

GÉANT and outGRID – creating a global platform to combat Alzheimer's

Combining complementary research infrastructures in Europe, Canada and the US through high speed research networks to enable closer collaboration

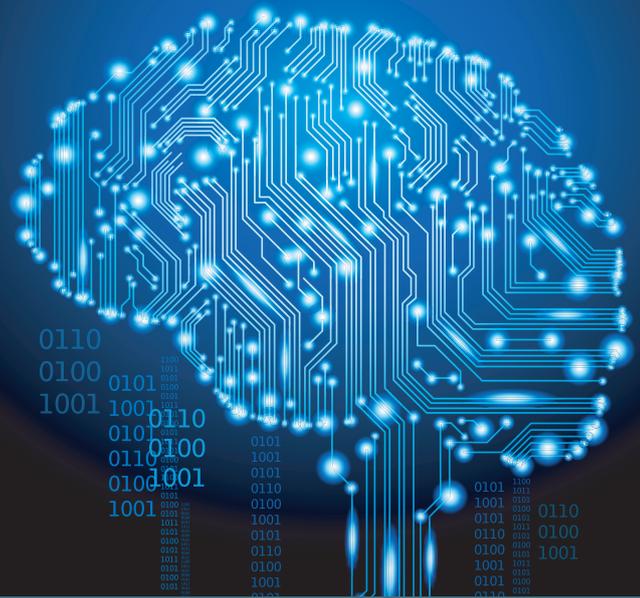
Combining to fight dementia

There is a new case of dementia every 24 seconds in Europe, with an estimated 10% of Europe's elderly population suffering from some degree of Alzheimer's Disease, the most common form of neurodegenerative dementia.

With no current cure for dementia, scientists and doctors around the world are working closely together to research these damaging neurodegenerative brain conditions, both to help faster diagnosis and to pinpoint causes and potential treatments.

As part of this there are currently three major regional research infrastructures using brain scan images for research and diagnosis – neuGRID in Europe, CBRAIN in Canada and LONI in the United States of America. Each of these enables neuroscientists to collect and archive large amounts of imaging data and to access resources for computationally intensive data analyses. By comparing these detailed images, they will allow scientists to identify neuro-degenerative disease markers and increase our knowledge of Alzheimer's and other dementia conditions. All of these infrastructures rely on research networks, with GÉANT and European NRENs central to neuGRID, ensuring the cost-effective, high speed movement of enormous datasets and support for the grid computing power needed to quickly process and access this data.

Bringing the data, tools and computing power within these three initiatives together would create a global platform that would dramatically accelerate neuroscientific research. However as each project is based on differing technologies and workflows this interoperability is not necessarily straightforward. The EU-funded outGRID project was consequently created to investigate and promote potential interoperability, laying the foundations for longer term technical integration.



The Challenge

Enable scientists and doctors across the globe to share vital neuroscience data, helping accelerate research into Alzheimer's .

The Solution

The outGRID project used high bandwidth research networks to demonstrate the feasibility of connecting global neuroscience infrastructures from Europe and North America, laying the foundations for future interoperability.

Key Benefits

outGRID has led unparalleled neuroscience collaboration, bringing together scientists and researchers from across the world. By creating a global infrastructure research into Alzheimer's, progress will be accelerated, potentially helping those with this crippling condition.



outGRID demonstrates way forward

Through a programme of close collaboration with the neuGRID, CBRAIN and LONI projects, outGRID has achieved three major objectives. Firstly, it has successfully demonstrated that interoperability is feasible, showing how scientists in each of the three projects can access and analyse data stored within the other two platforms. GÉANT was heavily involved in the high speed data transfer needed to prove this feasibility, both through its pan-European reach and transatlantic links to both US and Canadian research networks. Without the power of research networks to connect the three projects together, real time data sharing and analysis would simply be impossible, due to the enormous amounts of information involved.

Secondly, outGRID has moved forward international neuroscience collaboration through a high level workshop held jointly with the International Telecommunication Union (ITU), part of the United Nations. By successfully demonstrating the need for greater collaboration it directly led to commitments from each project to work together to create a new global infrastructure for neuroscience.



The success of outGRID demonstrates the feasibility of connecting research infrastructures across the globe through high speed research networks, making data and resources available to scientists and doctors, wherever they are located. Not only does this show what can be achieved through closer worldwide neuroscience collaboration, but it provides a blueprint for other disciplines, showing the advantages of creating global platforms to drive forward critical research that directly benefits us all in area such as human health.

Dr Arthur Toga, founder and director of LONI and co-principal investigator, Global Alzheimer's Association Interactive Network (GAAIN).



Neurodegenerative diseases are one of the biggest challenges for global human health, predicted to affect over 115 million people by 2050. With no known cure, concerted research collaboration is absolutely vital if we are to better understand conditions such as Alzheimer's and begin to create drugs to combat them. Ensuring interoperability across different neuroscience platforms is critical to sharing information and accelerating research. Research networks such as GÉANT are at the heart of this collaboration – without their combination of robust, high speed connectivity and global reach we simply couldn't exchange the enormous amounts of information that these initiatives are collecting.

Dr Giovanni Frisoni, outGRID

Funding for the future

Building on this, outGRID's third achievement has been to secure funding to build this future interoperability. In Europe, the next generation of the neuGRID project (neuGRID for you) is working towards interoperability using the GÉANT network, while significant \$5m funding from the Alzheimer's Association in the US has led to the creation of the Global Alzheimer's Association Interactive Network (GAAIN). This five year project will enable US researchers to share and access data and tools stored on neuGRID and CBRAIN, dramatically increasing the resources available to them.

The success of outGRID lays the foundations for dramatic changes in global scientific collaboration in neurodegenerative diseases, promising to accelerate research and treatment methods for Alzheimer's and potentially easing suffering for millions of people across the globe.

connect • communicate • collaborate

The world is criss-crossed with high-capacity data communications networks, connecting and serving research and academic institutions across the globe. The most advanced of these is GÉANT, serving Europe. GÉANT interconnects with counterparts across the world, such as Internet2 in the USA and CANARIE in Canada.

GÉANT provided the outGRID project with the fast and reliable connection needed to connect the neuGRID European neuroscience infrastructure to counterparts in the USA and

Canada, proving the feasibility of creating a global resource for neuroscientists. This will accelerate research and help pinpoint the causes of crippling diseases such as Alzheimer's.

Without access to GÉANT and its transatlantic links this unprecedented global collaboration would simply not be possible.



For more information:

GÉANT: www.geant.net
outGRID: www.outgrid.eu
neuGRID: www.neugrid4you.eu/
LONI: www.loni.ucla.edu/

CBRAIN www.cbrain.mcgill.ca/
GAAIN www.gaain.org/
CANARIE: www.canarie.ca
Internet2: www.internet2.edu

