

# Maintaining and Measuring Mental Wellness

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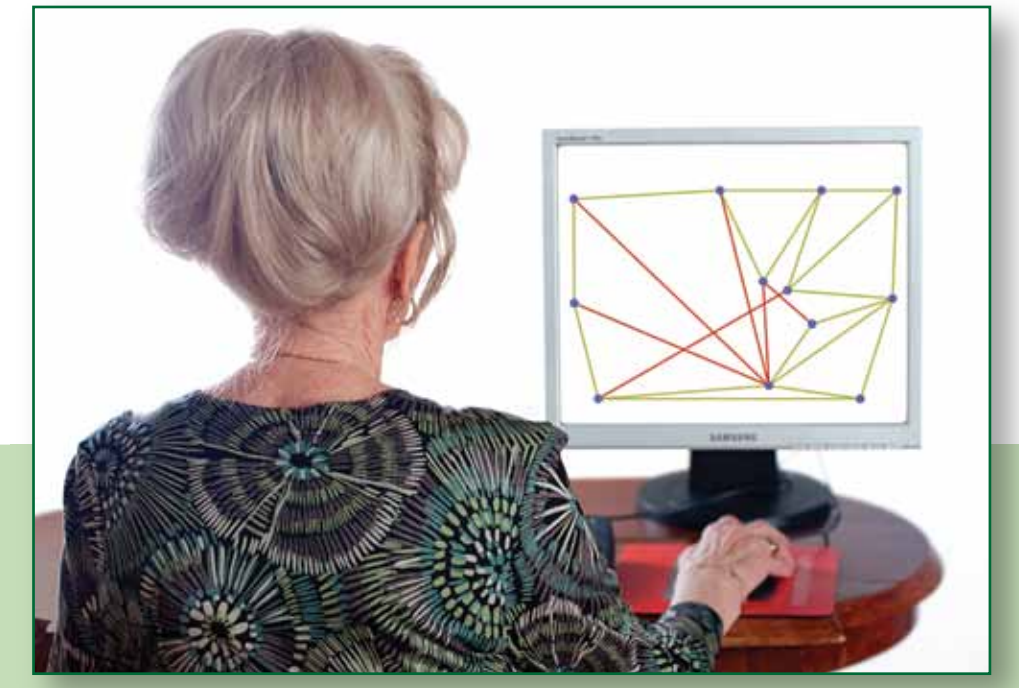
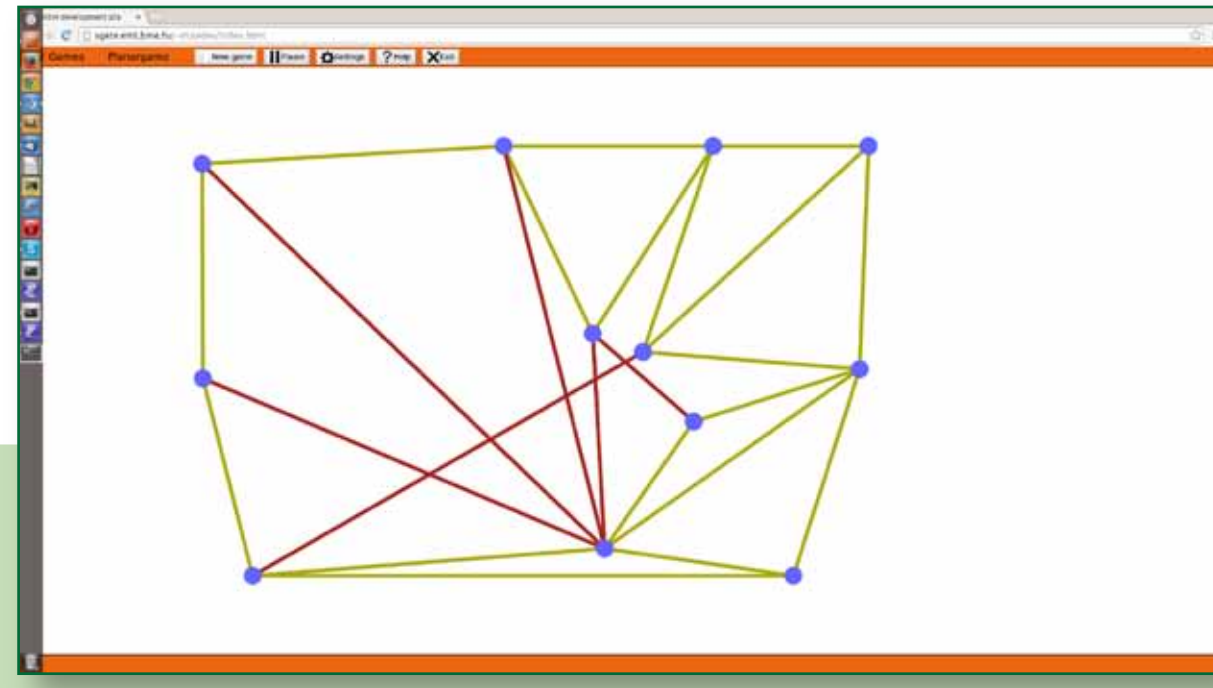
Info



