

**rdc-tec**

# rdc-tec GmbH

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IT Research, Development, Consulting – Technology Center



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## About rdc-tec

rdc-tec means “Research, Development, Consulting – Technology Center”. We provide a broad specter of IT consulting services, as well as research and develop our own products.

IT projects are an integral part of any technology company. With best professional solutions, we bring your IT projects to success. We will accompany you all the way along: research, design, development, deployment and maintenance.

Just send us your project description for the first contact:  
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## Clients and Partners



Hays PLC is an international company providing recruitment and human resources services across 33 countries globally.



SEW-Eurodrive is a German manufacturing company founded in 1931. Today, it is an international organization that manufactures geared motors, frequency inverters and servo drives employing over 17,000 people worldwide with annual sales in excess of €2.8 billion.



The Karlsruhe Institute of Technology is a public research university and one of the largest research and education institutions in Germany.



HS High Stake GmbH is a limited liability company with seat in Karlsruhe, Germany.

## Reference Projects

1500 man-hours

Service Delivery

Tools & Technologies

### **SNMP Manager**

SNMP manager for embedded systems.

Custom SNMP manager running on SEW UHX with Microsoft WEC2013 and communicating with Industrial Network Access Points Siemens W700.

C, C++, SNMP, SNMP++, Net-SNMP, Windows API, embedded, cross compiler, Industry 4.0, Waterfall, Visual Studio, Application Builder, TFS, Doxygen, WireShark, WiFi, Ethernet, Industrial Network Access Point, router, embedded x86, WEC2013, MS Office, Windows

3000 man-hours

Service Delivery

Tools & Technologies

### **Industrial WiFi/Ethernet Access Point Firmware**

A firmware variety based on embedded Linux frameworks for heavy duty network access points with multiple WiFi/Ethernet chips on board.

Custom firmware / operating system development for Industrial Network Access Points ADS-TEC IWL3000, NXP/Freescale TWR-LS1021A, and SEW UHX on Linux LEDE/OpenWrt. Custom network protocols development: SEW Discovery Protocol (SDP), SEW JSON-RPC (SJR).

C, C++, Python, PHP, HTML, CSS, XML, JavaScript, WSDL, MySQL, RegExp, GCC, embedded, firmware-/driver-/kernel-development, cross compiler, open source patches, SQLite2/3, JSON, JSON-RPC, SOAP, Web Services, Industry 4.0, Waterfall, Kconfig, StarUML, Eclipse, Brackets, Atom, NetBeans, CodeLite, PyCharm, PHPStorm, uHTTPd, iPerf, WireShark, Valgrind, WiFi, Ethernet, Industrial Network Access Point, router, ARM Cortex-7, x86, Raspberry Pi, Git, LibreOffice, MS Office, Linux Ubuntu, OpenWrt, LEDE, Raspbian, Windows

850 man-hours

Service Delivery

### **RTP Proxy for IP-Telephony**

A real-time proxy for audio streaming with advanced traffic analysis (e.g. jitter) and management (e.g. telephone answering and forwarding machine).

Architecture design and development of a proxy server: multithreading core, Netty-like processing, asynchronous event loops, Reactive Streams, unit

Tools & Technologies

tests, etc.

Rust, Cargo, MIO, Reactive Streams, Netty, IDEA IntelliJ, UDP, RTP, JSON, XML, Mercurial, WireShark, Windows, Mac OS X

2000 man-hours

**Computer Telephony Integration (CTI)**

A management system for integrated and coordinated interactions between telephones and computers.

Service Delivery

Architecture design and development of:

- Windows TSP driver: multithreading and multiprocessing framework, TCP/IP communication, TSPI2 compliance, RSA and SHA cryptography over SSL channels, etc.
- Windows tray/dialog app: controls subclassing, TAPI2 compliance, Access Control List (ACL) processing, registry processing, multi-language support, check for updates, etc.
- Windows MSI installer: unattended installation, multi-language support, etc.

