Nga Iwi o Ngapuhi Membership System: Relationship Management and Relational Design

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ABSTRACT

This paper reviews a capstone project undertaken by Auckland University of Technology (AUT) students to develop a tribal membership register for Te Runanga a Iwi o Ngapuhi. The initial scope of the project incorporated a database to record details of people, land, and their common history. As the project unfolded complex issues related to land, genealogical and historical relationships had to be addressed. The paper discusses the relationship between the clients and developers and the partnership model that was adopted. Research conducted to develop a suitable data model uncovered the GENTECH genealogical data model originated by genealogists in Texas. This model was adapted for this project to suit the unique needs of Maori. The paper describes the initial implementation of an online membership register and concludes with a critique of this model proposing further extensions to address the interactions between people, land and history.

Keywords
Maori Research, Ngapuhi, whakapapa, capstone projects, genealogical systems, data modelling

1. INTRODUCTION – BACKGROUND

1.1 Bachelor of Information Technology Projects

Within the structure of AUT's Bachelor of Information Technology degree, students undertake a capstone project, comprising approximately one third of their final year of study. This project has an integrative role in the degree, serving to consolidate the knowledge, skills and abilities previously acquired, and intended to afford a context in which to prepare students for entry into professional practice. Projects tend to fit within one of the three broad categories of: 1) Commercial software development project, 2) Commercial software research and development project, 3) Applied or theoretical research project. This paper reviews a capstone software development project, which had the aim of creating an online membership application system for Te Runanga a Iwi o Ngapuhi. This project shared characteristics of all three of the above categories of project, involving developing a system for a live client, evaluating alternative technology options, and researching approaches to modelling for genealogical systems, adapting these to suit the specific requirements of Maori.

1.2 Te Runanga a Iwi o Ngapuhi

Te Runanga a Iwi o Ngapuhi, the project client, is a statutory tribal authority which represents and manages the interests of Ngapuhi. Latest census figures (2001) indicate that there may be as many as 103,000 members of this iwi. The majority of these members live outside the tribal boundaries in Northland, and identifying and maintaining contact with members is a costly and difficult exercise. The current paper-based membership system has approximately 2000 members recorded, and the establishment of a more complete membership list is not a trivial task. As a very large and dispersed iwi, the Runanga has a pressing need to create a full membership register, enable members to participate in tribal decision making processes, help support Treaty of Waitangi settlements, and improve the long term management & reporting of tribal resources. The Runanga has developed its own website (http://www.ngapuhi.co.nz) as a means of communicating with its dispersed membership, including membership applications forms and a guestbook. Nevertheless, providing a fully dynamic, robustly architected website has been beyond the resources of the Runanga to date.

The impetus to develop a land information system augmenting the tribal register, originates from a desire of the tribal authority to better manage tribal land resources. In certain cases tribal land resources may determine democratic participation rights as well as being used as the basis for shareholding in the assets themselves. Under customary law, Maori land is inherited through family linkages and the most accurate information can be found by investigating the family relationships and background of land ownership candidates. Parcels of Maori land often have hundreds of owners for one block of Maori land, with each owning a proportion. Many of these owners live great distances from the tribal authority and existing land ownership records (e.g. addresses for contacting owners) are sometimes out of date or inaccurate. The processes of the Native land Court (now the Maori land Court) were often not concerned with achieving fair and accurate outcomes under Maori custom, focusing instead on individualizing titles as efficiently as possible. Therefore in some instances people came to own land via non-Maori processes. The three factors of land, genealogy and tribal membership are interconnected, and provided the original scope of the investigation. Integrating a genealogical system with a land-based system would allow the Runanga to more clearly and accurately address issues of management of land-based assets where communal permissions need to be sought, and informed consent desirable.

This paper discusses the management of the research project, highlights issues arising in the design and implementation of the membership register, reviews aspects of the data model required to enable genealogical extensions to the system, and critiques the model as initially designed.