## Major objectives

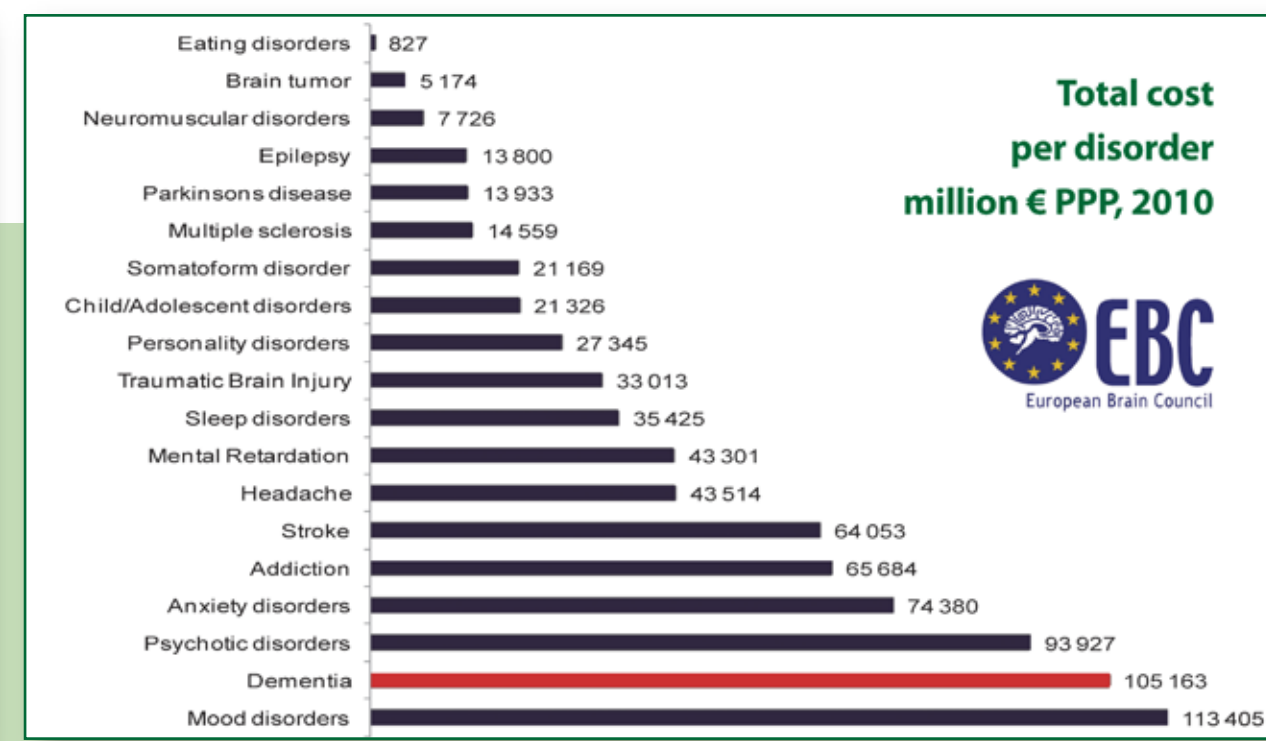
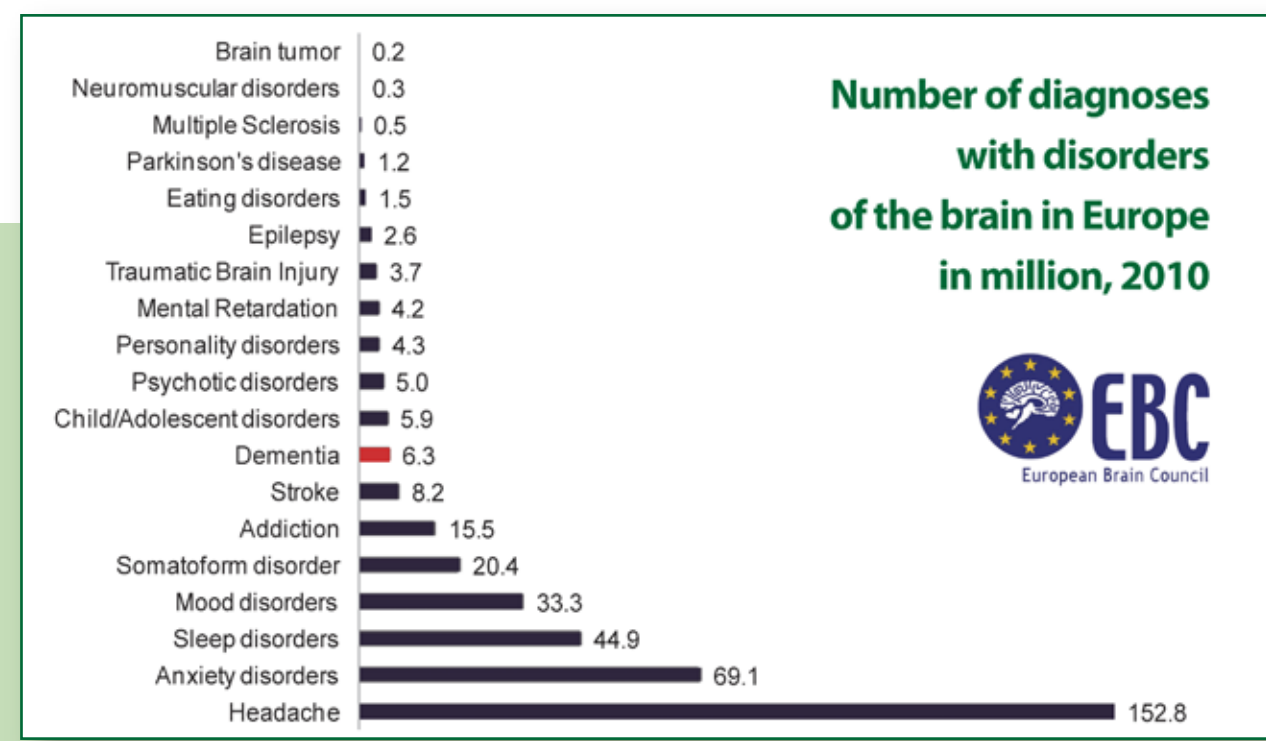
### Develop a Mental Wellness Toolset (MWT) for individual use to

