



## **CallDesk – A Thin-client Agent Desktop**

**Marketing White-paper**

Version 1.0

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## List of Acronyms

AJAX	– Asynchronous Javascript and XML
ASM	– Active Switch Matrix
CTI	– Computer Telephony Integration
CRM	– Customer Relationship Management
GUI	– Graphical User Interface
ROI	– Return on Investment
UI	– User Interface
WYSIWYG	– What You See Is What You Get

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## A. Introduction

This white paper provides detailed information about CallDesk – a thinclient Web based Agent Desktop, which can be integrated with any enterprise contact center CRM system currently being used or planned for implementation.

### A.1 Overview

CallDesk, as already introduced, is a Web based software interface using which the call centre agent / operator can perform all the necessary call handling and management activities. Activities like receiving or making a call, putting a call on hold, call transfer, or in-call conference with supervisors and numerous other futuristic and extremely useful call handling facilities are integrated into the software.

CallDesk as an Agent Desktop is a highly in-demand software because call centre companies across the world are looking forward to a software that can provide certain critical features and benefits, which are discussed in detail in later sections.

CallDesk is implemented using a unique architecture known as “SERVER PUSH NO REFRESH”, to interact with the Genesys servers for all call handling functionalities. In the SERVER PUSH architecture for every asynchronous call event the server intimates the client about such event. This pro-active communication from the server reduces the client’s overhead to continuously poll the server for events.

On the other hand the “NO REFRESH” concept means that every time the state or data of the page or any component (buttons, edit controls) changes, the web server does not require to re-render the page on the client. Using the AJAX Framework it is possible to reflect the changes on the browser without re-loading it. This reduces processing time for the Web server.

The CallDesk technology is supported on all the browsers currently available.

CallDesk has certain unique aspects that make it a powerful tool –

- Has a well-defined and powerful Supervisory mode that can control any Agent remotely with activities like changing State of the Agent, logging out of Agent. The Supervisor can ‘barge’, ‘coach’ or ‘listen-in’ onto a specific call by a specific agent.
- Uses “SERVER PUSH” and AJAX to ensure reduced processing overhead on the web servers, thereby improving call handling speeds and performance efficiencies.
- Capable of asynchronous predictive dialing.
- Has powerful call recording feature.

## A.2 Objective

The objective of CallDesk is to provide an easy to use Web based UI for organizations that have a well-laid out and business-critical contact center or call center. This software provides an easy to learn and use interface for the end-users. The end-users do not require any prior training or knowledge about CTI solutions or computers for that matter. This software provides highly scalable, reliable, and powerful call handling facilities in collaboration with the Genesys servers.

## A.3 User modes in CallDesk

The clients who will use the Thin-client Agent Desktop are basically organizations who have a well-laid out and business-critical contact center / call center, and it is an absolutely necessary component of their CRM initiatives.

In terms of end-users of the Agent Desktop we can categorise them into – Agents and Supervisors.

**Agents** – They are the important and larger chunk of end users for the Desktop. They are basically the users who will be using the Desktop to initiate and handle varied in-bound or out-bound campaigns as designated.

