

ProExtra 2.0 – Improving Health in a Constrained World

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Abstract

The health industry is constantly faced with growing demands for health care services. Unfortunately, the supply of funds is not always available to meet those demands. ProCare Health Limited manages a suite of episodic clinical programmes for High-Needs patients using an electronic solution called ProExtra. The suite offers over a dozen services including Beta-Blocker Initiation, ECHO, ECG and Spirometry. The limited funding for ProExtra services is pooled at the PHO level and shared across all practices and services. The release of ProExtra 2.0 marked a significant step as it was enhanced for general practitioners to manage the utilisation of their budget in the most effective manner. ProExtra 2.0 provides visual representations of the budget and intelligently informs the funding status and availability of services. Service allocation decisions are made at the level closest to patients, potentially improving the value of services and health outcomes. As a web-based solution, ProExtra 2.0 integrates seamlessly with the practice management system, delivering real-time content and advice to general practitioners. Naturally, ProExtra 2.0 acts as powerful demand management tool, enabling general practitioners to make informed decisions on the types of services to offer with regards to the total allocated budget at the practice.

1. Introduction

The health industry is constantly faced with growing demands for health care services. An aging population coupled with rising disease prevalence and costs are just some of the contributors straining the health system. While the budget for health care has continued to increase, it is limited and does not fully cover the needs of every patient. Government and non-government organisations in the sector are tasked to manage their budget in the most effective and efficient manner to improve the health of its population. ProCare Health introduced ProExtra 2.0, an electronic tool aimed at making a difference to the delivery of health services in a financially constraint world.

1.1. ProCare Health Limited

ProCare Health Limited is the largest Primary Health Organisation (PHO) in New Zealand. ProCare comprises of 3 PHOs, ProCare Network Auckland, ProCare Network North and ProCare Network Manukau. ProCare's jurisdiction spans across the greater Auckland area and has direct relationships with the region's 3 district health boards, Auckland District Health Board, Counties Manukau District Health Board and Waitemata District Health Board.

Based in Auckland, ProCare cares for over 660,000 patients who are associated with over 500 ProCare general practitioners and 400 nurses in over 170 general practices. ProCare has over 120 staff members located in 3 branches, situated in Grafton, Epsom and Manukau.

1.2. ProExtra

One of ProCare's core functions is to design and develop clinical programmes to improve the health of its population. In 2005, ProCare developed a suite of episodic clinical programmes for High-Needs patients. These programmes are managed centrally using an electronic solution called ProExtra. It was initially available to ProCare Network Manukau and it has been subsequently implemented in the other 2 PHOs, ProCare Network Auckland and ProCare Network North. The available services differ between the PHOs. Currently, in ProCare Network Manukau, there are over a dozen services in the suite including Beta-Blocker Initiation, Echocardiogram (ECHO), Electrocardiogram (ECG), Engage

Mental Health, Flinders Self Management, Medication Packaging, Pneumococcal Vaccination, Sexual Health for Under 22s, Spirometry and Vasectomy.

ProExtra services are mainly funded through a Ministry of Health funding stream called Services to Improve Access for High Needs Patients (SIA). The limited funding is shared across all practices for all services within a PHO. ProExtra services are delivered via vouchers issued by general practitioners. Depending on the type of service, the general practitioner may or may not be the service provider. In the case where the general practitioner is the service provider, a voucher claim is generated electronically from the practice management system and sent to ProCare for payment. In the case where an external provider delivers the service, the general practitioner prints the pre-approved voucher for the patient and the patient presents the voucher to an approved service provider in order to receive the prescribed service. Service providers are paid when they send the invoices with the associated vouchers to ProCare.

In order to deliver a ProExtra service, service providers are required to accept the terms and conditions of the service by establishing a service provision contract. A service provision contract is required for each service in ProExtra.

While there is limited funding for ProExtra services, ProCare does not restrict the provision of any service to eligible patients. ProCare will honour all ProExtra service claims based on trust and the judgement of the general practitioners. However, general practitioners are advised to be considerate in order for the programme to remain viable in the long term.

1.3. Enigma Publishing Limited

Enigma was commissioned to assist in the development of ProExtra. Enigma has been instrumental in the delivery of ProExtra 1.0 and 2.0.

Enigma is a leading provider of Knowledge Management and Decision Support systems for the health sector. Enigma's range of software solutions provide tools for health professionals to target, screen, and proactively manage and measure a range of chronic health conditions and other health issues across primary and secondary settings, in the workplace, and extending to community and personal use.