- provide cognitive training for elderly persons in entertaining ways by computer games;
- recognize, measure and visualize eventual significant changes in their cognitive abilities over time;
- issue polite early warnings about changes to those directly or indirectly effected.



### Develop Community Building Tools (CBT) for

- health-aware persons and their families;
- professionals providing care for elderly people with declining mental abilities.



Dementia: frequency and costs in Europe

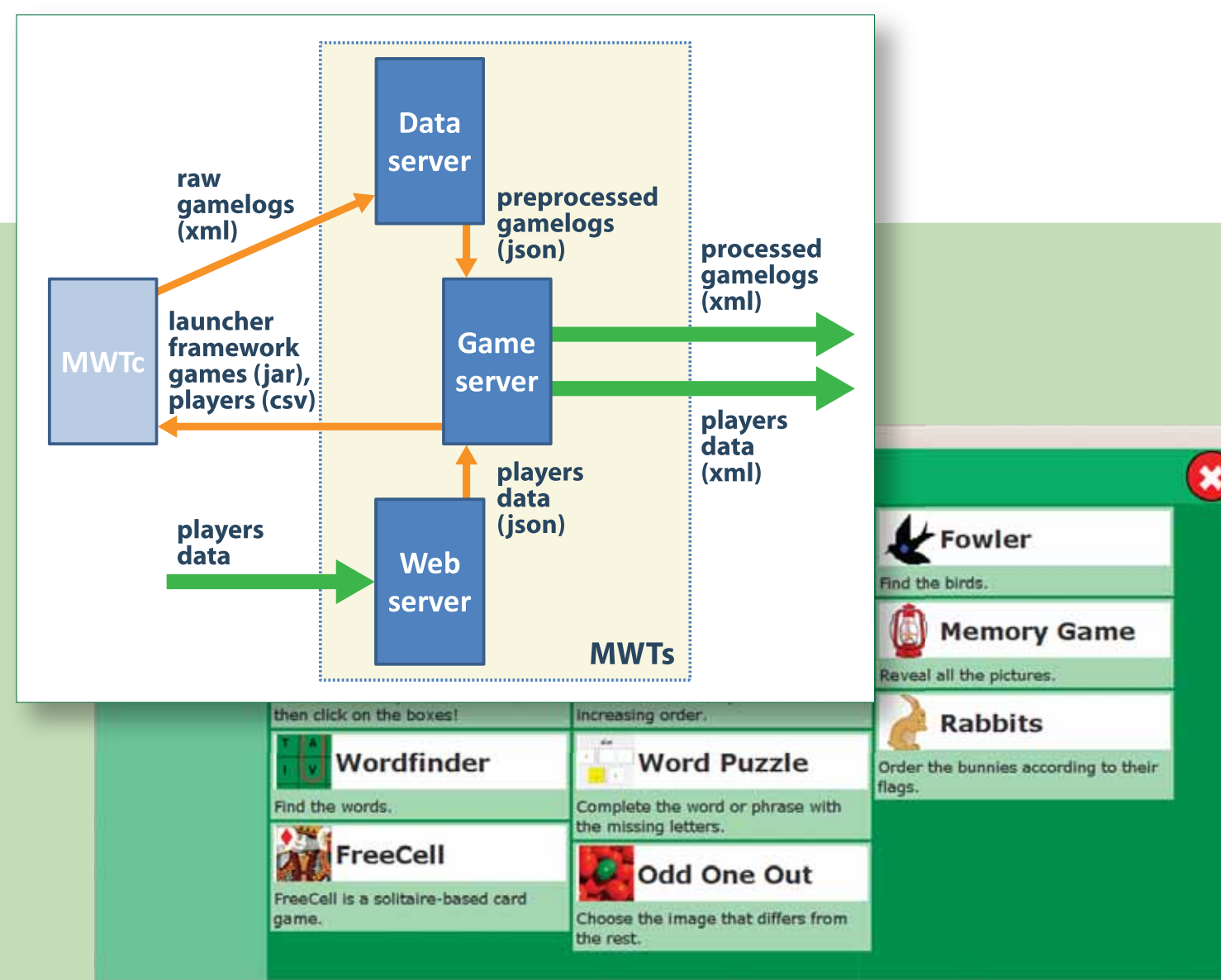
## Social and economic aspects

- World's elderly population is continuously growing accompanied with specific health problems and diseases of ageing people.
- Costs of health services and care might be reduced significantly by the early detection of the Alzheimer's disease and other dementias.

## Early pilot

### Goals of Early Pilot

- develop and test ideas
- implement and evaluate different games
- set-up experimental architecture
- deploy development technology (Java in offline mode)
- build communities of test persons (elderly home, clinics, home care environment)