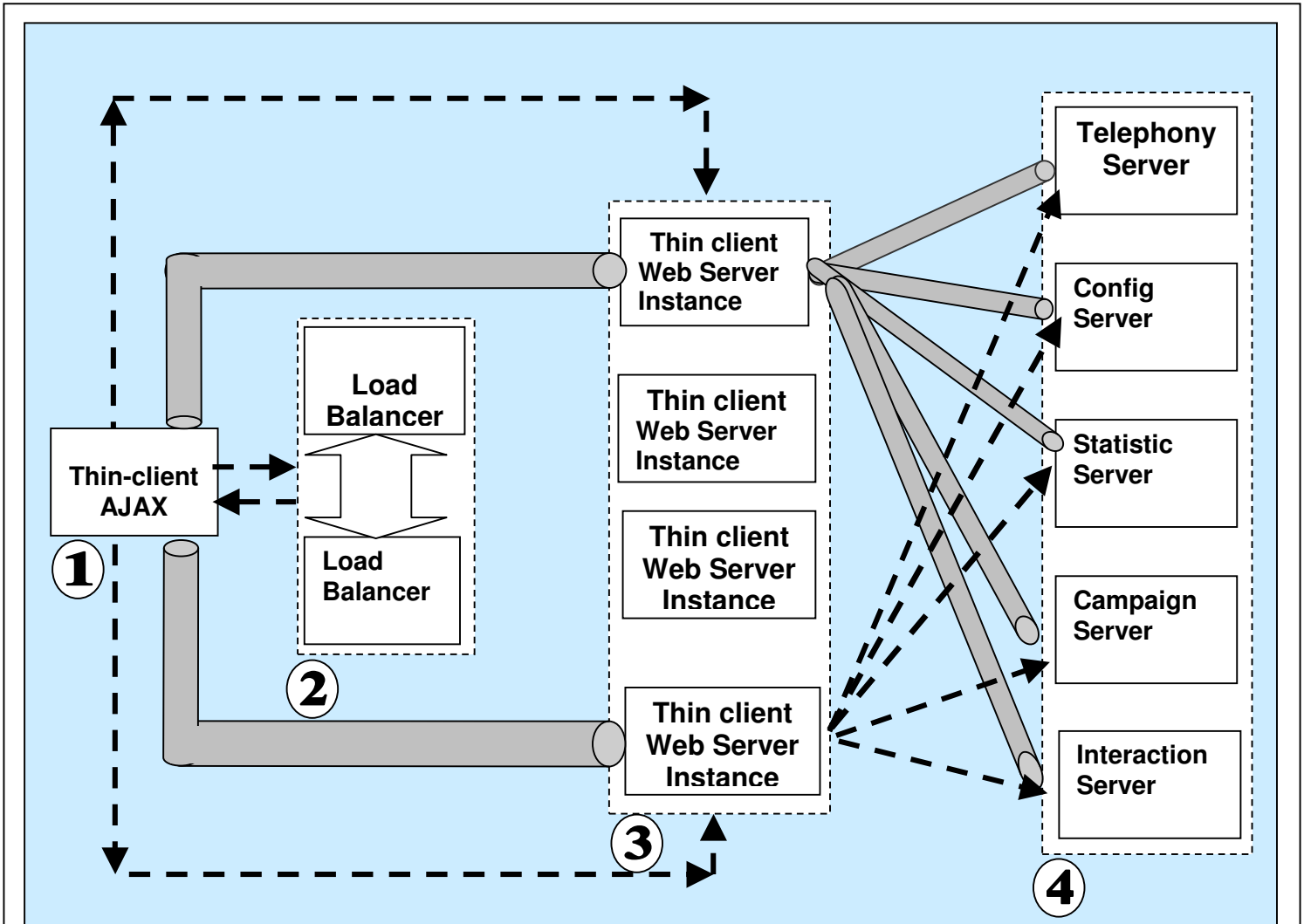
**Supervisors** – They are the group of users who have the functionality to monitor, coach, or listen-in to specific calls in progress by specific agents. These intrusions into on-going calls by the supervisor will obviously be unnoticeable by the customers being handled over the call. This is over and above the normal agent functionalities that are anyway part of the Supervisor.

## A.4 Current platforms –



The Agent Desktop has been developed in ASP and C#.NET hence only IIS can be used as a Web server, and Microsoft™ Windows™ Server product can must be used to deploy the Desktop.

The client part of the Desktop is developed using AJAX framework, which provides a “refresh-free” GUI and uses the end-user’s computing resources to render the web pages, thereby significantly reducing the overhead on the Web server. As already mentioned (Section A.1) the client part needs to be preferably browsed through Mozilla browsers.

**B. Architecture of CallDesk**



- 1** LAKSHYA Thin-client Agent Desktop (NO REFRESH) with AJAX Framework
- 2** Load Balancer Cluster
- 3** Thin – client Web Server Application / Interface Pool
- 4** CTI Service Provider Servers – Genesys, Asterisk, Aspect, Alcatel, etc

 Server-push (unsolicited events)  
 Request Path

**Architecture Diagram – Thin-client Agent Desktop**

## B.1 Architecture overview

The Thin-client Agent Desktop is based on the Server-Push architecture, wherein there can be two types of message transfer between CTI / Telephony servers and the Agent Desktop Client, namely – Synchronous and Asynchronous.

For the asynchronous or solicited message a permanent connection with the CTI servers are maintained, and the message is pushed to the agent web server by the CTI server. The Agent Desktop Web Server instance then pushes the message to the Agent Desktop client.