ProCare and Enigma have a long standing partnership dating back to 2001 when the CVD Risk Management platform 'PROMPT' was developed for primary care. Enigma are best known for PREDICT, their electronic clinical decision support platform. ProExtra 2.0 successfully leverages off the rules engine for business processes and workflow.

2. ProExtra 1.0

The first version of ProExtra was released in 2005 with a number of known limitations:

- General practitioners were unable to monitor their utilisation of the services in a timely manner. This led to suboptimal decision making when considering which services to offer based on their limited budget.
- General practitioners were advised about the limited funding but were not provided with specific budget information for the practice. This led to overspending in the programme, potentially disadvantaging patients requesting for services during the end of a funding period.
- General practitioners were not always aware of all the services or eligibility rules for each service. At times, the lack of knowledge prevented appropriate services from being offered during consults.
- All service providers including general practitioners established service provision contracts manually, resulting in a slower uptake of new services.
- ProCare was unable to proactively manage the demand for ProExtra services. As a result, reactive measures were taken to curb budget issues.

3. ProExtra 2.0 Solution

ProExtra 2.0 represents a significant improvement to the delivery of the programme. New concepts and features were introduced and the development framework behind ProExtra was overhauled to ease future needs.

3.1. Navigation

ProExtra 2.0 introduced the ProExtra LaunchPad (Figure 1) to enhance the navigation of the solution. It is the default page that allows general practitioners to easily view all the available services and to quickly select a service for a patient. The LaunchPad also shows the funding status for each service. Any service may be enabled or disabled on the LaunchPad depending on the programme rules as specified in the business rules engine. Upon selecting a service, the specific ProExtra Service page (Figure 2) will be displayed. A ProExtra voucher (Figure 3) can be generated from the ProExtra Service page.

ProExtra Services.*

Beta-Blocker Initiation	(\$45.00)	█
ECG	(\$45.00)	█
Echo-Cardiogram	(\$292.50)	█
Engage Mental Health Consult	(\$50.00)	█
Home Visit	(\$45.00)	█
IUCD insertion	(\$150.00)	█
Insulin Initiation	(\$150.00)	█
Medication Packaging	(\$60.00)	█
Medication Reviews	(\$438.75)	█
Pneumococcal Vaccination	(\$60.00)	█
Sexual Health (U22)	(\$35.00)	█
Spirometry	(\$60.00)	█
Vasectomy	(\$325.00)	█

Service Key

Exception: patient is ineligible for this service.	█
Patient may be eligible, but practice funds are too low.	█
Patient may be eligible and practice has required funds.	█

Funding Available
- ProCare Test Practice #1 -
September, 2008

Current Balance: \$1,843 (61%)
Days Left: 15 days (50%)
Total Monthly: \$3,000

* All amounts include GST

ProCARE

ProEXTRA Services

ProEXTRA

NZMC / NZNC number:

NHI:

PMS Patient ID:

Date of birth: dd/mm/yyyy

Age: Years

Gender:

Figure 1 - ProExtra LaunchPad

ProExtra Launchpad **Medication Packaging**

Patient Consent : Yes - No

Date of Service : 16/09/2008 dd/mm/yyyy

Reason for Request : 5 or more long term medication

Period of Supply : 3 Months

Patients Preferred Pharmacy Location : Manurewa

Provider's contract for this service is current.
[View Terms & Conditions](#) (Last Update on 26/03/2008)

I Accept Terms and Conditions Yes - No


REQUEST VOUCHER

Copyright © 2001-2008 ProCare Health Limited. All rights reserved.
[Logout](#)

Figure 2 - ProExtra Service Page

Important Information for the Pharmacist

This voucher entitles you to invoice ProCare Network Manukau for the cost of providing medication packaging to the bearer of this voucher. You must have signed a 'ProExtra' contract with ProCare Network Manukau before we will reimburse you.