### Results of Early Pilot

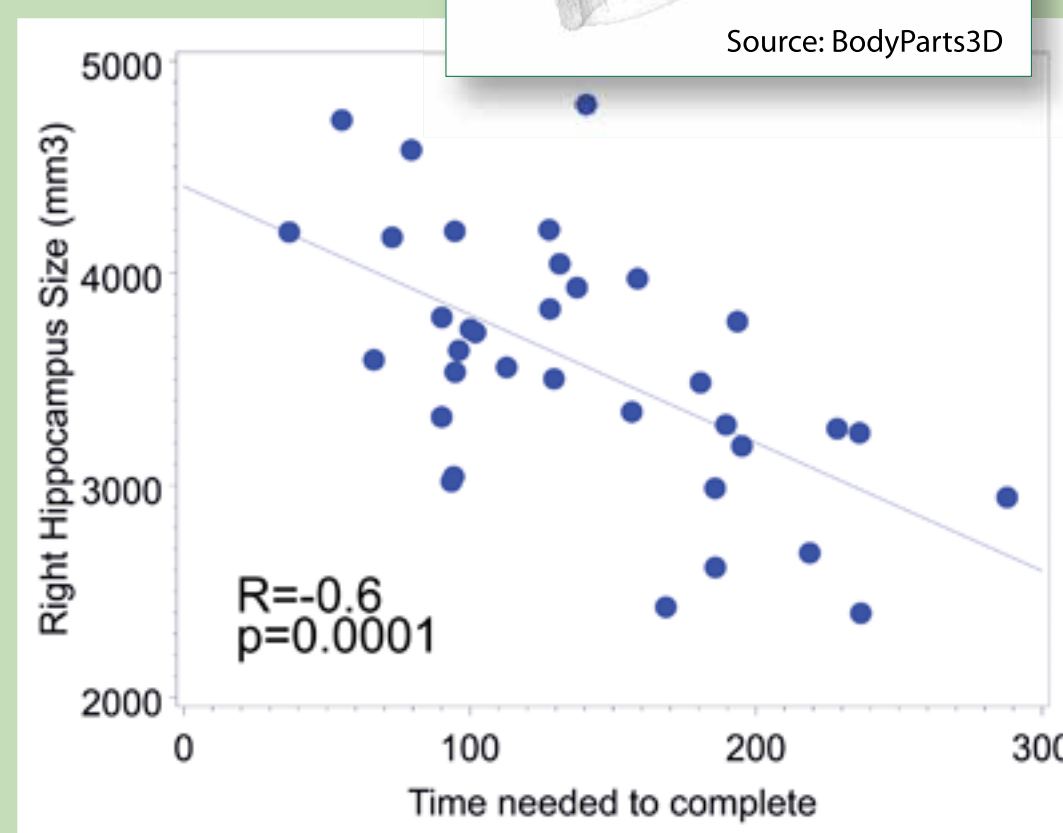
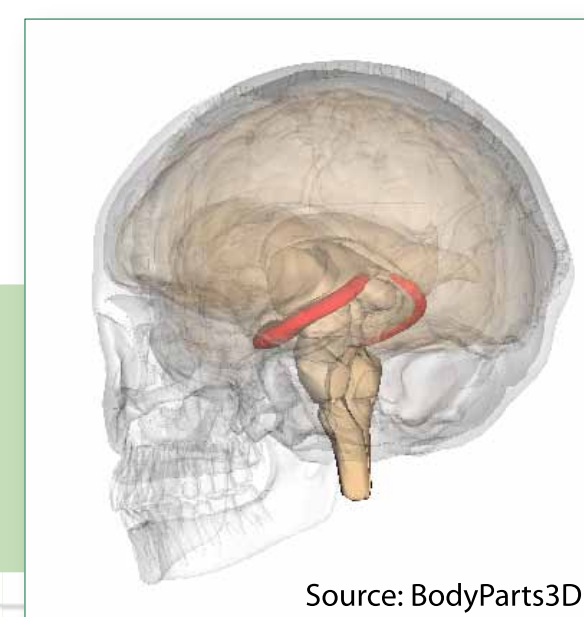
- eleven games implemented
- test groups created (total 62 persons, average age 70 years; 49 healthy, 13 MCI-diagnosed)
- more than 100,000 game logs collected and processed
- relation of neuropsychological functions and user performance while playing games studied further
- lots of useful feedbacks received from end users influencing further developments

### Scientific goal

- Evaluate serious games as tools for measuring cognitive decline.

### Method

- 55 elderly subjects were enrolled during the Early Pilot.
- They were assessed by a standard neuropsychological test battery, the Addenbrook's Cognitive Examination (ACE); the Ray Verbal Learning Test (RAVLT); and the Trail Making A and B.
- They were examined by structural magnetic resonance imaging (MRI).
- They played the serious games provided by the MWT.
- Their psychiatric status was measured by taking the medical history and by using the Geriatric Depression Scale (GDS) and the State Anxiety Inventory (STAI).



Right Hippocampus Size and Memory Game Results

## Scientific aspects

### Rationale

- The measurements mentioned above proved to be good predictors of Mild Cognitive Impairment (MCI) and dementias in previous investigations.

### Early results

- High correlations ( $p < 0.01$ ) were found between the results of the neuropsychological tests, the size of the hippocampi and the game performance (see Figure).
- It indicates that serious games can be useful tools in the early detection of Alzheimer's dementia.