2. DEVELOPING A PARTNERSHIP AND ASSOCIATED SENSITIVITIES

In research upon Maori by non-Maori or external groups the scope for cultural gaffes in the traditional western “researcher as expert’ model is considerable (Corbett, 2002). Undertaking research in a culturally appropriate way, which operates in a model of mutually respectful partnership, requires forethought and agreement about the process to be adopted. Bishop (1996) demonstrates collaborative research methodologies that accord with the beliefs and cultural values of the Maori people. For instance when researching whakapapa within the Maori community, researchers may be accepted into a social grouping with its own hierarchy and agenda, where the knowledge is socially owned and not able to be appropriated by the researcher without permission of the group. In this model the researcher is not even in control of the research plan or outcome (Bishop, 1996). For researchers in such alternative traditions as *kaupapa maori research* (Bishop, 1996 p. 63), the ethical questions are complex. The 'medico-ethical' model of informed consent is inadequate, since if the object of the research is empowerment, how can this be so if the researcher initiates the process, and retains power and control as the expert in the research process.

In order to clearly establish the grounds for partnership and build clear understandings at the outset, a memorandum of understanding was negotiated to set the parameters of the project between AUT’s School of IT and the Runanga. The on site client at AUT was a member of a hapu within the Ngapuhi iwi which greatly assisted access to the needed people and information in cultural terms, another function of Maori focus on kinship through genealogical lines. At an early stage of the project the team visited the Runanga at Kaikohe to meet “kanohi ki te kanohi” (face-to-face) to establish trust by meeting and eating together, and begin to develop a basis for mutual co-operation. A concern for the project supervisor was that this project met the technical definition of “research” at AUT, and it was therefore necessary to safeguard the interests of students as ‘research subjects’ involved in this undergraduate research project. The actual risks of the project were not immediately clear, but as Bishop has noted above, Maori people have known sensitivities about research related to whakapapa, which is considered a taonga particular to the whanau, hapu and iwi who have interests in this information.

Computerization of cultural information raises several concerns among Maori. For instance in relation to the internet, Smith (1997) had identified concerns relating to threats to cultural values, loss of control of information, intellectual and cultural property ownership issues, accuracy and authority of information, the commercialization of information, and access issues. The Department of Courts (1999) noted from their consultation process over the computerization of Maori Land Court records that Maori had objected “to the database being made available over the internet”, and believed “that management of the records (paper and electronic), the information therein, and access, has to be consistent with the following principles: the mana of the records/information comes from iwi, [and] whakapapa is intrinsically tapu”.

The potential of the final outcome of this project to support not only the production of a tribal membership register, but also the recording of whakapapa, and consequential land ownership rights, gave rise to natural

concerns about the design of the system, use of data provided in the course of the project, the responsibilities for management of the resulting information, and access to this sensitive data. An application was made to AUT's ethics committee, which duly approved the project. The accompanying memorandum of understanding had previously defined the scope of the project, the expected outcomes, the ownership rights, confidentiality of information, and publication rights related to the research. The discussions related to this ethics application and the formalising of the roles of the parties and parameters of the project were very helpful in designing a project, which met the goals of a mutually respectful research partnership, and safeguarded the rights of the students involved.

3. SCOPING THE PROJECT

In this project considerable work was required to disentangle the three system components – land, genealogy and membership. First the inter-linkages between the two aspects of genealogy and land information had to be researched to inform future design efforts. Once an understanding had been achieved, and an approach established, the project was able to be redefined into one that was smaller, more focussed on the membership requirements and able to be completed as a third year student project covering two semesters.

3.1 Genealogical Information System

The availability of genealogical information is essential for identifying current members of Ngapuhi and for preserving ancestral information for future generations. A genealogical subsystem therefore, had to be able to handle the very flexible relationships between people, which reflect Maori whakapapa, and it was desirable that such a system be able to share data with the land and membership subsystems. The challenges in building a genealogical subsystem included: building a system that allows for genealogical research to be carried out and information to be stored; building a generic system which can be expanded on and the information captured used by future increments; and making this information available to the public using appropriate levels of security. For example, to define the level of availability and data exchange between the three system components – land, genealogy and membership.

