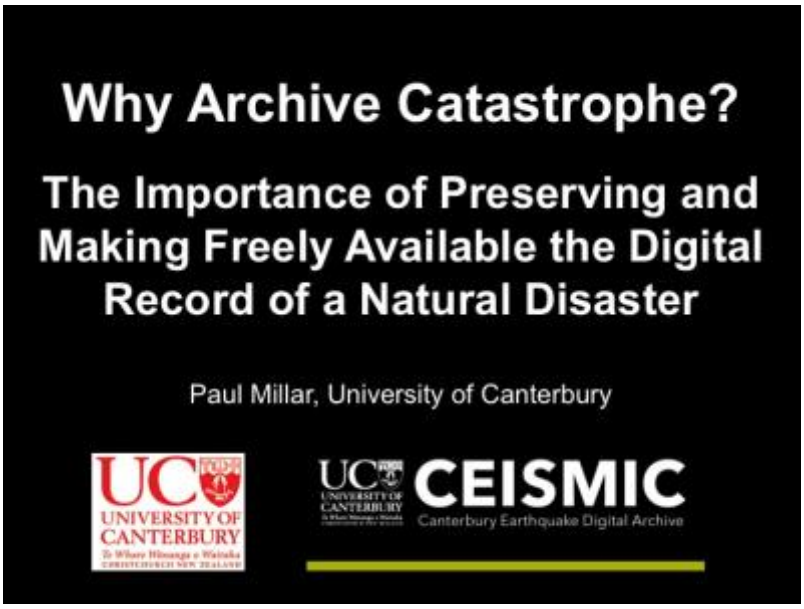
[Powerpoint 1: Title]



Why Archive Catastrophe?
The Importance of Preserving and Making Freely Available the Digital Record of a Natural Disaster

Paul Millar, University of Canterbury, New Zealand

Introduction

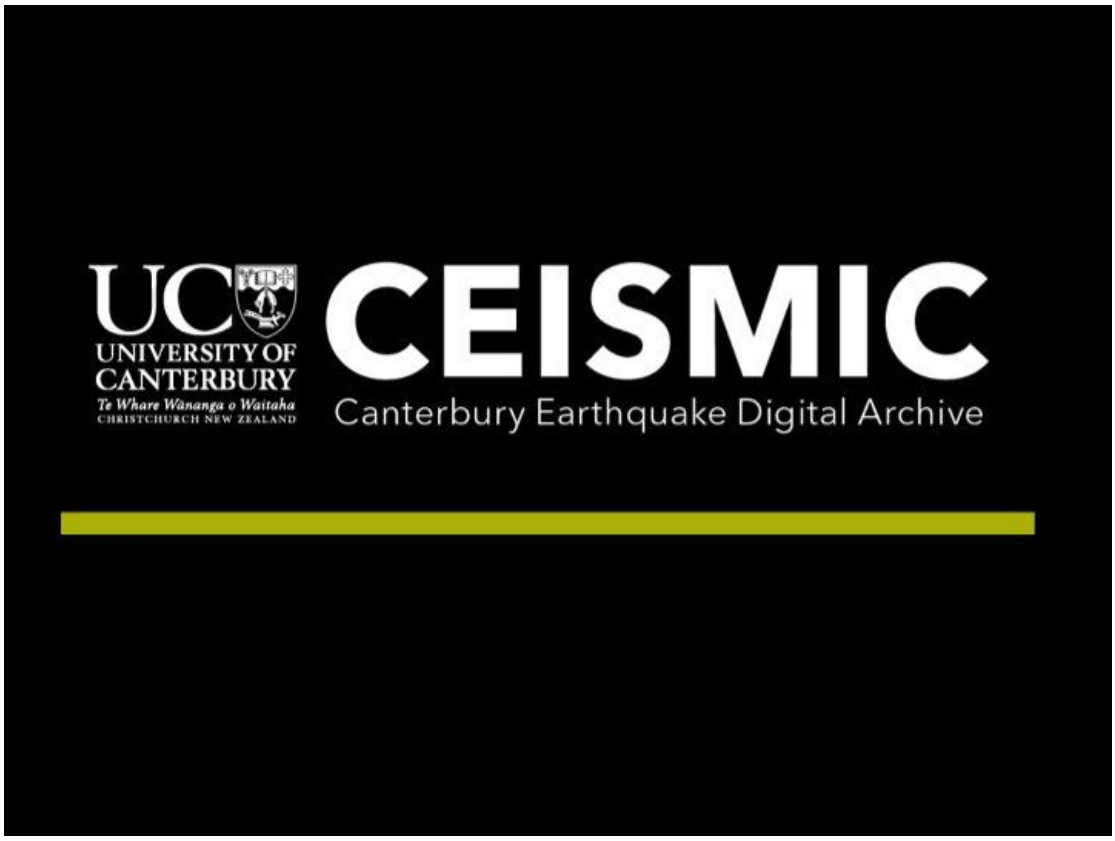
For a New Zealander there can be no better answer to the rhetorical question in the title of my talk— 'Why Archive Catastrophe?'—than to quote one of our best known Maori proverbs:

[Powerpoint 2: Proverb]

He aha te mea nui o te ao?
He tangata! He tangata! He tangata!
What is the most important thing in the world?
It is people! It is people! It is people!