MEDICATION PACKAGING

PLEASE COMPLETE AND ATTACH TO YOUR INVOICE

NHI: ABC1235
Purchase Order Number: **99495869**

Medication packaging provided for (please tick):
 <1mth 1mth 2mths 3mths


Was packaging in addition to the above provided? (please tick):
 yes no

Additional packaging provided for (please tick):
 <1mth 1mth 2mths 3mths

Please specify reason for additional packaging:

Mail or fax voucher and invoice to:

The ProExtra Administrator
ProCare Health Limited
PO Box 105 346
Auckland
Tel: 09 375 7815
Fax: 09 377 7826



Please go to one of the following pharmacies:

Name	Address	Telephone & FAX
Clendon Pharmacy Ltd	Clendon Town Centre Clendon Manurewa Auckland	Phone: 09 267 0143 Fax: 09 267 3368
HealthCare Pharmacy, Clendon	9-11 Robert Ross Place Clendon Manurewa Auckland	Phone: 09 269 3646 Fax: 09 269 3647
Hillpark Pharmacy Ltd	77 Grande Vue Rd Manurewa Auckland	Phone: 09 267 2590 Fax: 09 267 2590

Figure 3 – ProExtra Voucher

3.2. Virtual Budget Allocation

ProExtra 2.0 enables ProCare to calculate a budget for each practice based on an allocation method e.g. total number of enrolled High-Needs patients at a practice. The total budget is allocated on a quarterly basis and each practice is provided with a monthly budget. The virtual budget allows ProCare to proactively manage the programme's budget.

3.3. Real-time Budget Monitoring

ProExtra 2.0 uses traffic light control concepts to visually inform general practitioners about the status of their budget against a funding period. On the ProExtra LaunchPad (Figure 1), the *Current Balance* indicator shows the budget balance while the *Days Left* indicator shows the number of days left in the funding period in real-time, graphically and numerically. These graphic indicators are colour coded to signify certain states. For example, the colour of the *Current Balance* bar changes depending on the service utilisation rate. If the current utilisation rate exceeds the daily rate, the *Current Balance* indicator turns red. The LaunchPad also displays the cost of services and funding eligibility of services. Visual representations like histograms and traffic light colours are used to communicate budget and service statuses effectively and efficiently to general practitioners.

3.4. Streamlined Service Provision Contract Management

ProExtra 2.0 improved the management of service provision contracts by allowing service providers to sign service provision contracts electronically. The *Terms and Conditions* section as shown in Figure 2 allows the service provider to view, accept or decline the terms and conditions before providing a service. In the event that a service provision contract is updated, all the service providers will be prompted to accept the new contract when they next use the service.

3.5. Real-time Business Rules Validation

ProExtra 2.0 uses the PREDICT rules engine to govern if a service will be available or funded potentially based on any combination of patient demography, clinical criteria, previous service utilisation and available funding. These rules are developed to ensure maximum value is attained for targeted patients and also, to control the appropriate issuance of pre-approved vouchers. The rules in ProExtra 2.0 are managed using a user-configurable rules engine, capable of handling complex conditions. The web-based editorial tool allows programme rules to be managed and enforced immediately without requiring any technical resource. For example, the Engage mental health service is only funded when the Kessler10 assessment score (calculated in the ProExtra form) is greater than 14.

3.6. Real-time Access to External Systems or Data Sources

ProExtra 2.0 has the capability to access data that is external to the practice management system. The ability to use externally-provided information creates a significant opportunity in developing an "intelligent" solution. Supplementary information is accessed from various other sources to improve the value of the programme and to assist general practitioners in their decision-making process. As a web-based solution, ProExtra 2.0 has been architected to use web services technology. Web services supports interoperability between disparate systems over a network. For example, the PREDICT web forms currently call ProCare's web services in real time to get up-to-date information about a patient's High Needs status, a practice's budget, a list of available services and service providers.

3.7. Extensible Framework For New Services

ProCare continues to add new services to the ProExtra suite. The development framework has been enhanced to ease the development of future services. The PREDICT Form Builder module was enhanced to enable new ProExtra services to be added with minimal technical programming effort. This provides a web interface to design new web forms, supporting standard HTML form controls, including in-built field validation.

4. Outcomes of ProExtra 2.0

4.1. Significant Behavioural Change

In order to gauge the impact of ProExtra 2.0 on service utilisation, ProCare modelled the number of ProExtra vouchers raised against SIA budget for all practices in ProCare Network Manukau and compared the results of April 2008 and

April 2009. The data for April 2008 shows the two variables are 59% correlated while the data for April 2009 shows a 67% correlation between the two variables. Statistically, there was a significant change between the two months, with a p-value of 1.045e-06 ($p < 0.00001$) as illustrated in Figure 4.