3.2 Land Information System

Maori Land represents one of several forms of land ownership in New Zealand. For instances there are forms of title such as <it Crown /it> for land owned by the Crown, and <it General /it> for privately owned land whether owned by European or Maori. <it Maori /it> land is usually collectively owned and derives from original customary titles set last century. Some of the most important issues to consider when determining the functionality of a land information system include the fact that land ownership cannot be determined from one individual source as the General land register does not manage Maori land. Searching for information about Maori Land can require access to a number of databases, agencies, internet sites and other resource material held by various institutions. In most cases information is kept in different formats by various organisations. The process of determining this ownership requires various types of supporting information used to narrow down the search. Also, sources of information such as land ownership records, family relationship records and oral history, are sometimes missing or incomplete.

Various sources were consulted during the research phase of the project, including Land Information NZ, the Maori Land Court, Te Puni Kokiri (the Ministry of Maori Development), libraries, the Internet, historical court minute books, various existing systems and discussions of the requirements with experts working in this area. The three main sources of information were the Maori Land Court, Te Puni Kokiri and Land Information New Zealand (LINZ). While LINZ holds the majority of land information for New Zealand, it only holds a small number of records related to Maori land, which are available online for a subscription fee.

The Maori Land Court holds most of the information on Maori land and has the sole legal jurisdiction to authorise various dealings with that land. The Maori Land Court's principal function is to oversee the ownership, management and retention of Maori Land under the Te Turi Whenua Maori Act 1993. The information of the Court is the most accurate and complete available at present. Records of all current Maori landowners and Maori land are available from the Maori Land Information System at the Maori Land Court. They are often the only records of land ownership. These records are however held by the registry within which the land is located. The disadvantage of the Maori Land Information System is that it is not available online which makes the access to information difficult and location dependant.

Te Puni Kokiri does provide a snapshot of Maori land ownership as at August 2000 and this information can be accessed through the Maori Land Information Base. It is used to locate the individual Maori Land blocks on a computer-generated map which can then be overlaid on a digital cadastral database. The information is available online and includes the size of each land block, an estimation of the current number of owners (excluding information on individual owners), topographical information such as roads or rivers and other relevant information such as land management type (eg. incorporation or trust), financial status of the land (eg mortgage or leased), type of ownership and general survey details.

3.3 The tribal membership system.

Developing the business requirements showed that the immediate need for the Runanga was the establishment of an up-to-date membership system verifying that people are indeed members of the iwi. This need is driven by current political and governance issues, including potential disbursement of funds to tribal management bodies on behalf of members. Ngapuhi are scattered throughout the country, and indeed the world, and the majority of iwi members do not live within their tribal area in Northland.

3.4 Implications for the Project

It became apparent that the Runanga wished to facilitate memberships from Ngapuhi dispersed world-wide. This requirement dictated the data model chosen for the membership system, and also that the membership system would be web-based. Updating online land information using existing land information systems would be expensive and time-consuming. It became apparent that developing a full genealogical/land-based system was impossible in the time available (two semesters) to the students. Developing a land information system revolves around not merely providing the right technology, but the difficulty of the information gathering process and the accuracy and currency of the results garnered from the process. A decision was made to focus upon the membership system requirements, with the database designed to allow for future implementation of genealogical and land information system requirements.

4. DESIGN ISSUES

4.1 Genealogy

Genealogy is made up of three key elements: 1) The data used for genealogical research; 2) The process of genealogical research; 3) The conclusions made by considering the available data and the processes for obtaining that data.

The process of genealogical research requires balanced consideration of these elements and provision of a means for them to interact successfully. The genealogical researcher must first conduct the research, extracting the data required before applying the process of fitting this data into the existing structure. The challenge of modelling a genealogical data model is that it must allow for uncertain, time-based and incomplete data to be entered while still maintaining data integrity.