You have honoured me with an invitation to speak today because our countries share a susceptibility to major seismic events, a reality that influences the way we plan our communities and regulate our lives. But despite the measures our governments put in place to protect us, despite the individual and collective responsibility we take for each other, recent catastrophic events in both our countries remind us how susceptible we are when confronted by nature at its most powerful. It is because of our people that I am here today. Had our recent earthquakes occurred in distant mountain ranges, had your tsunami swept a deserted coastline, we would have nothing to talk about. But because these events claimed lives, damaged communities and destroyed the infrastructure that sustains us, we have much to learn from each other.

[Powerpoint 3: CEISMIC Logo]



My project, The UC CEISMIC Canterbury Earthquake Digital Archive (hereafter referred to as CEISMIC), represents an effort to collect and preserve cultural data from a disaster—the stories, images and media relating to the devastating Canterbury earthquakes of 2010 and 2011—and make that data freely and publicly accessible place for the purposes of commemoration, teaching and scholarship.

[Powerpoint 4: Christchurch before the earthquakes]

Christchurch Before September 2010

My home is the New Zealand city of Christchurch in the province of Canterbury. Christchurch, which Maori call Ōtautahi, is the largest city in Te Wai Pounamu, the South Island of New Zealand. Although a small city by Japanese standards, with a regional population of 350,000 it represents the second largest city and the third largest urban area in New Zealand. It is a prosperous city with a rich farming hinterland, proximity to many beauty spots and tourist attractions, and a heritage that links it to its English founders, many of whom had connections with Oxford University's Christ Church College.

4 September 2010

Before September 2010 most of my fellow citizens of Christchurch didn't know about, or didn't give much thought to, the fact we were sitting atop one of the country's major earthquake zones. We thought that dubious distinction belonged to Wellington, our capital city, which sits atop the Alpine Fault and had been predicting 'the big one' for some decades.

[Powerpoint 5: 4 September 2010, No Lives Lost]

But on 4 September 2010 we all began learning more than we wished to know about the complex network of fault lines buried deep beneath the rich silt of the fertile Canterbury plains, when the Greendale fault ruptured in a 7.3 magnitude event. Remarkably there was no loss of life, few serious injuries, and a gratifyingly rapid response by emergency services and government. Many of us were naïve enough to think we had escaped serious harm, and some spoke proudly and a little patronizingly of our first world infrastructure and buildings—look what a similar sized quake had done to Haiti, we said.

[Powerpoint 6: 22 February 2011, many dead]

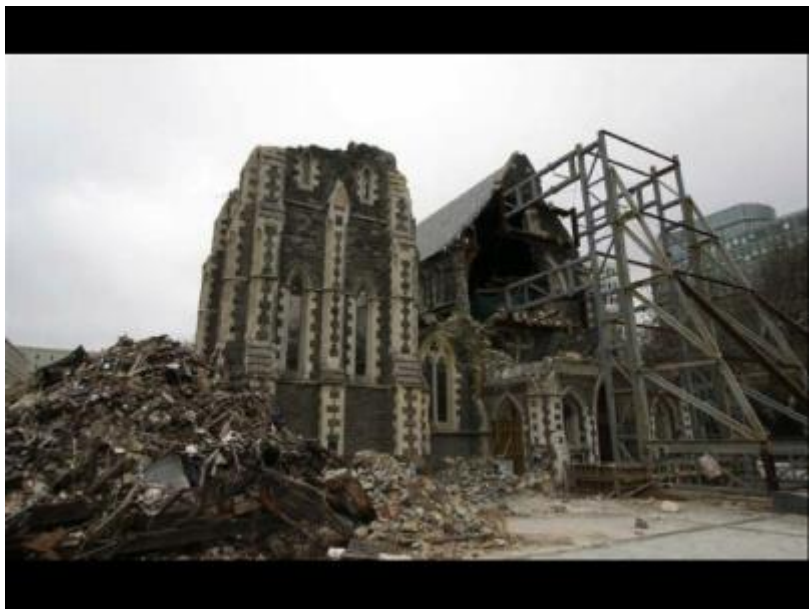
22 February 2011

But then came 22 February 2011. In the early afternoon an earthquake with a magnitude of 6.3 occurred near the city centre. Though not large by earthquake standards, the event's vertical peak ground acceleration rate reached 2.2 times gravity, still the highest ever recorded. Hundreds of lives were lost, thousands of people were injured, 80% of the city centre was damaged and required demolition, and 6000 suburban homes were 'red-zoned' and are being demolished, meaning that whole suburbs and communities will no longer exist. At an estimated $40 billion New Zealand dollars, it is reportedly the third costliest insurance disaster on record.

[Slideshow: Christchurch's Lost Heritage A series of 'before and after' images showing a selection of Christchurch's historic buildings destroyed by the earthquakes**]**

[Powerpoint 7: Cathedral before]

[Powerpoint 8: Cathedral after]