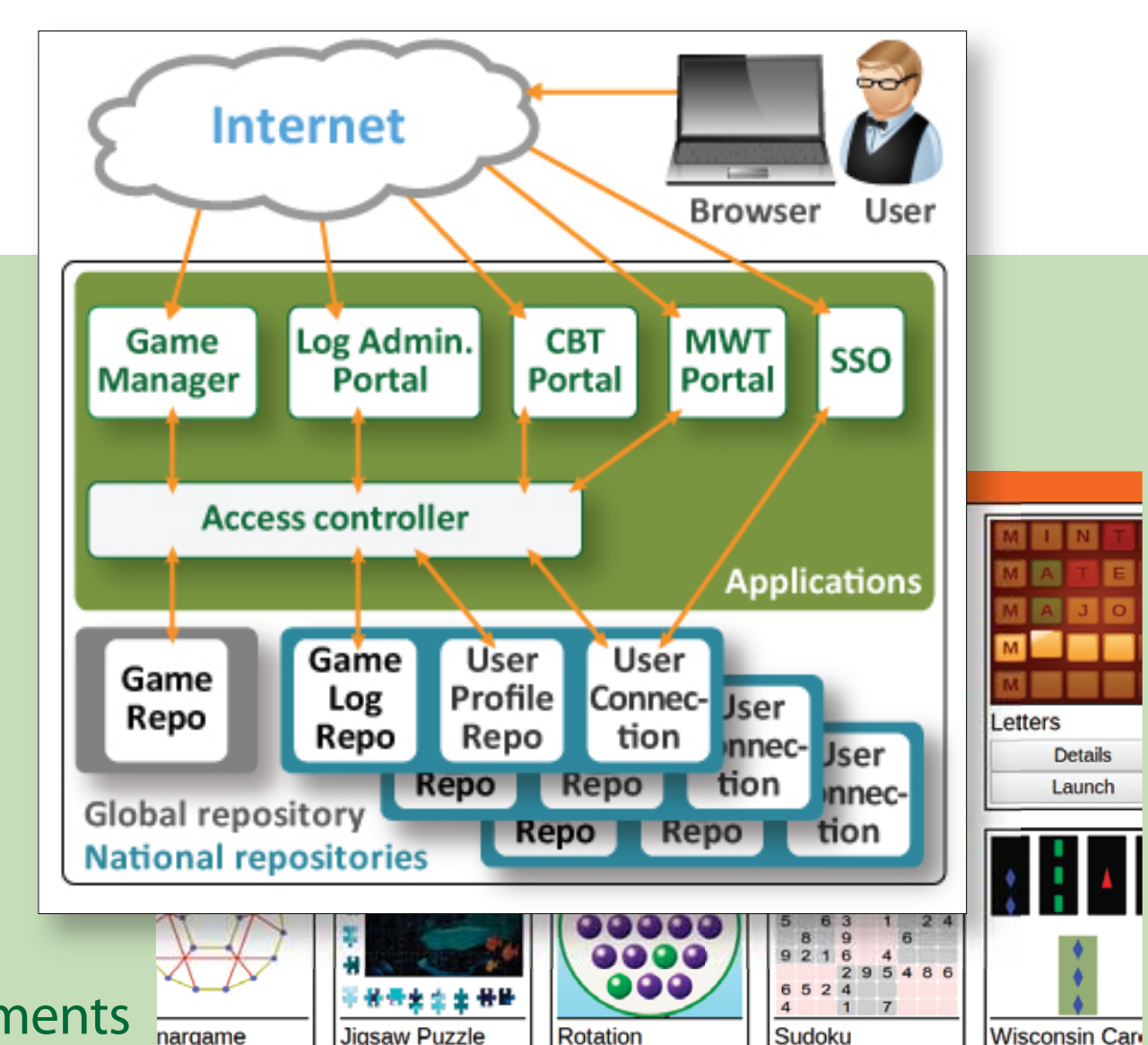
## Current status and next steps

### Current status

- new online MWT with almost 20 games
- online player registration open to everybody after completing a Paired Associates Learning test
- controlled cognitive training sessions held at Semmelweis University, Budapest
- improved internationalization and localization
- changed development technology with JavaScript and HTML-5, allowing development also for mobile devices

### Next steps

- develop more and challenging online games with attractive web design
- improve compatibility of the data produced by the games
- simple but motivating feedback to end users
- involve more end users, increase their motivation and interest
- extend data evaluation and prediction experiments



## Sponsors



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