In the above-depicted diagram, the “Server-Push” flow is shown with the “pipe” moving from the CTI Servers (collectively numbered as 4) to the Agent Desktop Web Server instance (numbered as 3) and from the Web Server instance to the corresponding Agent Desktop thin-client (numbered as 1) also through Server Push.

Every application or instance of the web server will maintain “n” number of permanent connections for each Desktop Agent, where “n” stands for the number of CTI servers (Telephony, Stats, Campaign, etc) which have unsolicited message to be delivered to the client. As we are using the AJAX framework, which allows auto-refresh of the Agent Desktop page, the web server need not handle rendering of the web pages. It only handles Server messages.

At this juncture it is imperative to introduce the Load Balancer, which is also a Web server (numbered as 2 in the above diagram).

The number of simultaneous agent connections supported by IIS is 50. Any subsequent connections will be refused. To overcome this problem, an Agent Desktop Web Server application or instance pool has been created, where each instance can take care of multiple agents. The optimum number of simultaneous connections is 30 per Web server instance.

The fact that there can be multiple instances of the Agent Web Server running at a given point in time, means that it has to be decided which Web server will receive request from a given Agent (client) at that particular point. This decision is taken on the basis of the processing load on each Web server, and it is done by the Load Balancer (numbered as 2). The Load Balancer can also be implemented on a cluster.

### About Data flow –

In a typical situation where an agent is trying to login through the Agent Desktop, the data flow is as follows:

- Step 1: Agent keys in the login id, password and place
- Step 2: The AJAX framework does the field validation at the client side, encodes the URL, posts the data in the REQUEST and sends it to the Load Balancer web server. The Load Balancer, after determining the suitable Desktop Web Server depending on load, will pass the URL of the selected Web server to the Agent Desktop client.

- Step 3: The client upon receiving the URL of the Web server to which it has to connect, just changes the URL string in the request object and sends the post data to the redirected Web server.
- Step 4: The Web server upon receiving this request makes a connection to the Telephony server and creates a thread to receive the response from the telephony server. This receiver thread runs as long as the connection is open with the client. The Telephony server's response is "pushed" through the Agent Web Server to the Agent Desktop client. This thread is designated by the "pipes" in the diagram.

## Server Push Technology

It means that a server pushes content to the browser client. In reality, a browser doesn't allow this directly. However, it may be emulated in a number of ways.

- The client uses the 'multipart/x-mixed-replace' content type when sending a response. The content type is expected to send a series of documents one after the other, where each one will replace the previous one. The server might delay between each part, which gives the illusion that the data is being updated after an interval. This technique requires a connection to stay open. The Mozilla based supports MIME multipart, so Mozilla based desktop client will use server push.
- The client polls the server at a certain interval, say every five minutes. This technique is typically used to update news information. The client does this by reloading a page every so often. IE based desktop client will use a "client poll" but it will not necessarily reload the web pages as the desktop uses AJAX framework.

This architecture uses a push technology, which will use a permanent connection with the web client. It implies that the user keeps the connection open but does not necessarily exchange messages. But this is fine with the nature of the application where an agent is expected to be busy 100%.

## C. Features and Benefits

### C.1 Features of CallDesk

CallDesk enjoys its niche position in the domain of thin-client agent desktop software, whether Web-based or not, due to some salient features. The features are listed below –

- **In-bound & Out-bound Support –**  
Supports both In-bound as well as out-bound campaigns. In the in-bound mode the software provides highly desirable features like Call wait, transfer, hold, conference, Agent Ready / Not ready states, "buddies" (agents logged in). In the Outbound campaigns one of the important features that is supported is, the ASM mode Predictive Dialing.

- **Scalable –**

Allows multiple instances of the software on a single machine. Each such instance can handle 30 simultaneous agent connections. Hence, the number of simultaneous agents can be scaled up rapidly. This software supports 400 agents simultaneously on systems equipped with 1GB memory.

- **Fault Tolerance –**

Supports distributed and multi-threaded service. Multiple instances of the Desktop can be created across servers. In case of failure of any instance of the Agent Desktop, it will only put into distress those agents who are being serviced by that particular instance, which is not more than 30 agents in any case. Rest of the agents connected to the other instances of the Desktop can continue to work unaffected.