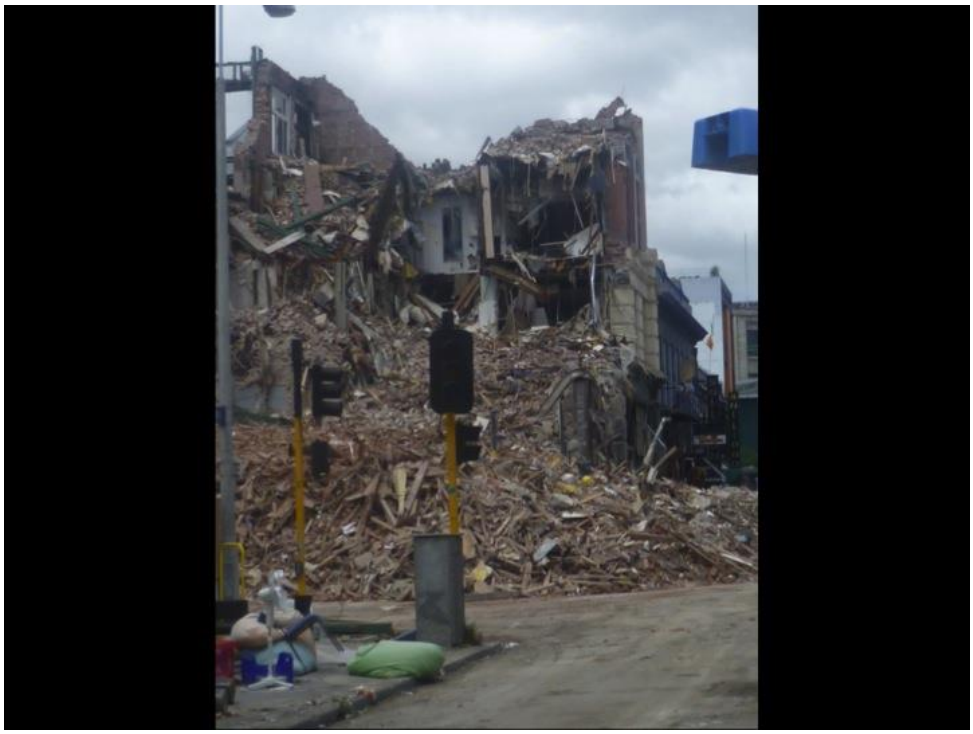


[Powerpoint 9: Timeball Station before]

[Powerpoint 10: Timeball Station after]

[Powerpoint 11: Offices before]

[Powerpoint 12: Offices after]

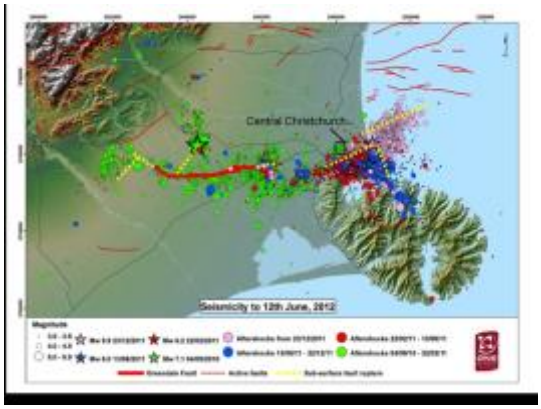


[Powerpoint 13: Deans Homestead before]

[Powerpoint 14: Deans Homestead after]