The characteristics of several off-the-shelf genealogical software products were studied in order to investigate possible solutions for a genealogical database system (IntellectualReserve., 1999-2002, Wetmore, et al., 1992, WhollyGenesSoftware., 2003). The resulting feasibility report considered possible integration with the rest of the system by evaluating the characteristics and functionality of the existing software and the requirements of the system to be implemented. Some of the advantages of using an off-the-shelf package included ease of maintenance and a lower cost than developing a custom made solution. However, these advantages had to be weighed against the inherent disadvantages of an off-the-shelf package, which included the inability to transfer data between the various subsystems, necessitating a complex and cumbersome manual process, no allowance for future expansion through incremental development and the existence of a lack of data integrity between the three subsystems.

4.2 Land

The essential information required to meet the needs of the Ngapuhi web system includes:

> The owner(s) name(s), the block name, the district in which it is situated, the owner(s) whakapapa, historic records of the land ownership – oral history records, Waitangi tribunal claims, Maori Land Court minute books, biographical sources etc.; Land ownership documents – titles, deeds etc.

The land system must implement the succession of land ownership, single and multiple owners, different types of land management (trusts, incorporations, individuals etc) and the creation of Maori reservations. The system to be implemented therefore requires an appropriate interface for each component and strict rules for data and information sharing between them to ensure the integrity and security of sensitive records.

4.3 Information structures

Every piece of information is important in genealogical research regardless of the correctness of the information at the time of examination due to the richness of tribal debate on matters of whakapapa. It is important to preserve even information that is believed to lack veracity along with currently available evidence, to allow for later re-investigation. Genealogical data is time-based, and the system must recognise this. The hierarchical and networked structures in different groups – family, hapu, tribe, etc. must be recognised. For Maori, several levels of this "family" relationship exist, as shown in figure 1 below, including parent-child, whanau (extended families), marae clusters within hapu (subtribes with their own territories) and hapu clusters within a larger tribe (iwi).

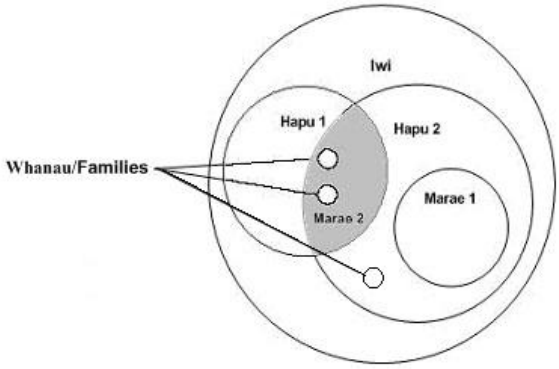

Figure One: Iwi Relationship Structures

4.4 Land Ownership and Verification

Multiple land ownership relationships need to be recognised and the system must also accommodate the various forms within the original blocks, e.g.. land blocks owned by a group of people, partitioned smaller pieces, and/or original blocks. The system needs to accommodate data management from external and internal information sources. External sources will include information entered from general public users which may include both potential members and members. Internal information sources are information from authorized genealogical researchers or system administrators. Both external information and internal information must go through an information verification process to identify the correctness of the information. Information relating to land ownership, genealogy, and membership is ultimately based on information about people, therefore the designated system must allow these three types of information to be interchanged readily to support cross-verification processes.

4.5 System Performance

System performance needs to be carefully tuned, as the Ngapuhi system is designated to be a web-based application. Web-based applications must provide quick response and data retrieval time to encourage users to continue using the application. With an estimated 103,000 members, and a genealogical database covering 30 generations of Ngapuhi settlement in New Zealand, the resulting database could comprise many gigabytes of data. Therefore, a sensible way to decrease response time may be through decentralising /normalising information.

5. GENTECH DATA MODEL

The Ngapuhi database model is based on the <it *GENTECH Genealogical Database model /it>* (Anderson. et al., 2000). This model was chosen as it comprehensively and fully describes not only the different types of data involved but also the relationships between them and the process of genealogical research. The

model supports both professional and novice researchers by allowing the novice user to enter data into the membership subsystem without supporting evidence. The model in genealogical terms consists of data representing <it *conclusions /it*> about persons or related data in the system, supported by interlinked data generating the supporting <it *evidence /it*> to substantiate those conclusions. This is one of the most important characteristics of the model as it provides the flexibility to easily integrate the membership system, which provides the conclusional data, with the genealogical subsystem that provides the evidential data through the use of assertions.