- **Resource Efficiency –**

CallDesk has a Load – Balancer component, which distributes client requests in accordance with the processing load that is being experienced by the individual web servers. This improves response times and promotes optimum usage of resources. The low memory footprint of the agent desktop ensures that even if there are a high number of agent connections active, it does not lead to any resource crunch.

- **Predictive Dialing –**

Supports predictive dialing, which maintains statistical details regarding the probable time that would be taken by an agent to complete a call. Depending on these call handling times, the calls are lined up for various agents.

- **Auto-rendering of pages –**

The GUI part of the desktop is developed in AJAX framework, hence page refresh is not required at the client end. Any state, data change or updation in the page is done without the Web server having to refresh the page.

- **CRM Integration –**

CallDesk is capable of integrating with any enterprise CRM system that is currently in place at the client site. It can retrieve or update data as and when required into the existing CRM application / databases, during any current in-bound or out-bound campaign.

- **Reporting –**

Supports builtin reporting options to produce critical performance, usage, or system reports, which can give an accurate feedback and information on the call handling and management activities of the contact center.

- **User modes –**

Supports dual usage mode. This can be used by the agent for call handling purposes as well as by the supervisor for call monitoring purposes, to ensure a better call handling.

- **“WYSIWYG” User friendliness –**

The GUI of CallDesk has been designed with care to support simple usage. All the functionalities in the form of controls or tools have been laid out in a logical manner on the Desktop. As the GUI is ‘drag & drop’ enabled, the users can customize the Desktop in accordance to their requirements. All controls are available on the desktop by default hence call handling becomes easy.

- **Compatible with any CTI server –**

CallDesk uses XML data transfer, hence it can integrate with any CTI server from the makes of Genesys, Alcatel, Aspect or even Asterisk. Incidentally this is the only Agent Desktop software that is compatible with the world’s #1 Open-source Telephony & PBX server – Asterisk.

## **C.2 Benefits –**

CallDesk is a product that drastically improves the productivity and efficiency of the contact / call center agents, supervisors, existing CRM solutions that have been deployed by different organizations.

The benefits that can be achieved with this agent desktop software are listed below –

- **Productivity –**

Due to its innovative, user-friendly, and highly integrated GUI, the software provides simultaneous access to all possible inputs, information and tools to the agent. Integration with existing CRM applications, ensure immediate availability of relevant customer information for the Agent, thereby drastically increasing “**1<sup>st</sup> call resolutions**” and customers having a better and more satisfactory experience. The easy customization and logical design of the UI enables faster navigation in the UI and improved speed of work.

- **Reliability –**

CallDesk has undergone rigorous acceptance tests and is currently in use with some of the most reputed organizations wherein this Agent Desktop is applied to critical call / contact operations. In case of instance failures, the entire call center operation need not be closed down as only the agents serviced by that instance will be affected.

- **ROI and economical –**

It ensures good return on investment for the company and provides an extremely economical solution to call centers when they plan to scale up operations and increase agent numbers. This is possible due to the low resource utilizations in terms of memory, CPU usage, and so on. Also, there will be minimal expenditure incurred on hardware scaling up.

- **Better customer handling –**

The Supervisor mode of the Desktop enables highly customer-oriented facilities like “Coaching” and “Barge-in” for the Supervisor to ensure smooth customer call handling by the agents. Thus the contact session with the customer provides relevant, accurate, and productive information to the person, thereby ensuring quality handling of customer calls and helps improve the customer relationship.

## D Hardware and Software requirements

CallDesk has certain specific hardware and software specifications which is required for the CallDesk to run optimally.

### D.1 Hardware specifications –

<b>Server Requirement (core features only)</b>	
Processor	Intel Core 2 Duo Processor @ 3.4 GHz
Memory	4GB
Storage	360 GB HDD
OS	Windows 2003 Server

<b>Client Requirement (core features only)</b>	
Processor	Intel Intel Pentium 4 (Core 2 Duo recommended)
Memory	512 MB RAM (1GB recommended)
Storage	40 GB HDD (if logging is enabled)
OS	Windows XP Professional (most compatible), works on Linux, Solaris or any flavor of Unix.
Display	Support for 1024 X 768 resolution minimum