The Background to CEISMIC

Powerpoint 15: Aftershocks

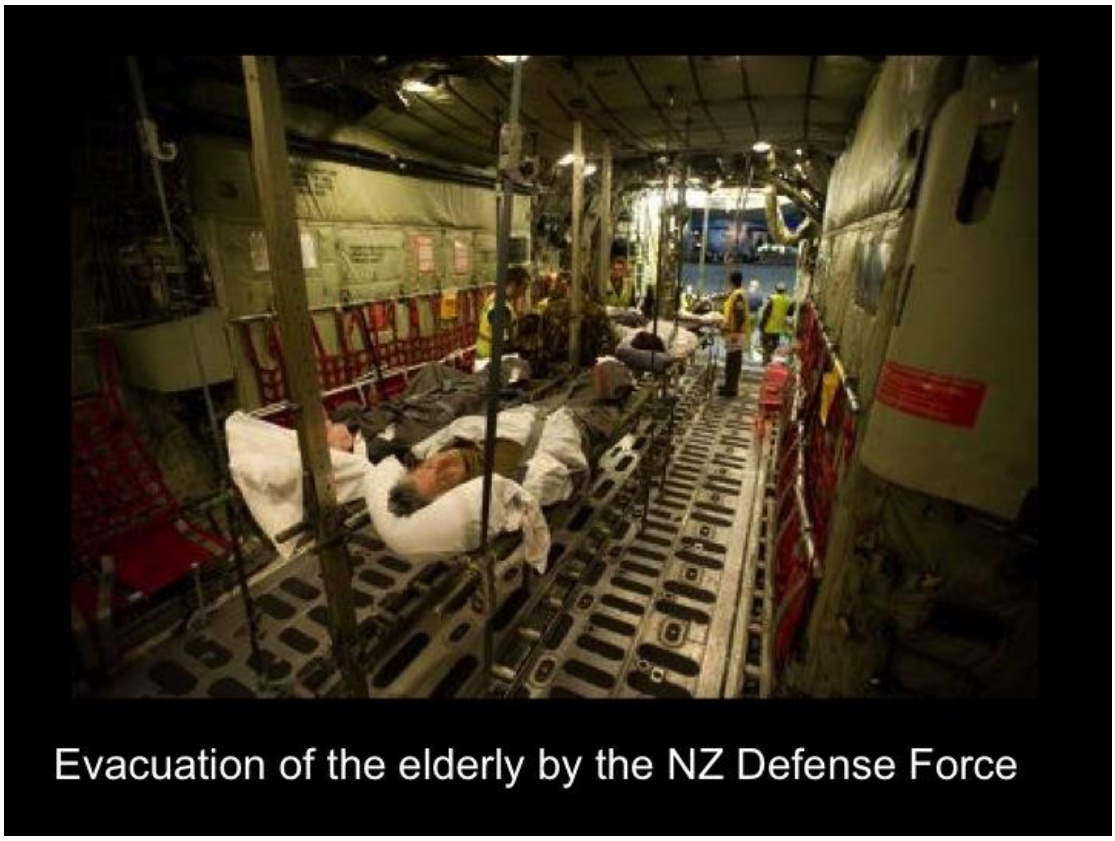


The human toll and the human experience of such an ongoing event was the catalyst for my project. Since September 2010 there has been over 13,000 aftershocks, many of them adding to the damage caused by the major events.

[Powerpoint 16: Liquefaction Potholes in Ferry Road]

Large parts of our city are prone to liquefaction, lateral spreading or land slides. Schools, homes and places of work have been destroyed or disrupted. Although we have all lived through the same event, every person's experience has been unique, and there is much we can learn to better respond to the needs of others in the future. Our children, for example, who waited fearfully for hours at school following some of the large aftershocks before learning whether the rest of their family was safe.

[Powerpoint 17: Evacuation of elderly by NZ Defense Force]



Or our old people, many of whom were evacuated for their safety, only to succumb to shock and die alone apart from their families.

[Powerpoint 18: CEISMIC's Vision]

In proposing the CEISMIC Archive to my managers at the University of Canterbury, I argued that we must begin collecting material now and be prepared to operate for many years, because when all the empirical data around the Canterbury earthquakes has been collected, the city's infrastructure restored, and the aftershock sequence has decayed to almost nothing, the effects of these events will still be strong among families and communities. These events, which have torn apart towns and suburbs, have irrevocably changed our society. For a long time our cultural landscapes will seem as strange to us as our deconstructed cityscapes.

I argued that these experiences need to be recorded, preserved and made freely available now, even though the demand for much of what we are collecting may not be strong initially. In the immediate aftermath of the disaster people are too busy going about the business of surviving from day to day and rebuilding their lives to take time to think about what has happened. But one day people will want to know more, they will have questions they need answered, and it is my intention that on that day the CEISMIC archive will supply their need.

Beginnings of CEISMIC: From Single Archive to Federation and Consortium

The ethos behind the development of the CEISMIC archive, was that a robust ‘Digital Humanities’ response to disaster situations could reduce the loss of such crucial digital artefacts as images, recordings and social media exchanges produced as a direct result of the events.

[Powerpoint 19: September 11 Digital Archive]

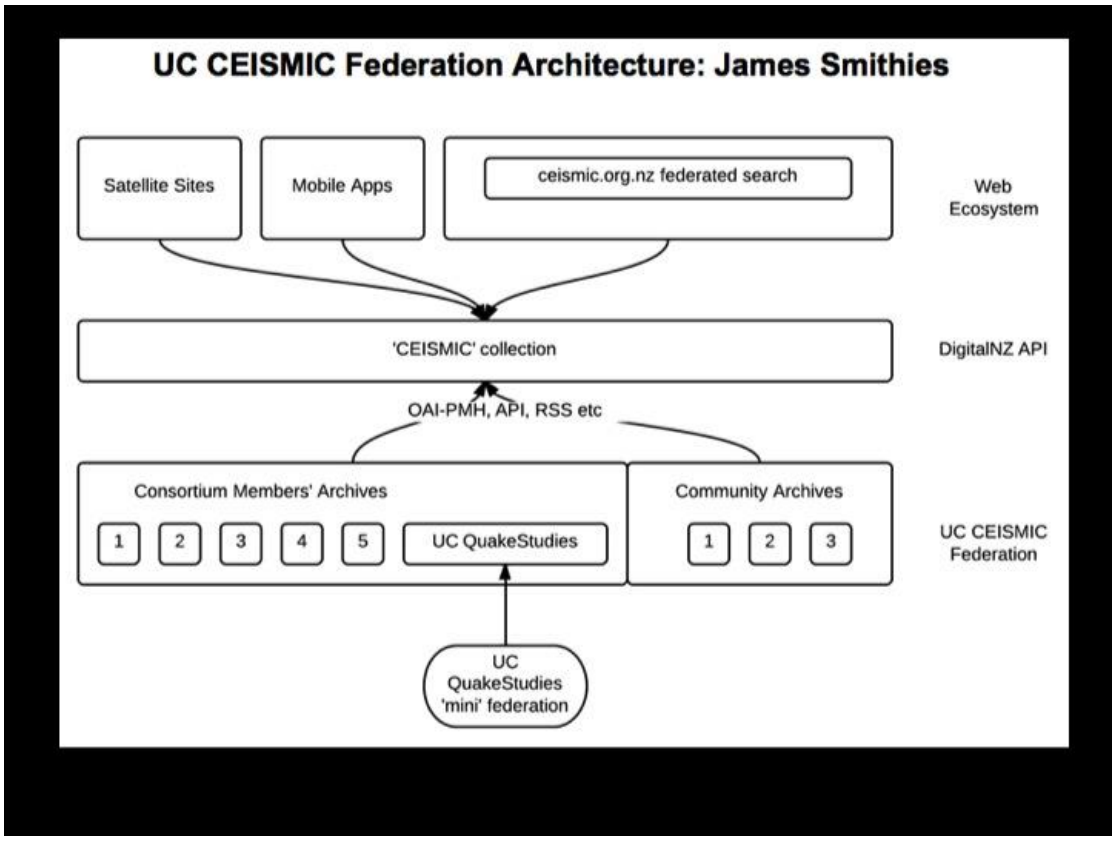
Our initial proposal, which was based upon existing US models like the September 11 Digital Archive and the Hurricane Memory Bank, assumed that a single database would be sufficient. However it soon became apparent that the local and national situation post-disaster, with numerous and overlapping organisations and stakeholders, demanded a more complex response. The single archive model was inflexible and relied on taking material from content holders, which wasn't always well received. So instead we changed course and convened a unique consortium of organisations committed to the development of a national federated earthquake archive for commemoration, teaching, research and cultural heritage preservation.