Tools & Technologies

C++, Windows API, ACL, TAPI, TSPI, Crypto++, TinyXml, Visual Studio, Installer Essentials, ReSharper, Doxygen, TCP/IP, HTTP, UDP, RTP, RSA, SHA, MSI Packaging, Advanced GUI, Mercurial, WireShark, VMware, Windows

2000 man-hours

**Call Manager**

A novel N-tier system for computer-telephone interactions that allows more efficient integrated computer-telephone work- and dataflow within middle-size to enterprise business environments. All interactions between arbitrary numbers of computers and telephones are managed by dedicated telephony servers. The tiers include Ethernet telephones, desktop/mobile apps, streaming proxies, call manager servers, databases.

Service Delivery

Implementation of various features for streaming proxy and call manager servers within a team of developers: jitter analysis module, faxing functionality, etc.

Tools & Technologies

Java, Spring, Hibernate, Netty, Stream API, J2EE, log4j, JUnit, Maven, IDEA IntelliJ, C, XCode, CLion, gcc, PostgreSQL, HTML, XML, JSON, JavaScript, Node.js, AngularJS, Web services, RPC, SOAP, TDD, Model-Driven Engineering, TCP/IP, UDP, RTP, Mercurial, WireShark, Mac OS X, Linux, Full-Stack, B2B, B2C, CRM, CMS, SaaS

500 man-hours

**ProjectsImporter**

A parser for freelance sites with an aggregator and a web presentation of projects.

Service Delivery

Architecture design and development of parsing service and 3-tier aggregator-presenter system: multithreading processing, model-driven engineering, Hibernate OGM, Guice dependency injections, database caching, etc.

Tools & Technologies

Java, Hibernate, Google Guice, JUnit, Apache CLI, log4j 2, JSP, J2EE, AngularJS, Maven, IDEA IntelliJ, JavaDoc, JIRA, Confluence, HTML, MongoDB, NoSQL, UML, StarUML, Tomcat, Git, Latex, Windows, B2B, Responsive Design, Full-Stack

3000 man-hours

**Semantic Tracking Modules**

Novel tracking algorithms for the Fraunhofer Network Enabled Surveillance and Tracking (NEST) system. The NEST system allows intelligent monitoring and surveillance of public areas (storehouses, train stations, airports and maritime areas).

Service Delivery

Research and development of semantic tracking modules. The developed tracking modules (JIPDAF, bootstrap particle filter) are empowered by an extended data association (additional attributes, e.g. color and sizes), the Least Discernible Quantum concept and a high-level memory framework.

Tools & Technologies

Java, Apache Commons Math, Maven, NetBeans, XML, XSL, Bayesian theory, mathematica, Git, JIRA, Confluence, Windows, Linux

10000 man-hours

**High-Level Memory for Intelligent Humanoid Robots**

A humanoid robot is one of the most complex and advanced intelligent autonomous systems. Here the ultimate goal is the creation of an anthropomorphic robot that is similar in appearance and cognitive abilities to a human. Since the intended capabilities imply most advanced cognition, reasoning and planning, a corresponding high-level memory system has to be similar to human memory.

Service Delivery

Research and development of high-level memory structure for humanoid robots (ARMAR-3, 4):

- leading of the "Perception and World Modeling" working group;

- real-time multithreading cross-platform distributed environment;
- data representation as multivariate Gaussian Mixtures;
- entities representation as dynamic sets of arbitrary attributes and relations on the basis of a proposed Progressive Mapping mechanism;
- prior knowledge representation as ontology of known entities, classes and rules;
- Bayesian update (Kalman filter, JIPDAF, bootstrap particle filter);
- probabilistic classification on the basis of weighted structural and pdf similarities;
- information deficit analysis on the basis of information entropy;
- Gaussian Mixture components reduction and weighted sampling on the basis of weak distance analysis with probe functions;
- Least Discernible Quantum employment for particle filter re-sampling and entropy calculation unification.

