

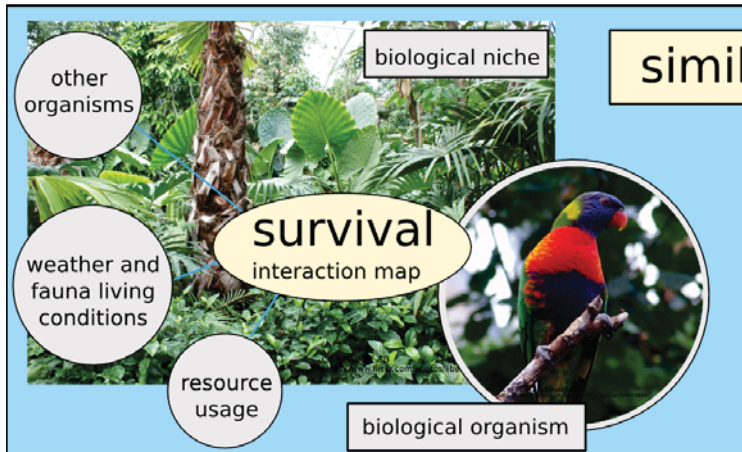
A Biological Perspective on Digital Preservation

A transfer of Biological Ecosystem methodologies into the digital world and its benefits for Digital Preservation

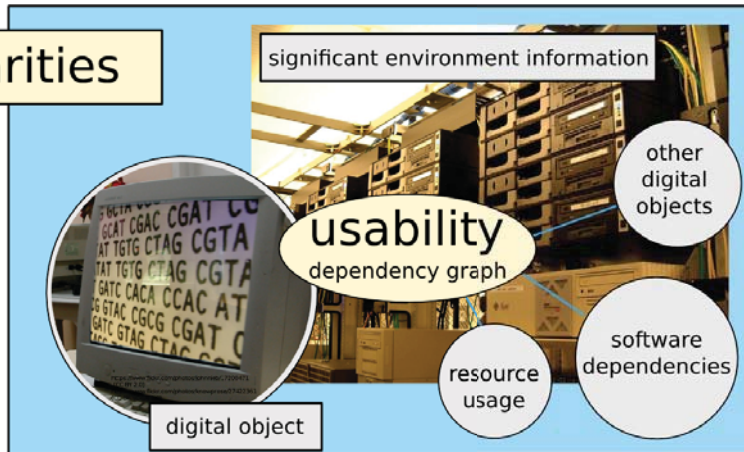
Successful preservation of Digital Objects (DOs) ultimately demands a solid theoretical framework. Such a framework with a high degree of generality emerges by treating DOs as containers of functional genetic information, exactly as in the genomes of organisms. We observe that functionality links survival in organisms and utility in DOs. In both cases, functional information is identifiable in principle by the consequence of its ablation.

In molecular biology, genetic ablations (mutations) and environmental ablations (experimental manipulations) are used to construct interaction maps fully representing organismic activity. The equivalent of such interaction maps are dependency graphs for the use of DOs within their Digital Environment. These graphs are extracted live (sheer curation), and weighted based on the significance of the environment entities for the regarded DO uses.

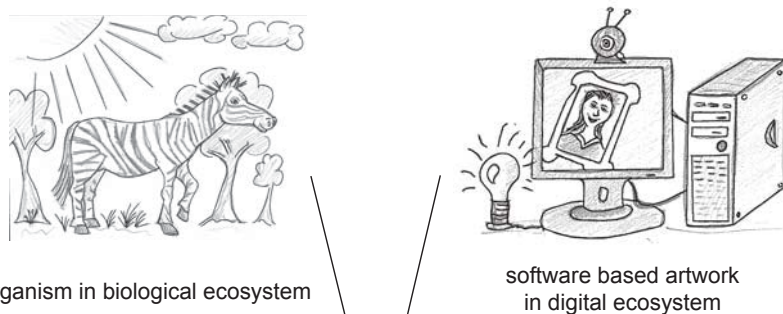
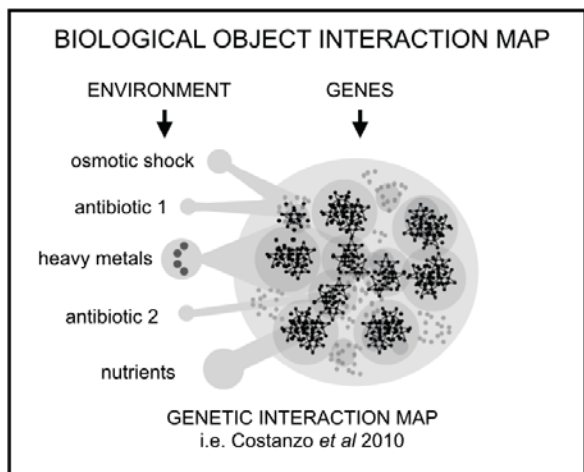
The Biological Ecosystem



The Digital Ecosystem



similarities

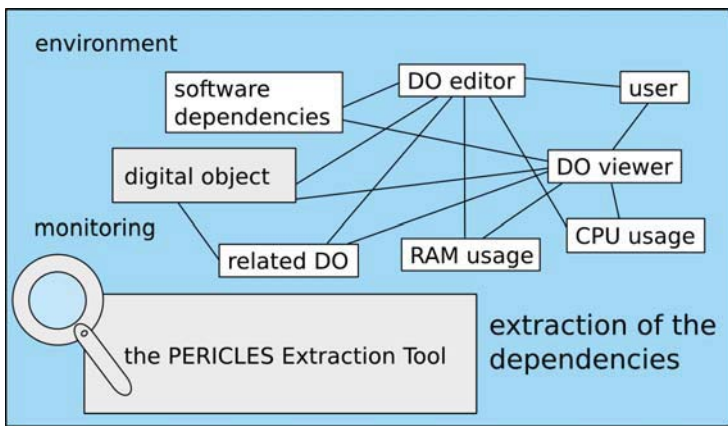


a) Extraction of significant environment information

b) SEI helps to reconstruct the ecosystems



c) SEI allows object migration with surviving functionality



A biological view on digital preservation brings benefits for both disciplines

Validity of the biological perspective on DOs has been illustrated in the case of the yeast genome. The genome is both a biological object and a DO in its sequenced shape. They are united by a common theoretical framework based on functionality, and operationally defined by fitness in the face of analysis by mutations.

The long term preservation perspective affords advantages to generalised evolution by supplying an example of a non-organismic evolutionary entity, by virtue of the fact that it is digital, allowing structural analysis. This is likely to be the first of many examples.

Generalised evolutionary perspective affords advantages to digital preservation in form of a better view of SEI than was hitherto possible.