[Powerpoint 20: Guiding Principles]

Guiding Principles for the formation of the CEISMIC Consortium

CEISMIC's success as a large consortium creating a federated archive owes much to the Digital Humanities ethos I mentioned, which has informed the project's guiding principles of community engagement, open access to data, the development of a multi-channel environment, creation of a healthy digital ecosystem with principles of organic growth, and equivalent support for any collection regardless of affiliation or size.

[Powerpoint 21: UC CEISMIC Federation Architecture]



Guided by these principles, my Project Manager, Dr James Smithies, led an information architecture workshop with technical personnel from the key agencies, which determined that the University of Canterbury could best manage the complex and flexible solution necessary to produce a wide-ranging and robust response. It took a further eighteen months of intensive technical development, but in late 2012 my team reached its final milestone and successfully delivered a national federated archive underpinned by a high-spec research repository, located at UC, called ‘Quakestudies’.

CEISMIC.org.nz: A National Federated Archive

The UC CEISMIC federated archive is accessed through the site ceismic.org.nz, which makes available earthquake content held within the digital archives of consortium members and affiliated content collectors.

[Powerpoint 22: Consortium Partners]

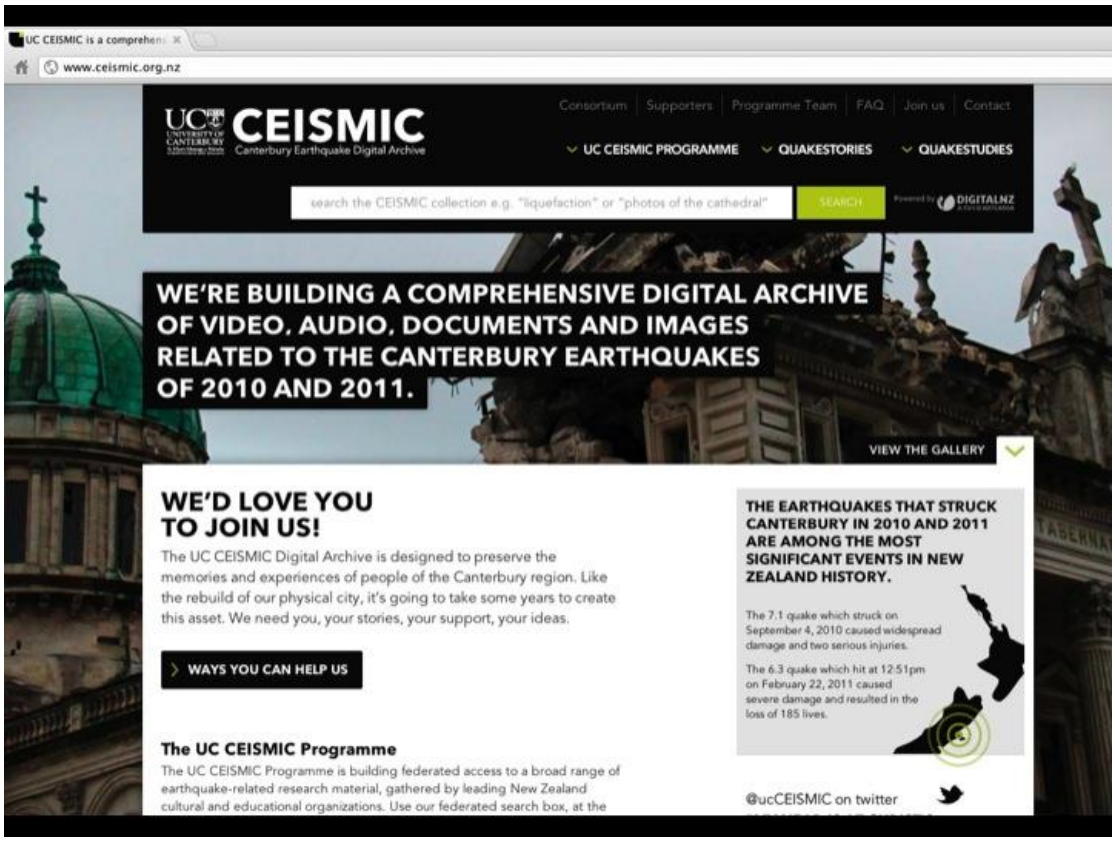
This site serves a consortium led by the University of Canterbury and including the following local and central government organisations, cultural heritage aggregators, research centres and representatives of local Maori:

- Christchurch City Libraries
- The Canterbury Museum
- The Canterbury Earthquake Recovery Authority (CERA)
- The National Library of New Zealand
- The Ministry for Culture and Heritage
- Te Papa Tongarewa; the Museum of New Zealand
- NZ on Screen
- The New Zealand Film Archive
- The Ngai Tahu Research Centre
- Archives New Zealand, and

- The Natural Hazards Research Platform.