#### Tools & Technologies

C++, CMake, OGRE, OpenGL, DirectX, Boost, Java, XML, TCP/IP, UDP, ontologies, ontoprise, Protégé, NoSQL, MongoDB, mathematica, MATLAB, Blender, Subversion, Mercurial, Windows, Linux

#### 3000 man-hours

#### **K $\mu$ 4 Decay Analysis**

A NA48 experiment at CERN has gathered about 4 Tb data for kaon decays. This has brought new possibilities for semileptonic decays analysis: branching ratios, chiral perturbation theory checks, etc.

#### Service Delivery

Research and development of an analysis system for the rare kaon decay K $\mu$ 4. Hereby, each decay event is contaminated by millions of clutter decays. The system managed to get several thousands of K $\mu$ 4 events (646 times better than any previous attempt in the world) and analyze their branching ratio.

#### Tools & Technologies

C++, CERN ROOT, mathematica, Latex, Windows, Linux

#### 2000 man-hours

#### **University-Wide IT Infrastructure**

An IT infrastructure for the University of Mainz (35 000 students, 6 000 employees).

#### Service Delivery

Architecture design and development of:  
AD Service – analysis and monitoring of the university-wide Active Directory for portal applications;

	<p>WEA Service – Windows Event Log analysis for distributed filtering and monitoring on all computers of the Uni-Mainz.DE domain. Information transmission to a central database based on BITS and SSIS. OLAP and data mining analysis based on the MS SQL-Server Analysis Services. Visualization with Reporting Services, presentation of multidimensional data-cubes of events, data mining;</p> <p>Notification System – trigger system for failure events monitoring of heterogeneous data sources on the basis of MS SQL Notification Services. Notification of University of Mainz administrators per e-mail, RSS, Windows Messenger within a “publish/subscribe” architecture;</p> <p>Unified Messaging for the MS Exchange Server – control of the Message Waiting Indicators (MWI) of the University of Mainz telephone system for voice mails stored in MS Exchange mailboxes;</p> <p>Web Mining OLAP – analysis of Apache server logs with the MS SQL Analysis Services;</p> <p>ZDV Browser – secure web browser for public campus computers and classes for electronic examinations. The browser also substitutes Windows shell (Explorer and command line) and is flexibly configurable for different environments.</p>
Tools & Technologies	C++, COM, ATL, Windows API, MFC, C#, ASP.NET, MS SQL, SQL Server Integration Services (SSIS), BITS, OLAP, Data Mining, XML, XSL, MS Exchange, MS IIS, Apache HTTP Server, Subversion, Windows, Linux
1000 man-hours	<p><b>ATLAS Detector</b></p> <p>ATLAS is one of detector experiments constructed at the CERN Large Hadron Collider (LHC). The detector is 46 m long, 25 m in diameter and weighs about 7 000 t. It produces 1 petabyte (PB) of data per second.</p>
Service Delivery	<p>Development of:</p> <ul style="list-style-type: none"> <li>• trigger system for the Liquid Argon Calorimeter of the ATLAS detector. The system calculates incoming energies (incl. jet energy summation) on the firmware level dealing with 40 million complex events per second;</li> <li>• purity control and monitoring system for the calorimeter.</li> </ul> <p>Extensive tests of the muon spectrometer.</p>
Tools & Technologies	C, C++, LabView, SPSS, FPGA, CAN bus, Windows, Linux
1000 man-hours	<p><b>Acoustic Signals and Speech Recognition System</b></p> <p>A system for acoustic signals and speech analysis with</p>

Service Delivery

classification.

Architecture design and development of an acoustic signals and speech analysis system with Fourier/wavelet transformations, temporal analysis based on Markov chains, etc.

Tools & Technologies

C++, MFC, DirectX, mathematica, CVS, Windows

600 man-hours

**Template Translation System Multilingual Support**

The system allows automatic site text extraction, distributed translation, automatic substitution.