<b>Network Bandwidth</b>	
Web server to Client	
At 1 <sup>st</sup> login of agent	750KB
Per call	20KB excluding voice
Voice	Depends on the codec used
From T Server to Web Server	
At 1 <sup>st</sup> login	3KB
Subsequent communication	3KB

### D.2 Software Specifications –

The software requirements for the CallDesk are tabulated below –

<b>For Server &amp; Client</b>	
OS	Windows 2003 Server
Web server	IIS v6.0
Browser	Compatible with all known browsers, preferably FireFox
Add-ons	Adobe or Macromedia Flash Player

## E. Market Analysis –

Agent desktop software used currently to support call or contact center operations are either thick-clients or thin-clients or simply available as ActiveX controls. The closest competitor to the CallDesk thin-client agent desktop has a capability of supporting only 30 simultaneous agents.

CallDesk supports ASM mode Predictive Dialing, which is one of the reasons behind the efficiency of the agent allocation operations of the Desktop. This is not available with any other agent desktop.

CallDesk, uses the “server push” architecture where the server proactively communicates any asynchronous call event to the client, as already mentioned. This also is a 1<sup>st</sup> in the domain of agent desktops.

The CallDesk desktop does not require the browser to refresh the page to reflect any change in state of any component of the page, thereby reducing client overhead. This again is unique to CallDesk only.

Being a distributed and multithreaded thinclient based Desktop, the obvious advantages of centralized control, administration and monitoring is possible, also the distributed nature means that crashing of a single instance of the Web server will not effect the entire operations.

## F Performance analysis

Current installations of the Thin-client Agent Desktop generates credible performance statistics, some of which are enumerated below.

**User support** – The Agent Desktop is currently supporting 400 agents at a single installation. This has been demonstrated on a Dual Core Laptop.

**Memory Utilisation** – Every application pool or instance of the Agent Desktop at initiation consumes 35MB of memory, which climbs upto 100MB. In the typical environment for supporting 400 agents, the memory requirements would be touching 2GB.

## G Future Prospects –

For future enhancement to the CallDesk, some of the focus areas that are being currently explored are as follows –

- Make the GUI of the Agent Desktop browser independent and more compatible to exploit the full features of the modern browsers.
- Port the software onto non-Windows platforms like Linux, Unix, or Solaris, which are in-demand platforms in this industry.
- To equip the Desktop with features like Call Parking. When the agent’s workstation suddenly crashes during an active call it will be “parked”. The

parked call with the last state of the Desktop can be “unparked” by the same agent in another machine or by the supervisor. A recorded message will be played till the agent is ready with another machine and logged in. During this period, the customer stays online and does not realize the disconnection. This feature will be extremely beneficial to call centers who plan to outsource their campaigns to agents who are working from home.

## H Reference Documents –

The CallDesk software user guides are available at the URL mentioned below. Feel free to refer and use them.

<http://122.161.0.215:3080/twiki/bin/view>

## I Contact Information –

For more information about the CallDesk Thin-client Agent Desktop, please contact us at the details mentioned below –

Technical queries –

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Your suggestions and customization requirements are most welcome, so that we can provide CallDesk suited exactly to your requirements. Please contact us at the following detail –

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**Appendix 1 – Complete feature outline of the CallDesk Agent Desktop**

This appendix will provide with a detailed outline of the features incorporated in the standard version of the CallDesk Agent Desktop. These features are all-encompassing for a typical agent desktop requirement.

Depending on specific requirements of the client, customizations can be implemented on the CallDesk Agent Desktop to exactly match the specifications.

**Table of Features**

Inbound	Outbound	Statistics	Recording	Supervisor
Hold/Retrieve a Call	Preview/Predictive/ Progressive campaign	TotalInbound Calls	On Demand Call Recording integrated with Genesys Stream Manager	Barge
2-Step Transfer	Add chain	TotalOutboundC alls		Coach
2-Step conference	Get chain	AgentLogintime		
Mute	Personal Call Back	TotalInteralCalls		
Ready/NotReady with reason code	Campaign Callback	AgentTalkTime		
Answer a Call	Call Result			
Reject a Call	Call disposition Code			
AttachData	Call Result			
Dial Pad (for manual dialing, Sending DTMF)	Update/Markdone Auto Preview			
ThirdParty CRM				
Send/Receive attach data				
Dial Manual call				
Buddy List ( Agents in a group, Chat between the agents)				
Autoanswer				