This federated model has provided an elegant and cost effective nationwide solution, closely integrated into the national digital infrastructure and with the capacity to provide long-term archiving services. Conceived and constructed in less than eighteen months, it is also a robust technical solution that positions the archive to operate smoothly for decades.

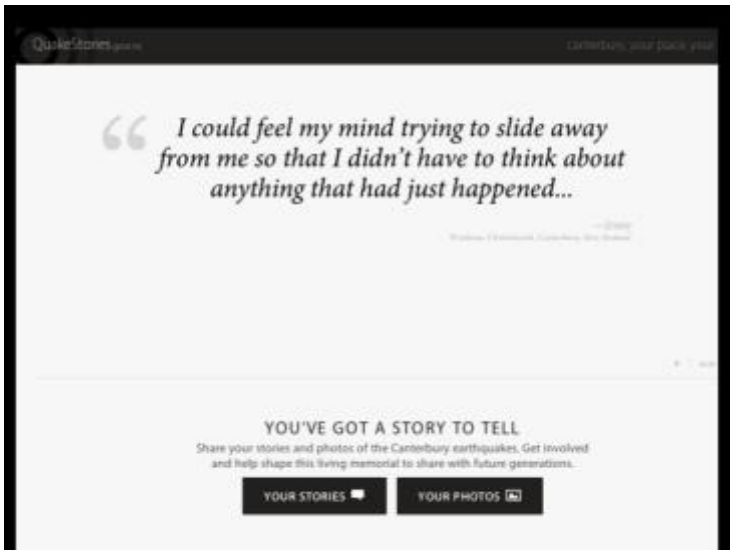
[Powerpoint 23: ceismic.org.nz with Digital NZ search]



A key measure of the success of this concept, and the robustness of project management, is that Digital NZ, a business unit of the National Library, has come on board to provide metadata aggregation and search services to ceismic.org.nz. The site is now a national asset of significance included in the strategic plans of more than one consortium member.

Slideshow: A Selection of Archives in the Federation

1. **Powerpoint 24: Quakestories**



(http://www.quakestories.govt.nz/) This archive, developed by the Ministry for Culture and Heritage, invites people to share their earthquake stories and images in order to create a 'living memorial to share with future generations';

2. **Powerpoint 25: When My Home Shook**

(http://whenmyhomeshook.co.nz/) is dedicated to helping Canterbury School children cope with their experience of the

earthquakes by providing a place where they can openly share their personal stories;

3. **National Library of New Zealand's** collection of cartoons relating to the Canterbury earthquakes. Among the collection are a number of cartoons referring to Japan, including:

Powerpoint 26


'Christchurch earthquake - raising the spire'
by Rod Emerson

a) 'Christchurch earthquake - raising the spire', by Rod Emerson, published four days after the devastating February quake it indicates the international support we received by showing urban rescue workers from Britain, Singapore, Taiwan, Japan, the United States and Australia trying to raise a fallen church spire.

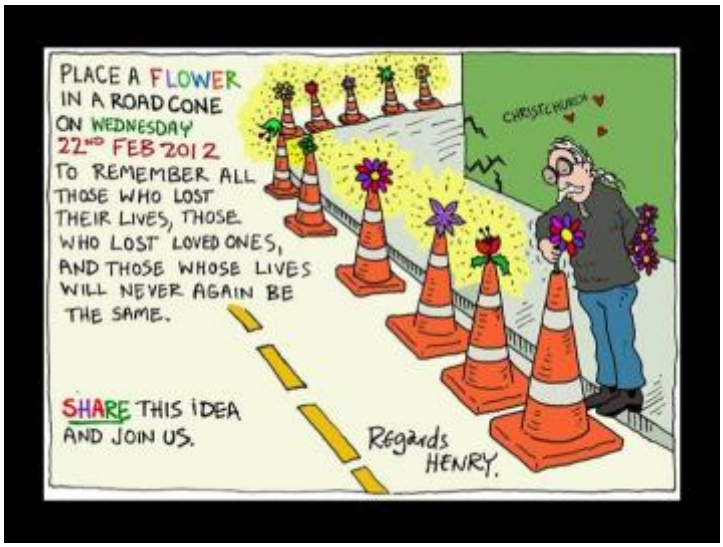
Powerpoint 27


'Earthquake and Tsunami' by Malcolm Evans
14 March 2011

b) Malcolm Evans cartoon 'Earthquake and Tsunami', dated 14 March 2011, shows the joined hands of two people, signifying those who have suffered from the earthquakes of 4 September 2010 and 22 February 2011

in Christchurch and those who have suffered from the earthquake, tsunami and nuclear catastrophe in Japan that struck on 11 March 2011.