4.2. Improved Budget Management

Since the launch of ProExtra 2.0, the state of the programme’s budget has improved from being in deficit to surplus, with spending reduced by \$30,000 a month, as illustrated in Figure 5. The improvement meant that all the services will remain viable as the alternative may result in the reduction of one or more services. In addition, this has been achieved without denying any payments of requested services.

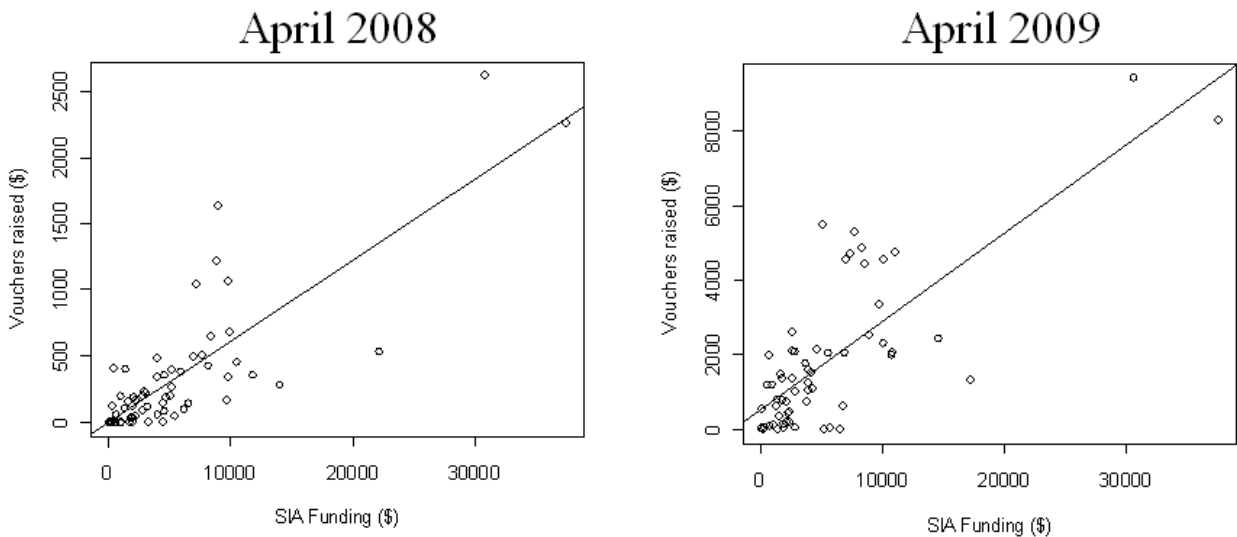


Figure 4 - Relationship Coefficient

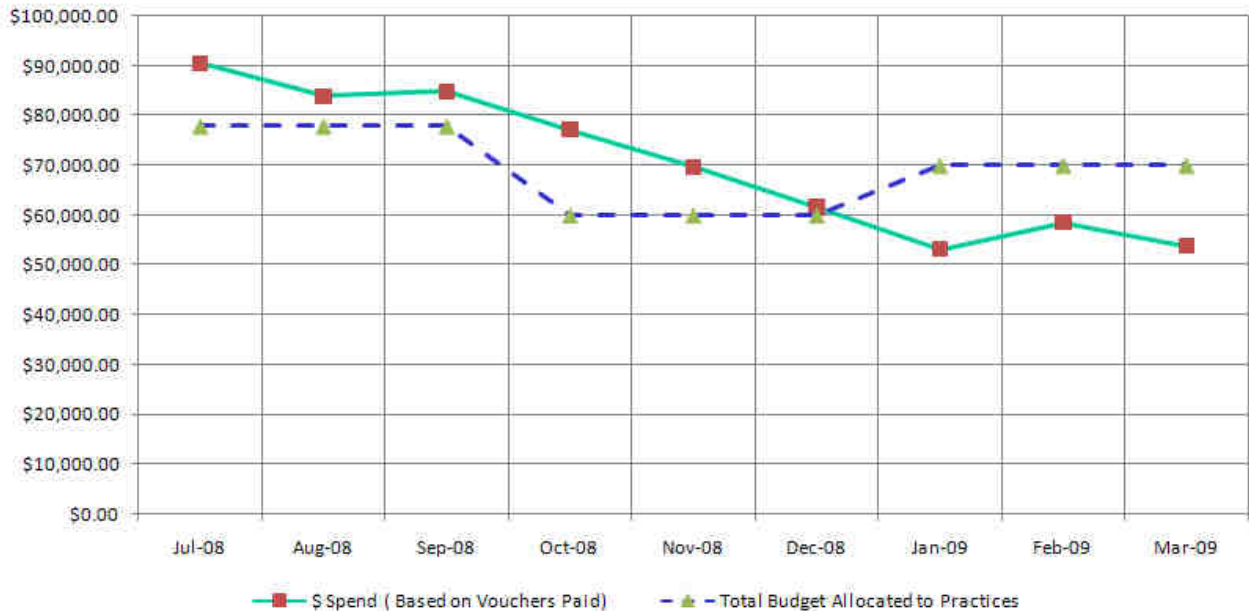


Figure 5 – Improved Budget Management

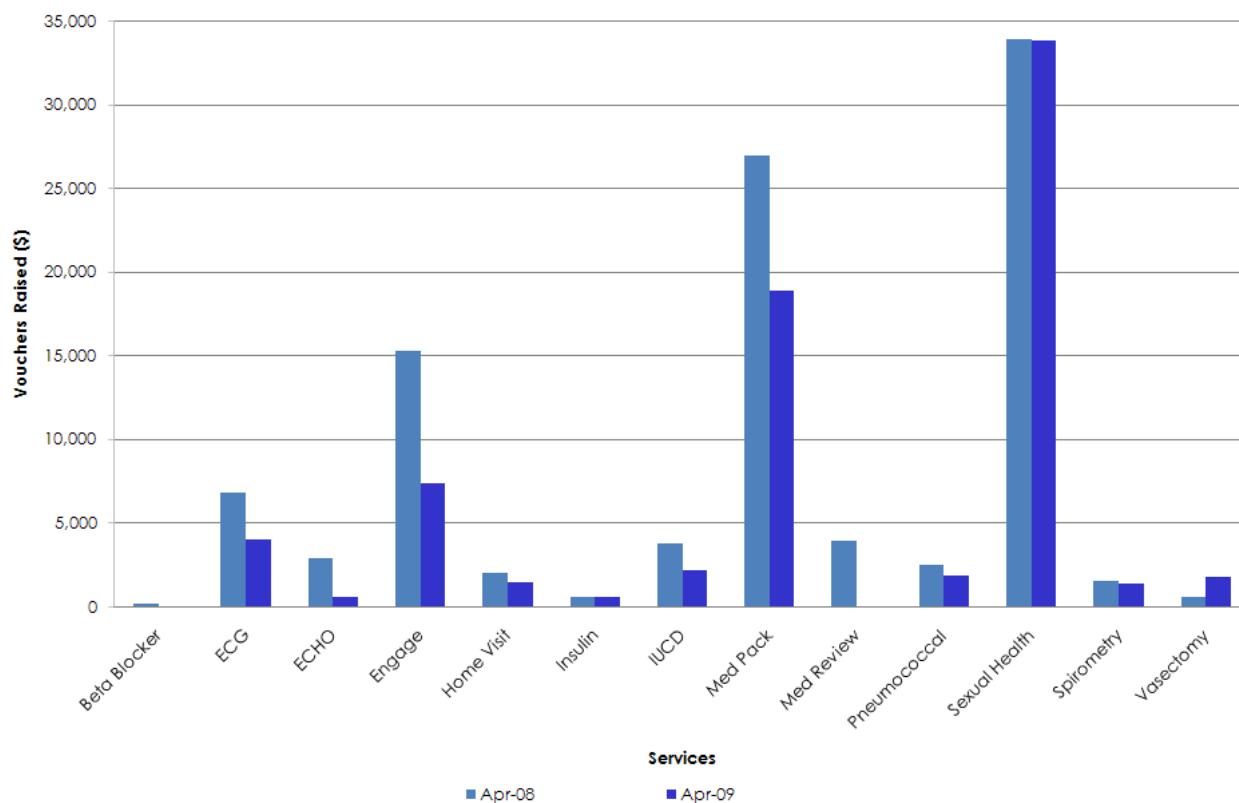


Figure 6 - Improved Targeting of Services

4.3. Improved Targeting of Services

With general practitioners fully informed about the state of their budget, there are early signs of changes in the way they choose to utilise the ProExtra services. General practitioners appear to be changing their decisions to target specific services that are presumably more critical based on the available funding, as illustrated in Figure 6. ProExtra provides excellent information from which general practitioners can discuss their use of the services in peer groups with a view to improving quality of care and optimising the use of these limited resources.

