

## Case Study



### Urban Science Takes the Lead with Flexible and Scalable New High-performance Enterprise Lead Solution

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#### Abstract

Global retail consulting firm, Detroit-based Urban Science, has been helping automakers evaluate, streamline and revitalize their sales operations for three decades through superior analytics and marketing expertise.

With their customers' expanding presence in direct response marketing, Urban Science experienced increased demands that gave rise to the need for a new Lead Platform for its key delivery system – the Enterprise Lead Solution (ELS).

Toward this objective, Urban Science selected Microsoft's .NET Framework 3.0 as the platform and Infosys as its strategic development and implementation partner for the new ELS. Following a successful proof-of-concept, Infosys recommended that the new ELS be developed on the emerging Windows Workflow Foundation (WF).

A new ELS was architected, developed and implemented leveraging Infosys' proven processes and project management expertise. The new system exceeded the flexibility, scale and high performance targets desired by Urban Science to compete in the global market.

## Situation

With 400 employees across five continents serving almost every major global automobile manufacturer, Urban Science provides its clients actionable insights to help transform their sales channel performance.

One of their key delivery systems is the Enterprise Lead Solution (ELS), which does the following:

- Captures leads gathered from the Internet or other channels
- Scores leads based on “probability of sale”
- Assigns these leads differentiated treatments
- Distributes leads among appropriate sections of the organization for follow-up
- Reports on everything from the number of leads delivered, to the marketing steps taken, to close rate analysis.

ELS allows Urban Science to predict optimal resource allocation at the customer level itself, helping improve return on investment (ROI) on their marketing and sales activities.

Lately, Urban Science had seen automobile manufacturers becoming increasingly involved in direct-response marketing and making greater investments in lead management. This clearly pointed to the need for a new Lead Platform for ELS that offered increased flexibility, extensibility and performance to meet the increasing demands.

These business drivers led Urban Science to evaluate alternative platforms. It ultimately zeroed in on the emerging .NET Framework 3.0.

Although Urban Science was originally inclined toward BizTalk Server 2006, Infosys’ comparative analysis identified Microsoft’s new Windows Workflow Foundation (WF) as the best fit for the client’s business and technology environment.

Though WF had been rolled out only a few months ago, Infosys had already evaluated its performance. Recognizing that Urban Science needed this new technology to stay ahead of the game, it executed a pilot to provide the proof of the pudding.

## Proof of Concept

The earlier version of ELS processed leads from prospective vehicle buyers submitted through many sources, including websites, Business Reply Cards, events, lease renewals, etc. Details of the leads were aggregated into XML strings governed by the industry standard Auto Data Format (ADF).

These ADF XML strings were then posted on an Urban Science Web Service that sent them to the ELS for a sequence of steps, including ‘lead scoring’, to determine the ‘probability of sale’ for each prospect.

The tight binding of data in the earlier system, with steps coded one after the other, meant that code needed to be re-factored and re-deployed for new business requirements, customers or prospects. This sequential processing meant that the ELS was tightly bound to one manufacturer at a time and lacked the flexibility to quickly adapt to other customers.

By showcasing Workflow activities like ‘rules engine’ and ‘Web Services interaction’, Infosys’ POC demonstrated that, with WF, Urban Science could achieve the following in a cost-efficient manner:

- Higher scalability
- Flexibility to simultaneously deal with multiple prospects and vehicles
- Secure communication between providers and the client’s Web Service
- High system performance

## Solution

With Urban Science convinced about the efficacy of the ELS running on WF, Infosys proceeded with the detailed architecture. Ensuring total transparency, the client's team was closely involved at each stage of design and development.

Using capacity projection techniques, Infosys predicted the environment requirement for deployment through load testing. Detailed User Acceptance Testing (UAT) for various functionalities ensured that the solution was aligned with the client's vision.

The new ELS was designed to address various factors as shown in the table below:

Factor	Solution
Flexibility	WF based flexible design that allowed easy addition, deletion and re-arrangement of the order of activities
Reliability	MSMQ based queuing mechanism to ensure leads are not lost due to overload on web servers
Security	Authentication of providers to ensure secure communication
Performance and Scalability	IIS based WF hosting
Maintainability and Manageability	WF based solution is easy to maintain and modify due to rich set of designer tools that integrate with Visual Studio 2005

## Technologies

The solution was designed and built leveraging the following best-of-breed technologies:

