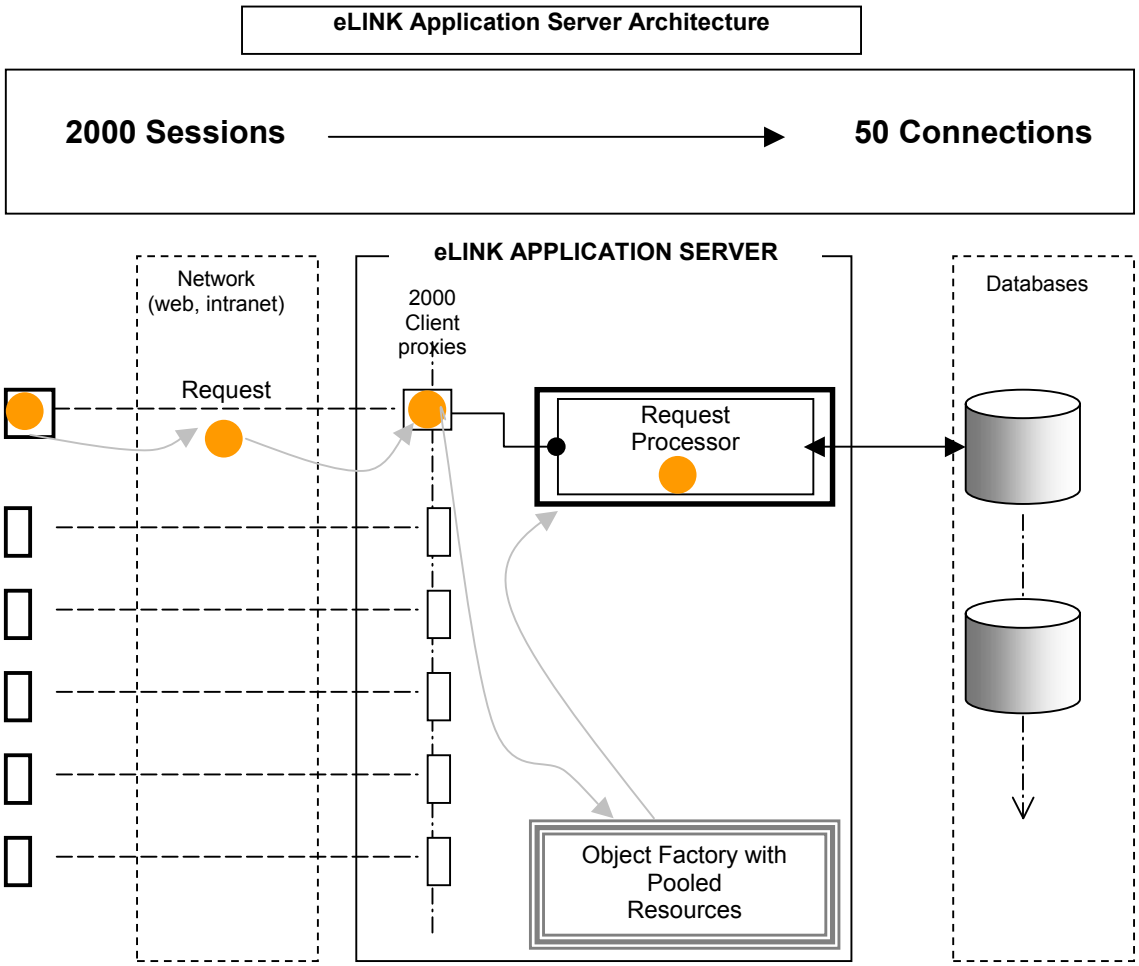
Scalability, *Continued*

Scalability Figure



Appendix 4:
Outlook/ Exchange integration: technical overview

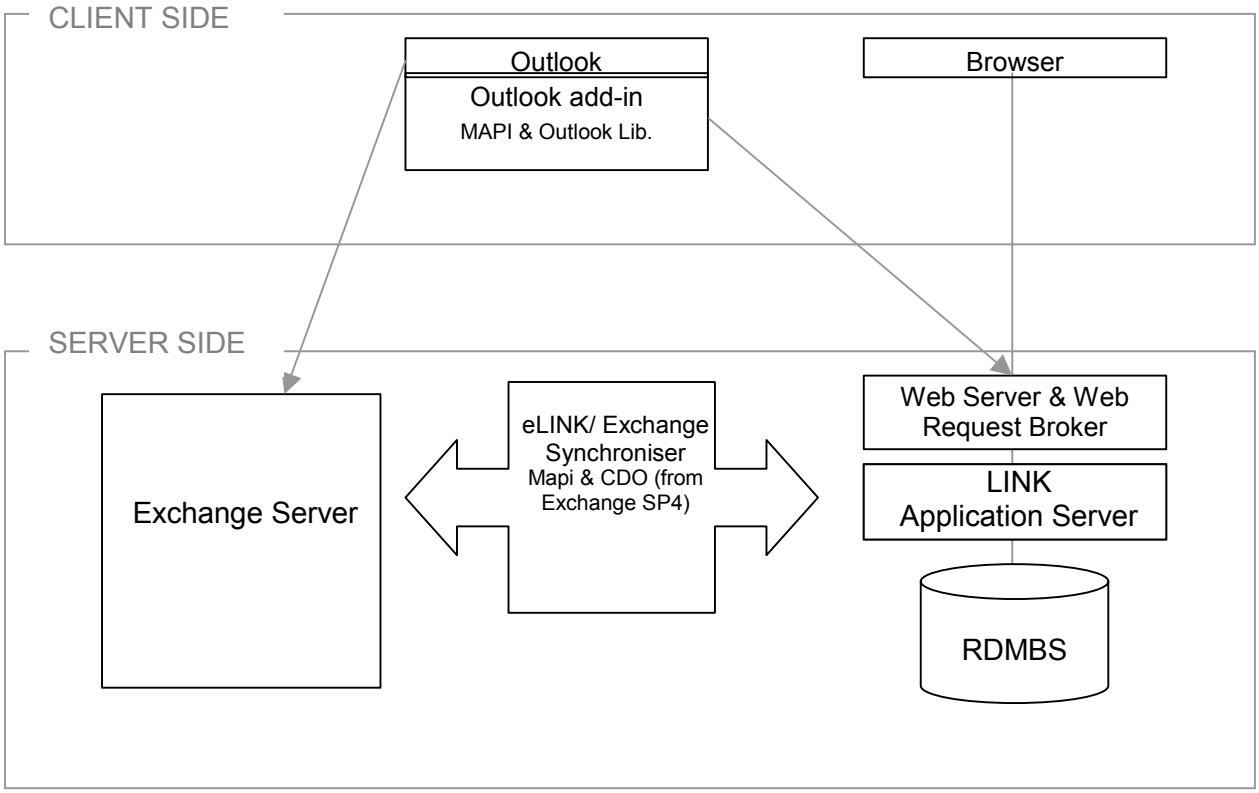
eLINK for Outlook/ Exchange

eLINK is delivered with an Outlook Add-in (client side) and an Exchange Synchroniser.[1]

The Outlook Add-in can be used in Outlook function with or without an Exchange Server. The Outlook Add-In features a full synchronisation of Outlook Contacts, Tasks and Appointments with corresponding eLINK elements.

Agenda replication and system notifications are handled by the Exchange Synchroniser.
System notifications can also be sent using any SMTP Mail Server.

Figure of the integration



[1] At setup, you can choose to install the elements for the Outlook integration and/or Exchange Synchronisation on top of eLINK standard.

Appendix 5:
Validation of eLINK on Mac

Configuration

eLINK has been tested on an iMac with the following configuration.

Machine: **iMac**
OS: **OS X**
Web Browser: **MS Internet Explorer 5.1 for Mac**
Language: **English**

ActiveX Features are not available

All eLINK features that are not managed by an ActiveX are fully available.

Features related to ActiveX:

- There is no Outlook integration
- The POP3 mailbox is fully operational.
- Queries: the user can execute queries and print the answer tables. Not available: export the results to a file; create new queries.
- Documents: the user can upload files into eLINK Documents (though not as smoothly as in the Windows environment). Not available: launch and creation of Templates.
- Document Templates: not available.