4.4. Improved Effectiveness of Service Allocation

ProExtra 2.0 allows service allocation decisions to be made by general practitioners who work at the level closest to the patients. This is a more effective way to allocate services compared to setting a target at a higher management level. Services are utilised based on clinical decisions, potentially improving the value of services and health outcomes.

5. ProExtra 2.0 Technical Solution

5.1. Solution Overview

The ProExtra 2.0 solution encompasses 3 systems, the practice management system, Enigma's PREDICT system and ProCare's ClaimsNET system as illustrated in Figure 7. The solution integrates with 3 practice management systems, MedTech32, MyPractice or NextGen. These are currently ProCare's preferred practice management systems.

The major components in ProExtra 2.0 include:

- ProExtra 2.0 Web Forms – ProExtra LaunchPad and specific ProExtra Service page.
- ProExtra 2.0 Forms Builder – Design and implement web forms for ProExtra services.
- ProExtra 2.0 Rules Engine – Implement business rules for service availability and funding eligibility.
- ProExtra 2.0 Web Services – Integration with external systems or data sources.

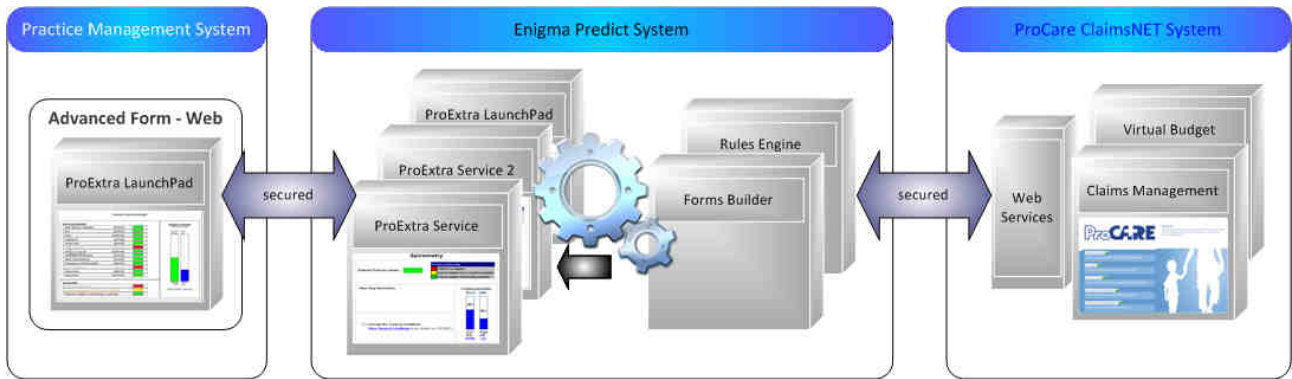


Figure 7 - ProExtra 2.0 Solution Overview

- ProExtra 2.0 Virtual Budget – Manages ProExtra budget allocation for each practice.
- ProExtra 2.0 Claims Management – Manages ProCare claims and voucher payments.

The front-end web forms are driven by the virtual budget, web services, forms builder and rules engine components. Claims management is a back-office component used for processing claims and vouchers for payment.

5.2. Technical Architecture

Technically, ProExtra 2.0 is an internet web application that is accessible from a desktop-based, practice management system. The web forms are displayed in the practice management system via a secured connection. The web application uses a local database and connects to external systems via web services. The solution operates in 3 network environments, the internet, the internal link between Enigma and ProCare, and HealthLink. The internet is used by the practice management system to connect to the PREDICT web solution. The Enigma and ProCare link is used to facilitate web services calls between PREDICT to ProCare while the HealthLink network is used for sending XML claims messages from the practice management system to ProCare.

5.3. Technologies

ProExtra 2.0 was developed using a combination of web technologies, Cold Fusion 8, JavaScript, AJAX, and Microsoft ASP.NET 2.0.

