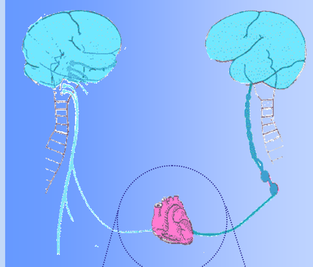
DodOrg Project Overview

L. Bauer, R. Buchty, F. Kaiser, A. von Renteln, C. Schuck, M. Wenz
Prof. K. Brändle, Prof. J. Becker, Prof. U. Brinkschulte, Prof. J. Henkel, Prof. W. Karl, Prof. H. Wörn

DodOrg

Nervous System

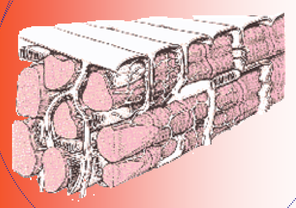


Brain Level

Heart

Organ Level

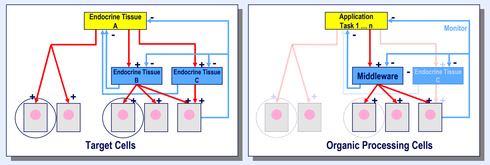
Myocardial Cell



Cell Level

Biological Concepts

Biological Concepts
(Prof. Kurt Brändle)

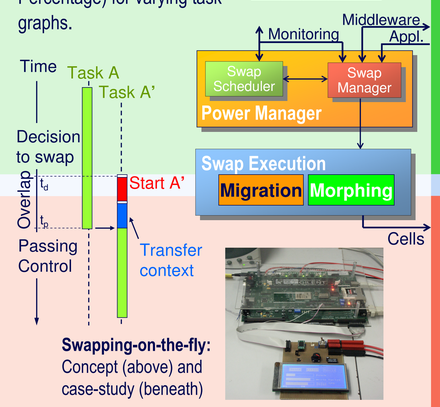


- Decentral control using messengers (data packets)
- Packets reach (every) cell of the architecture
- Target OPC alone decides whether it reacts
- Controlled by decentral feedback loops.

Ultra Low Power Processing
(Prof. Jörg Henkel)

- Power efficient heterogeneous task scheduling
- Simulation results (right table) show a good utilization (in Percentage) for varying task graphs.

Test Nr.	Organic Processing Cell I	II	III	IV	Utilization in [%]
1	24	24	5	25	
2	41	43	35	50	
3	49	68	53	57	
4	76	79	66	79	
5	76	79	85	118	

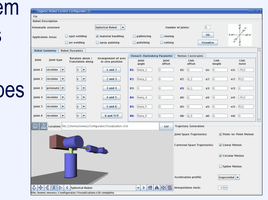


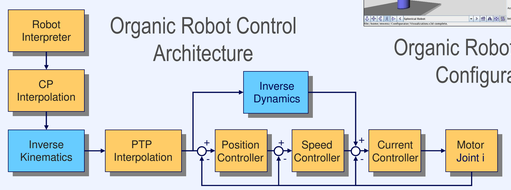
Swapping-on-the-fly: Concept (above) and case-study (beneath)

Task Distribution, Config., Optimization, Healing

Organic Robot Control *(Prof. Heinz Wörn)*

- Development of a configuration system in order to configure robot controllers on the fly (self-configuration)
- Applicable to many different robot types
- Reduce time and effort to develop new robot control systems



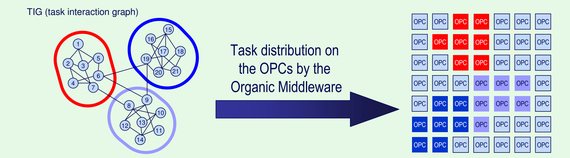


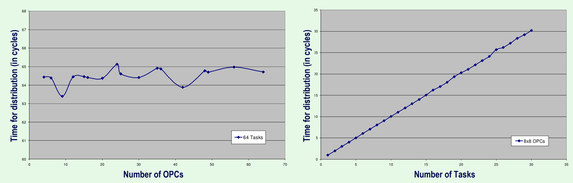
Organic Robot Control Architecture

Organic Robot Control Configurator

Application API

Organic Middleware *(Prof. Uwe Brinkschulte)*





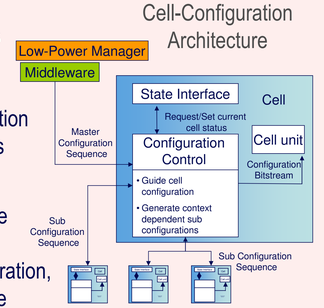
Organic Processing Cells
(Prof. Jürgen Becker)

Challenge

- Multiple configuration access ports on cell level
- No central control instance
- Support frequent reconfiguration
- Distributed sources/instances

Aim

- Unified configuration interface (protocol) on cell-level
- context sensitive self-configuration, cell builds up its infrastructure



Cell-Configuration Architecture

Application Monitoring

Middleware Monitoring, Feedback

Hardware Monitoring

Organic Monitoring
(Prof. Wolfgang Karl)

Aim

- Enable & Support Self-X Capabilities
- Focus on Increased Self-Awareness

Requirements

- Sustained System Monitoring
- Real-time Data Analysis & Evaluation
- Semantic Data Compression
- Adaptivity (Reconfiguration)
- Interfacing with other DodOrg Layers

Hierarchical Monitoring Infrastructure