Powerpoint 28

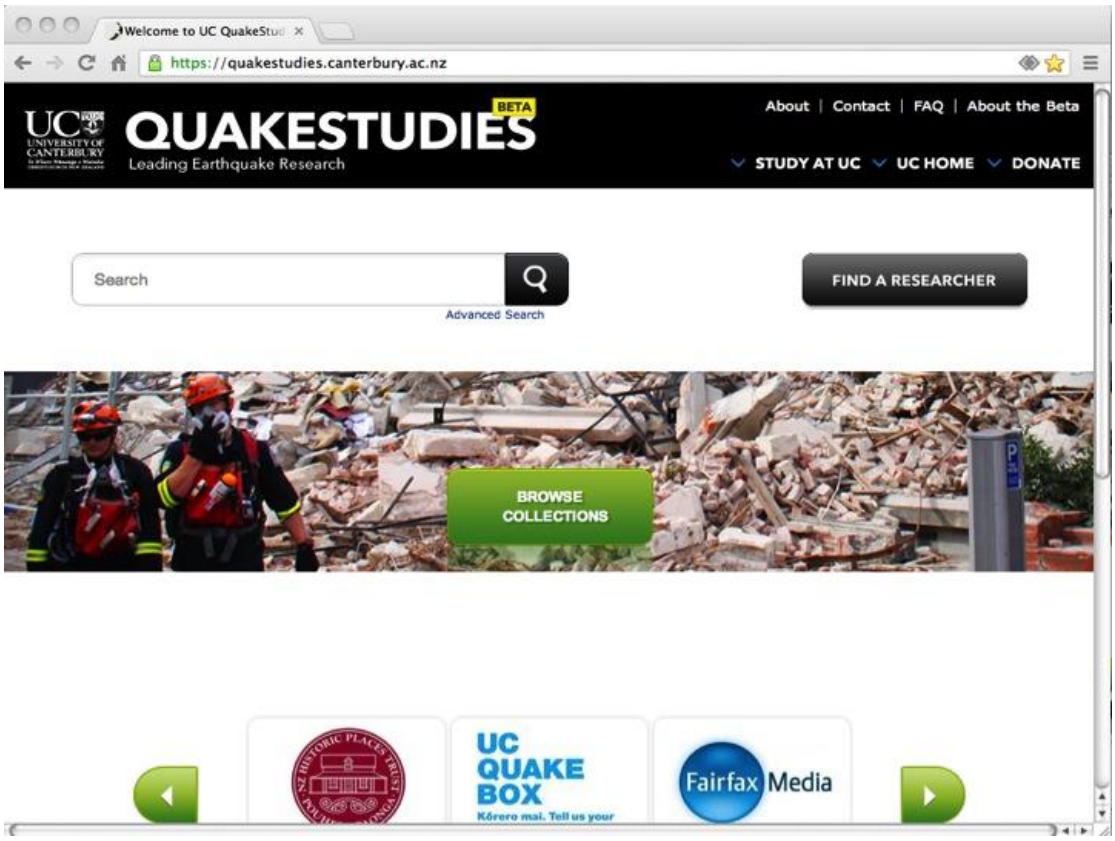


c) Henry Sunderland’s cartoon, 'Place a flower in a road cone', was drawn for the first anniversary of 22 February 2011. Henry proposed that people decorate with flowers the road cones guarding earthquake damage and hazards in the city to commemorate the event. People decorated thousands of road cones with fresh flowers throughout Christchurch, and also overseas in Australia, London, Singapore and Mexico.

Powerpoint 29

d) Midori Saito, then translated Henry's cartoon into Japanese in preparation for the anniversary of your earthquake and tsunami on 11 March 2012.