- Windows Workflow Foundation/.NET Framework 3.0
- Microsoft .NET Framework 2.0
- Visual Studio 2005
- Web Services Enhancements 3.0 (WSE 3.0)
- Microsoft Message Queuing 3.0 (MSMQ 3.0)
- Internet Information Server (IIS 6.0)
- SQL Server 2005

## Key Solution Features

The new ELS architecture was demarcated on the basis of two vital processes of lead receiving and lead processing, carried out by the Lead Receiver and Lead Processor respectively:

The Lead Receiver comprises of:

- **Web Services Security:** Using the token username turnkey scenario provided by WSE 3.0 as the security mechanism, each lead processing request is also made over SSL for the site hosting the ELS web service.
- **Lead Queuing:** To prevent the loss of incoming leads, Infosys implemented two levels – lead and prospect queuing – in the new ELS.
- **Basic Lead Processing and Prospect Queuing:** Developed as a Windows service, this component picks up leads from the lead queue for basic checks like duplication, etc. It then splits each lead into multiple prospects, sending them to the prospect queue.

### *The Lead Processor has the following components:*

- **Workflow Implementation:** Implemented as custom workflow activities, each lead processing step performs specific business functions independent of all other activities. This independence is achieved through a ‘common data store’ using ‘data dictionaries’ that store key value pairs from incoming ADF leads. This feature provides the flexibility that was lacking in the old ELS.

Another key feature of the new ELS is its ability to handle process as well as system exceptions using an audit trail and the fault-handling mechanism of WF.

Further, encapsulation of all custom activities through WF-supported atomic transactions ensures that failure at any point would roll back the lead in question to the database for clean-up.

The WF mechanism provides the interface between the workflow and the Workflow host (a mechanism that initiates the workflow) to manage ‘external events’ such as incoming leads that need to be processed.

- **Workflow Hosting:** In the new ELS, each time a message arrives in the prospect queue, the workflow host initiates a new lead qualification workflow.

The Infosys solution provided three hosting options for the workflow:

- i. Purely IIS-based
- ii. Purely Windows-based
- iii. Hybrid – invoking a Web Service-based host using the Windows Service

- **Configuration Files:** The configuration file settings were designed to provide flexibility in governing activities based on complex scenarios. The POC showcased key activities such as ‘rules engine’ and ‘Web Service interaction’.

## Benefits

The development team leveraged Infosys’ proven project management processes and expertise in Microsoft technologies to deliver the ELS with all the required features as per agreed timelines. It kept key Urban Science stakeholders apprised of the project status at each stage during execution. The new WF-based ELS delivered the following key benefits to the client:

- **Greater Flexibility:** WF for lead processing allows developers to change workflows quickly at any point. New business activities can be created as custom activities in the activity library, making them available for new workflows. The dynamic update capabilities of workflow enable runtime modification of executing workflows. In addition, the centralized data store, comprising data dictionaries, has made all activities independent of each other. Together, these features provide the flexibility needed by Urban Science to respond faster to dynamic business scenarios.  
This flexibility has enabled Urban Science to quickly add new customers – even those with different business processes – and make changes to the workflow for existing customers.  
Urban Science Global Practice Director Mark Yuhn says, “There is a marked increase in customer satisfaction, as the ELS now processes more leads. This makes our data more accurate and reliable. We would like to commend Infosys for its efforts, as this feature has surpassed our expectations.”
- **High Performance:** The Infosys solution exceeded the client’s performance metric expectation of 100 ADF leads processed per minute by 90 per cent. The new ELS is capable of processing 190 leads per minute. This was achieved using the default scheduler of WF, enabling all the workflow instances to run asynchronously.
- **High Availability and Scalability:** ‘Load balanced’ architecture and the ‘queuing infrastructure’ enabled by WF ensure high availability and scalability. The ‘audit trailing’ mechanism for tracking and intimation on lead failure helps enhance availability by lining up all failed leads in the lead failover queue. This ensures that no leads are lost. This mechanism also sends out mails to system administrators for timely action on workflow issues.  
“The auto generated mail system from ELS has made our work easier. Employees now refer to these mails to keep track of workflow issues,” says Urban Science Global Director of Technology Mike Boumansour.
- **Ease of Maintenance:** Activity and workflow libraries reduce the maintenance required for changing an existing activity or workflow. External configuration files simplify workflow changes and make them independent of other activities. Re-using existing activities makes creating new workflows and changes in existing workflows easier and quicker. According to Boumansour, “The workflow technology allows us to develop customer specific processes without the burden of significant ongoing maintenance costs.”



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#### About Infosys

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