The <it *GENTECH* /it> model is based on the fact that all genealogical data can be broken down into a series of short, formal genealogical statements, addressing the abstract dimensions of genealogy such as person, time, grouping, claim or assertion and source of evidence. The four subject types are INDIVIDUAL, EVENT, CHARACTERISTIC, PLACE and GROUP. In addition, the SOURCE data type, represents the source of the data defined by a particular ASSERTION.

The most important advantages of using the <it *GENTECH* /it> model include the ability to add data entities without the need to change the rules for data retrieval, management or the steps of managing the genealogical process; multiple findings can be recorded for a given data item, including the researcher's conclusions; a direct connection can be made between tribal members, genealogical and land ownership records because they are stored in the same database. This provides flexibility in terms of simplifying, extending or modifying the data entities and steps of genealogical research as suggested by the <it *GENTECH* /it> model so they can be tailored to the specific needs of the Runanga. The model supports matching and merging of the different types of information in the database through the use of assertions, and reports can be generated based on the data collected.

5.1 Initial design (adapting <it *GENTECH* /it>)

Anderson et al., (2000) have proposed that "the heart of the <it *GENTECH* /it> data model is the Conclusional Submodel, specifically the critical role that the ASSERTION plays. ASSERTIONs can be created in two ways:

<bi> By converting a SOURCE fragment into an ASSERTION. Each ASSERTION created in this way derives from one and only one SOURCE fragment. /bi>

<bi> By making an ASSERTION based on one or more ASSERTIONS" /bi.