Service Delivery

Architecture design and development of N-tier template translation system: admin/user apps, front-end and back-end for multilingual support of web sites.

Tools & Technologies

Java, RMI, JSP, Servlet, J2EE, B2B, E-Commerce, C++, ASP, HTML, CSS, JavaScript, XML, XSL, PostgreSQL, Oracle RDBMS, UML, Rational Rose, MS SourceSafe, Windows, Linux



# Technical Experience

## IT Languages

- Java
- C
- C++
- C#
- Python
- SQL
- HTML
- XML/XSL
- CSS
- JavaScript
- UML
- OWL
- RDF
- WSDL
- Visual Basic
- Rust
- Lisp
- Pascal
- Fortran
- Perl
- Bash

## Technologies

- .NET
- ASP.NET
- ASP
- JSP
- Hibernate
- COM
- ATL
- MFC
- Windows API
- JSON
- JSON-RPC
- SOAP
- RMI
- RPC
- JUnit
- SSL
- RSA
- XPath
- HTTP
- jQuery
- AngularJS
- Node.js
- Semantic Web
- CGI
- ISAPI

POSIX  
Boost  
OGRE  
Open GL  
DirectX  
OLE  
ActiveX  
Ontology  
J2EE  
JavaFX  
Swing  
Continuous Integration  
Mocking Framework  
Maven  
CMake  
OOP  
Crypto++  
SASS  
Jade  
DoxyGen  
JavaDoc  
OLAP  
Active Directory  
TAPI  
TSPI  
ACL  
BITS  
JFC  
TCP/IP  
UDP  
RTP  
NoSQL  
RTSP  
FPGA  
CAN bus  
Netty  
Reactive Streams  
JDBC  
MIO  
Cargo  
Applet  
Google Guice  
CERN ROOT  
Java Native  
Servlet  
B2B  
B2C  
SaaS  
Web Services  
CRM  
CMS  
WordPress  
J2EE

## Databases

MySQL  
MS SQL  
Oracle  
MS Access  
PostgreSQL  
Ontoprise  
Protégé  
SQLite  
MongoDB

## Web & Application Servers

MS IIS  
Apache HTTP  
Apache Tomcat  
JBoss  
WebSphere  
GlassFish

## Tools & Software

Visual Studio  
ReSharper C++  
CLion  
XCode  
PyCharm  
GCC  
Cross compiler  
IntelliJ IDEA  
Eclipse  
NetBeans  
Atom  
PHPStorm  
MS Office  
JIRA  
Confluence  
mathematica  
MATLAB  
LabView  
SPSS  
Adobe Photoshop  
Adobe Premiere  
Adobe After Effects  
Adobe Illustrator  
CorelDRAW  
GIMP  
Lotus Notes  
Brackets  
WireShark  
StarUML  
Together  
Rational Software Architect  
Latex  
Google Docs  
VMware  
Oracle VM VirtualBox  
Git  
Mercurial

## Versioning

## Operating Systems

Subversion, SVN  
CVS  
MS Source Safe

Windows  
Windows CE  
Linux  
Embedded Linux  
FreeBSD  
Mac OS X  
iOS  
Palm OS  
VAX/VMS

## Additional Information

### Software Engineering

Object-Oriented Analysis and Design, OOAD  
Database Design  
Design Patterns  
Algorithms and Data Structures  
Multithreading  
Model-Driven Engineering  
Advanced Windows Programming  
Advanced Linux Programming  
Scrum  
Kanban  
Pair Programming  
Extreme Programming  
Test-Driven Development, TDD  
Waterfall

### Industrial Know-How

Robotics  
Telephony  
Information Fusion and Tracking  
Classifiers  
OO Environment Modeling  
High-Performance Servers  
Development of Secure Systems  
Embedded Systems  
Data Mining  
E-Commerce  
Web 2.0  
Industry 4.0

### Languages

English  
German  
Russian