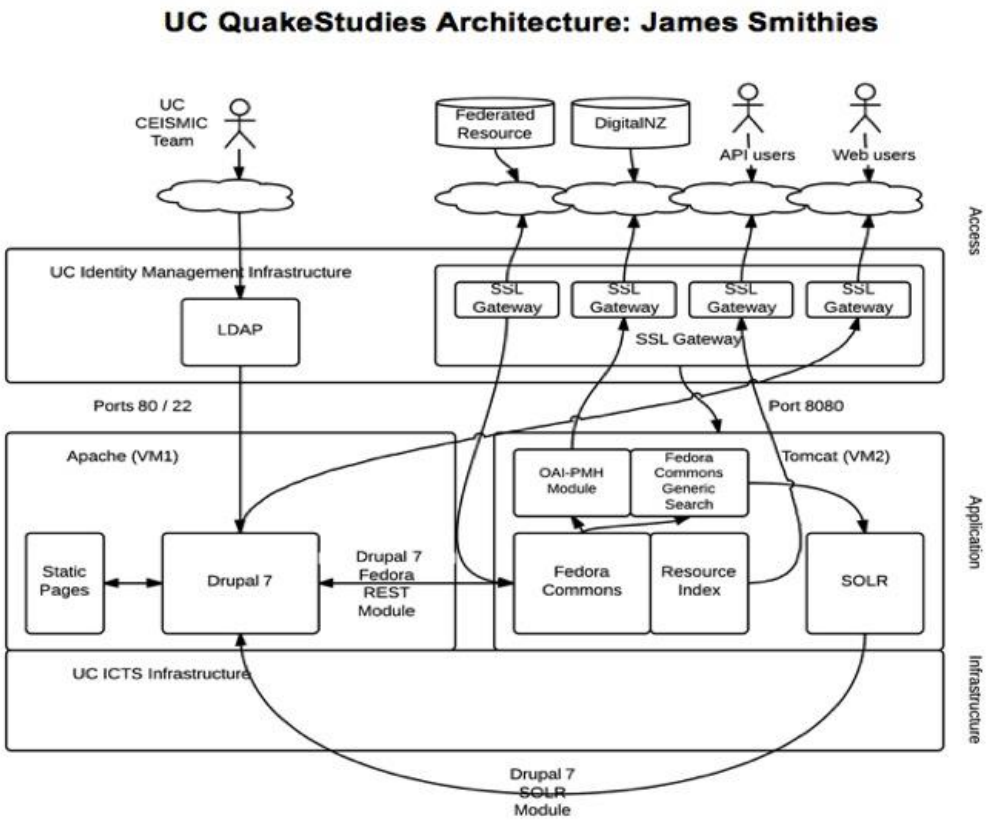
Powerpoint 30: Quakestudies Front Page



Quakestudies: High Spec and Scalable

Important as ceismic.org.nz is, the federation web site represents perhaps ten percent of our development effort. In assessing the archival needs of the federation it was determined that the greatest area of need was for a high spec digital archive dedicated to research needs. Accordingly we set about designing and developing Quakestudies, (quakestudies.canterbury.ac.nz) using open source software. The archive's open source components are intentionally integrated in a system that could be packaged and turned into an open source project for disaster archiving. Our ideal would be to make the Quakestudies model freely available to similarly affected communities around the world.

[Powerpoint 31: UC Quakestudies Architecture—James Smithies



Quakestudies is designed to sit on University of Canterbury infrastructure and have the ability to export data for analysis by such facilities as the University's Bluefern super computer and New Zealand's National eScience grid network. It has been engineered to scale to more than a million digital objects with the potential for additional capacity as required. It is the keystone archive within the consortium, looking to collect tens of thousands of digital objects each year. In keeping with Digital Humanities development approaches an operational office is managed by Dr Chris Thompson, an English doctorate, and staffed by Humanities graduates who carry out high quality metadata curation. This office operates according to the highest ethical requirements, overseen by a pan-university research committee chaired by the UC Dean of Postgraduate studies.

The point I would emphasise is that we are not capturing key streams in the massive flow of digital information generated by the Canterbury earthquakes and adding value to that information by ordering and categorizing it simply for our own community. Any researcher, teacher or student anywhere in the world has the same access to this information as a researcher, teacher or student in New Zealand. This is the practical and desirable outcome of what I have called the Digital Humanities ethos. It does not involve a proprietary system or service whose business model sees it profiting from a disaster or sequestering information to its own ends, but a free, federated, open access archive underpinned by a large national consortium of content partners. I believe it may be a unique model in the field of disaster recording—a model that has worked so well for us I would, as I have said, welcome the opportunity to make it available to communities in similar need.

For the purposes of promoting cross-disciplinary, inter-organisational and trans-national research into disaster impact and recovery we have required all research outputs in CEISMIC to be open and repurposable so, for example, interviews about women's experiences of the earthquakes will become a resource for researchers in language use, public health, education, resilience and so on.

Powerpoint 32 UC CEISMIC's Current Status

UC CEISMIC is now characterised by ongoing local, national and international involvement. Schoolchildren have contributed their earthquake stories, researchers have interviewed specific sectors of the community, the programme itself has supported the deployment of a mobile recording studio (the Quake Box), CEISMIC staff have contributed to sites to commemorate Christchurch heritage, supplied content to the HITLab's (Human Interface Technology Laboratory's) CityView AR mobile application, and archived full editions of the Christchurch Press, hundreds of archaeological reports on demolished heritage buildings, and videos of UC staff presenting at earthquake forums. A tablet application built around CEISMIC won Microsoft's 'Humanising Data' competition in 2012, and in 2103 CEISMIC itself won the International Digital Humanities award for best project for public audiences. The archive has featured on all major NZ television networks, in print media and on radio in New Zealand and in the USA.

Powerpoint 33 Future Prospects of the CEISMIC Digital Archive

CEISMIC is set up to collect material related to the Canterbury earthquakes as long as it is needed. Already we have created an archive that has as much if not more to say about the process of recovery than the impact of the immediate disaster. We are now a member of the University of Canterbury's Resilience Network—a grouping of four centres dedicated to earthquake engineering, technical innovation, and learning about risk, resilience and renewal. In the near future the government agencies established to oversee the earthquake recovery will be disbanded—and so discussions are underway to ensure that when that happens the records of their activities will become part of the public record through the CEISMIC archive.

Power Point 34: Conclusion

I can imagine a future time when the CEISMIC holdings will have expanded to such a degree that they tell the entire story of Christchurch and Canterbury before, during and after the devastating earthquakes of 2010 and 2011—making the full history of demolished buildings and vanished communities available, along with the details of the communities and constructions that have replaced what we have lost. I hope CEISMIC will become a place where my great-grandchildren's children will be able to go to 100 years from now and find out what Christchurch used to be like before the earthquakes, what the earthquakes meant for the region, its people and its heritage, and how we set about recovering from the event and creating from the rubble one of the world's most vibrant and exciting 21st century cities. On the way CEISMIC will fulfil its immediate mandate as a resource for teaching, commemoration and research—but ultimately it will be recognized as the home of the full story of Christchurch, created by and for the people who lived and suffered through the events and worked together to rebuild something new. For as I said at the beginning of my talk:

He aha te mea nui o te ao? / He tangata! He tangata! He tangata!

What is the most important thing in the world? / It is people! It is people! It is people!

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