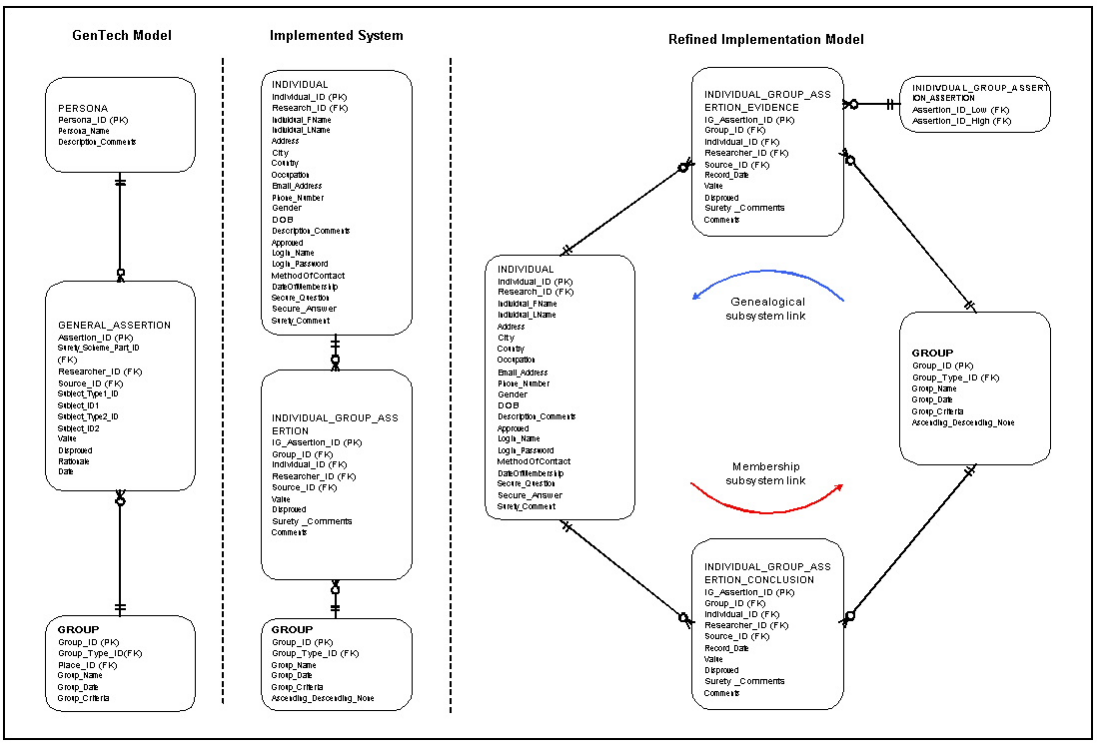

Figure Two: Assertions – Evidence and Conclusion Links

The purpose of the conclusional ASSERTION is to store the link between entities, used when retrieving or modifying data by the membership subsystem. The conclusional ASSERTION contains only the derived fact from a SOURCE or based on other ASSERTIONs (cf. figure 2 above). This reduces the size of the ASSERTION tables and improves the performance of the Membership subsystem.

After careful analysis of the c *GENTECH* /it> model for the purpose of building the Ngapuhi web system, two issues were identified:

<bi> The ASSERTION table would hold a very large number of records in a production system if all connections between INDIVIDUALs, EVENTs, GROUPs, and CHARACTERISTICs were stored in a single ASSERTION table . /bi>

<bi> For the purpose of building a land information system, a connection between the INDIVIDUALs and PLACEs needs to be established . /bi>

One of the disadvantages of implementing a system which incorporates land, genealogy and membership, is that the requirements of the land and genealogical system for storing every piece of information conflict with the requirements for speed and performance of the membership subsystem. Performance is a key factor for a live web system with thousands of online users. In the <it *GENTECH* /it> genealogical model, there is only one assertion table. The assertion between different entities in the Ngapuhi database model has been separated into the following, as they are the most common assertions to be used: Individual-characteristic-Assertion; Individual-Group-Assertion; Event-Individual-Assertion; Individual-Place-Assertion; Group- Characteristic-Assertion; General Assertion.

As a result of these conclusions the following modifications to the model were implemented:

Decentralisation of the different types of information held by the ASSERTION table into several different types of ASSERTION tables.

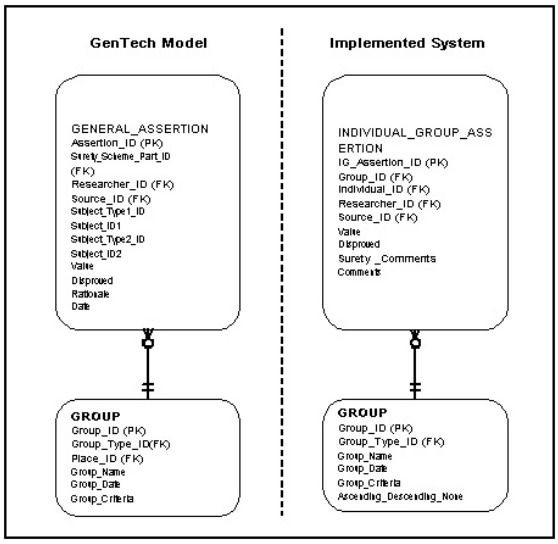

Figure Three: Individual-Group-Assertion

Implementation of an additional ASSERTION link between the INDIVIDUAL and PLACE entities.