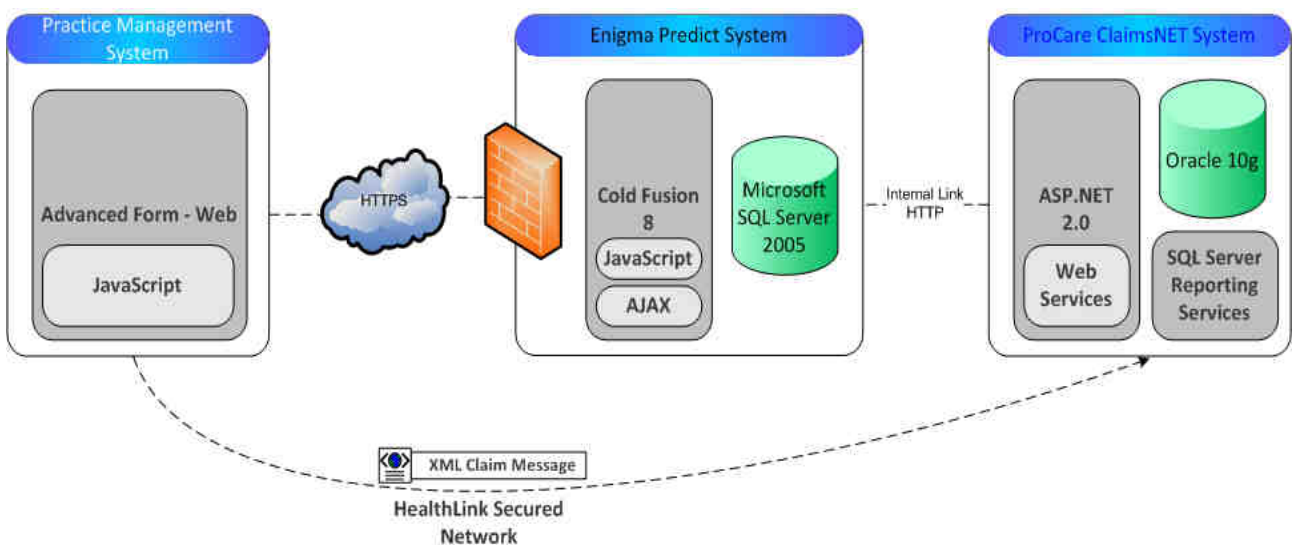


Figure 8 - ProExtra 2.0 Technical Architecture

The PREDICT system was developed using Cold Fusion 8, JavaScript and AJAX. Cold Fusion is a mature internet application development environment. AJAX or Asynchronous JavaScript and XML is used to enhance the user experience of web forms by not reloading the entire form when refreshing content. PREDICT uses Microsoft SQL Server 2005 as the database platform.

ClaimsNET is a web-based system developed using Microsoft ASP.NET 2.0 with C# as the programming language. The solution uses Oracle 10g as the database management system and SQL Server Reporting Services as the reporting tool.

5.4. Security

All ProExtra data are transmitted between the systems securely. The practice management system accesses PREDICT's web forms using the internet via standard HTTP protocol over Secure Sockets Layer (SSL). The HTTPS connection secures the data communication between the practice and the PREDICT system. It is the same method used by banks to secure their online operations. The connection between PREDICT and ClaimsNET is an internal link setup between the 2 organisations, ProCare and Enigma. For ProExtra services that are performed at the practice, XML claims message are sent from the practice management system to ProCare via the HealthLink secured network.

User authentication is required to access PREDICT web forms. The users are managed via PREDICT's security management module.

6. Future of ProExtra

ProExtra 2.0 has shown to be an effective tool in managing the demand for services in a limited funding model. ProCare envisage future versions of the tool to deliver better value for services and population health outcomes. The requirements for the next version of ProExtra, version 3.0 are currently being analysed. They may incorporate the following features:

- Support funding from multiple sources. While Services to Improve Access stream is currently the main funder, other sources e.g. non-government organisations or special interest groups may contribute to ProExtra's funding.
- Support budget allocation at the practice, service, general practitioner or even the individual patient level. ProExtra 3.0 may also support multiple allocation methods e.g. even distribution of funds or based on a particular percentage at an allocation level.
- Support patient co-payment for services in order to reduce the cost of the services to the practice. This will indirectly increase the number of patients who will benefit from the services.
- Services may be accessed from other online tools e.g. Continuous Care Online (CCO) or Patient Dashboard (PD). CCO and PD are ProCare's other online initiatives and it is envisaged that ProExtra services will be requested from those tools directly to provide an integrated approach to care.
- Support the use of new user interface technologies around user interaction and multimedia, e.g. Silverlight or more advanced AJAX-enabled interfaces.

7. Acknowledgments

The author would like to acknowledge Paul Roseman, Chris Wiltshire, Rabab Jaralla, Jackie Ferries, John Harry and Yvette Hodgson for their assistance in preparing the paper.