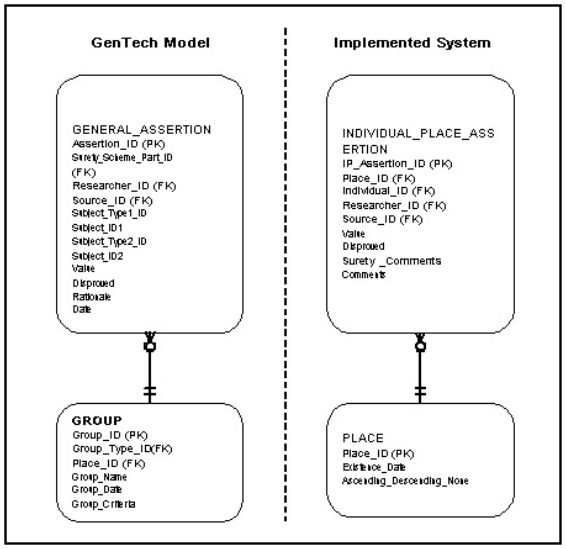

Figure Four: Individual-Place-Assertion

6. CRITIQUE AND FUTURE EXTENSIONS

6.1 Assertion Flexibility

The current Ngapuhi Web System provides an online membership registration, which is to collect potential member's personal, tribal and genealogical information. The database structure permits any extra personal information that is not defined when the database is constructed to be freely stored into the database at a later stage. For instance, if a member's eye colour is not one of the personal attributes to be gathered and stored in the database but later found to be an important piece of information, the Ngapuhi Web System database structure can easily store this piece of information by using the concept adopted from <it *GENTECH* /it> genealogical model, using the assertion. Any two entities can be freely related/connected by joining them together with an assertion. Any information that is not considered to be stored in the

database initial stage can be added by simply creating a new characteristic record (e.g. member's eye colour), and drawing an assertion between the new characteristic record and the particular member. For a person to have multiple names, each name is also created as a characteristic and then each name characteristic is relate to that person by connecting them together with an assertion. The same concept can be used when it comes to storing the land ownership information, i.e. a place record is created which then connects to the owner by joining the place and personal together with an assertion.

6.2 System Performance

The developed system has both tribal members and their genealogical information stored in one place. The consequence is that genealogical information, which takes a great amount of space in the database, would slow down data retrieval speed dramatically. It is recommended that membership and genealogical information and retrieval processes be separated. Refer to Figure 2 above.

6.3 System Audit Features

The current system does not have the ability to record important operations and backup information. For example, deletions of member's accounts are not logged. Also, when a member changes their name, the old name gets deleted in the current system. The functionality of storing the evidence data (cf. figure 2) for genealogical research is not implemented in the current system.

6.4 Representing Multiple Ownership of Land

In the developed system, records of land ownership information are recorded in the individual-place-assertion table. A group-place-assertion is not implemented and the system would therefore generate thousands of individual-place assertions to present multiple land ownership. A better presentation of multiple land ownership is to have assertions between a group of people and land blocks which is explained in details in section 6.5 Links between group & place.

6.5 Distinct Types of Group

In the system as developed, any relationship between an individual and a group is drawn by having the individual_user_group_assertion as the link between a particular individual and any related group. For instance, where Puna is a member of a hapu, the relationship can be drawn by creating an individual_user_group_assertion record that connects Puna as an individual with the hapu "group". During the implementation of the Ngapuhi web system, the development team realised the massive amount of user groups stored in the database would slow system performance considerably. The largest user group usage is by family groups. After investigating different approaches for improving system performance, a possible solution is to separate user_groups into administrative and relationship or inheritance groups (cf. figure 5 below). An administrative group might be an emailing list and an inheritance group might be a family or a tribal group. Having administrative and inheritance groups also creates a need to have separate assertions for each group. This approach would improve system performance because the number of records in group tables will be decreased and results can therefore be retrieved in a shorter time.

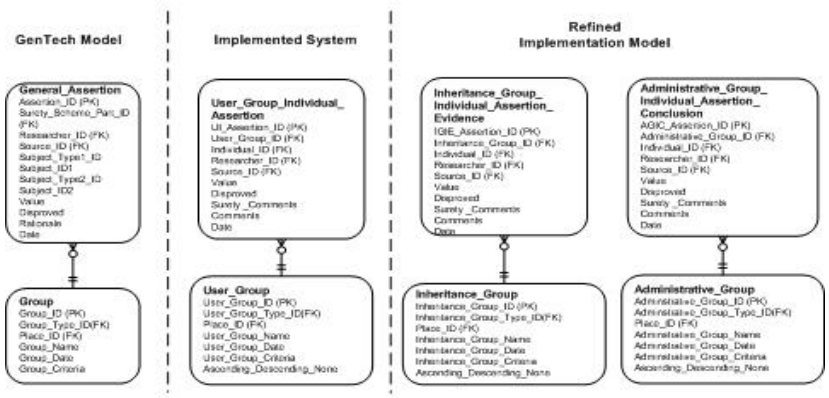

Figure Five: Modelling Group Structures

6.5 Links between group & place

A link between Inheritance Group and Place entities can be used to represent multiple ownership in blocks of Maori land. For instance, Mangakahia 2B2/2A1B1 land block has 46 known land owners. A place entity can be created to describe any piece of land block, in this case Mangakahia 2B2/2A1B1 land block. An inheritance group entity can also be created to hold the land owners of a particular parcel of land. These two entities can be connected through an inheritance-group-place-assertion to form the multiple land ownership relationship. As can be seen in Figure 6 below this represents an extension of the GENTECH model and the current implementation of the Ngapuhi system.

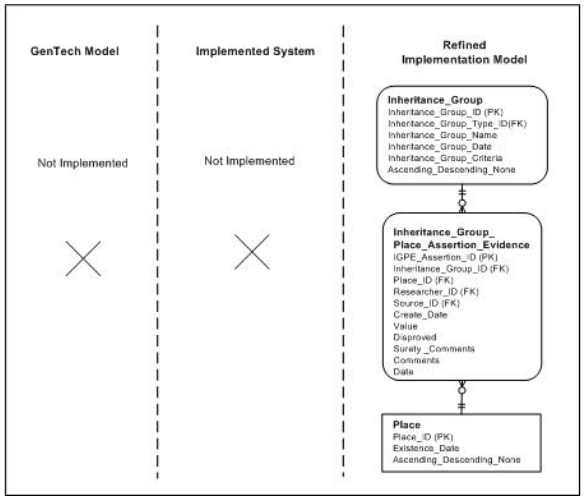

Figure Six: Modelling Multiple Land Ownership

7. CONCLUSION

This paper has reviewed a project to develop a tribal membership system for Te Runanga a Iwi o Ngapuhi. This has exposed students to the unique relationship issues of developing software with a Maori client. Challenges have been encountered in both comprehending the nature of human relationships and expressing these in a sound design. Modelling the relational data structures required to represent the dimensions of people, land and their history through whakapapa linkages, has proven complex, requiring considerable research into several systems, sources and international research projects. The data design based upon the GENTECH data model has evolved as requirements unique to Maori and performance considerations have been factored into the design. Many think of software development as a technical process, but in this project it proved to be more about people. “He tangata, he tangata, he tangata”.

8. ACKNOWLEDGEMENTS

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9. REFERENCES

Anderson, R., Barkley, P., Booth, R., Holsclaw, B., Velke, R., Wylie, J., et al. (Eds.). (2000). *GENTECH Genealogical Data Model* (1.1 ed.). Irving, Texas: GENTECH.

Bishop, R. (1996a). *Collaborative Research Stories, Whakawhanaunatanga*. Palmerston North: Dunmore Press.

Bishop, R. (1996b). He Whakawhanaungatanga - The Rediscovery of a Family. In R. Bishop (Ed.), *Collaborative research Stories Whakawhanaungatanga* (pp. 35 -71). Palmerston North: Dunmore Press.

Corbett, A. (2002, 26-27 September). *Non-Maori Undertaking Research on Maori.* Paper presented at the APNZ Research Forum Conference - Research that Works: Interacting to Innovate, Palmerston North.

Courts, D. o. (1999). *Maori Land Court Information Management Team Report - Access to and Archiving of Maori Land Court Records After Imaging*. Wellington: Maori Land Court.

IntellectualReserve. (1999-2002). *Personal Ancestral File*. Retrieved 12 March, 2003, from http://www.familysearch.org/eng/paf/pafonline.asp

Smith, A. (1997). *Fishing with New Nets; Maori Internet Information Resources and Implications of the Internet for Indigenous Peoples*. Retrieved 04/02/2003, 2002, from http://www.isoc.org/isco/whatis/conferences/inet/97/proceedings/E1/E1_1.htm

Wetmore, T., Hirschberg, D., & Roegel, D. (1992). *Lifelines*. Retrieved 12 March, 2003, from http://lifelines.sourceforge.net/

WhollyGenesSoftware. (2003). *The Master Genealogist*. Retrieved 12 March, 2003, from http://www.whollygenes.com/tmg.htm

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