PETER METZ

SYSTEMS SCIENTIST AND ENGINEER

Systems Scientist and Engineer with extensive experience designing, developing, analysing and integrating software systems and computing infrastructure.

My skills include analytic thinking and creative problem solving, as applied to system design, computer networking and virtualisation, as well as the development of software and hardware prototypes.

ABOUT ME

Most in my element when collaborating in small- to medium-sized multi-disciplinary groups and creating through the mediums of technology and/or organisational structures.

CORE SKILLS

- Problem analysis and solving
- Collaborative prototype development and evaluation
- Systems Engineering and Integration
- Software Development
- System Administration
- Technical Writing and Editing (English)

EMPLOYMENT SUMMARY

FREELANCE **01.2017 – present**
Berlin, Deutschland

- Developing and integrating custom hardware solutions including microcontroller- and SBC-based laboratory, imaging and monitoring equipment, and vacuum and high-voltage systems;
- Consulting on, and implementing websites and documentation systems, and their supporting infrastructure;
- Consulting on, and implementing decentralised and more-secure computing environments based on Qubes OS and other virtualisation systems, and through the use of internal networking infrastructure and VPN systems

SENIOR SYSTEMS ENGINEER **12.2013 – 11.2014**
Datamerge
Willetton WA 6155, Australia

- Conducted Pre-sales Engineering and produced high-level system and network designs and proposals;
- Developed and managed Project Plans for the implementation and migration of client infrastructure;
- Provided Level 3 support to my colleagues and some of our clients' own IT staff, across our range of supported storage, networking and security products, and for VMware vSphere

TECHNOLOGY ADVOCACY **12.2012 – 11.2013**
Independent Project, Perth, Australia

- Evaluated multiple Incident Reporting systems
- Established a Pilot Project documenting human rights abuses and engaged with academic, activist, political and legal groups involved in the refugee rights campaign in an attempt to develop a shared incident reporting and analysis system

CONTACT DETAILS

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Citizenship: Australian

LANGUAGES

English: Native language
Deutsch: C1

SYSTEMS SCIENTIST **04.2011 – 11.2012**
Resource Planning Department , BHP Billiton Iron Ore
Perth WA 6850, Australia

- Designed and implemented a standalone Research and Development environment (including supporting server, virtualisation and network infrastructure) and assumed the responsibility for negotiating its approval and expansion;
- Worked on the development of our in-house mine planning and visualisation suites;
- Provided ad-hoc specialist and technical support for a range of mine planning and financial modelling suites;
- Co-facilitated multiple working group and visioning workshops

SENIOR SYSTEMS ENGINEER / ANALYST **01.2000 – 04.2011**
Maritime Operations,
Defence Science and Technology Organisation
Rockingham WA 6958, Australia

- Proposed the independent sourcing, installation and integration of two Combat System laboratories, a decision that enabled a much deeper understanding of the systems involved, and which reduced costs by 75%;
- Maintained watches on technologies and standards, and proposed extensions to our internal Open Combat System Architecture in the areas of remote procedure calls and GUI management;
- Proposed and co-managed extensions to our internal simulation environment to support underwater models and operations;
- Identified stakeholder requirements, redesigned and virtualised shared supporting laboratory infrastructure, and used novel networking solutions to interconnect otherwise incompatible Combat and Simulation systems

EDUCATION

THE UNIVERSITY OF WESTERN AUSTRALIA **2008 – 2009**

Postgraduate research in Computer Science and Adaptive Systems

THE UNIVERSITY OF WESTERN AUSTRALIA **1994 – 1999**

Bachelor of Science in Information Technology (Hons, 1)
Bachelor of Engineering in Electronic Engineering (Hons, 2A)

PERSONAL INTERESTS AND PROJECTS

The development of off-grid and decentralised energy, control and communication systems; soil microbiology; mycology and its application to soil rehabilitation; mushroom cultivation; Permaculture design; reforestation; the history of computing and the restoration of classic computers; filming and video editing; self-organised political mobile libraries

Sample Projects

Managing a Client's Data Centre and Telephony Migration

Project:	Data Centre and Telephony Migration
Stakeholders:	Client organisation; Data Centre provider; IP Telephony provider; Internal (for technical review)
Environment:	Microsoft Hyper-V and Windows Servers; WatchGuard router/UTM; Netgear SANs; Zultys IP PBX
Role:	Systems Architect and Project Manager

Project Overview
The aim of this project was to move one of our larger client's core infrastructure from a self-hosted server room and pre-existing network and telephony provider to a data centre, while also managing the transition to a new data network and IP telephony provider.

Scope
On this project, I assumed the roles of System Architect and Project Manager.

As the architect, I was responsible for reviewing existing network configurations — both internal and Internet-accessible — testing and identifying issues with the new Private IP/Metropolitan Area Network prior to the migration, and preparing the necessary configuration files and changes so they could be applied to the core routing and telephony equipment on the night.

As the project manager, I was responsible for liaising with the various stakeholders; developing and maintaining the project plan and schedule; keeping management informed of the project's resource requirements; and submitting de-sign documents to the new network and telephony providers.

As this move also happened during one of the client's busier periods of operation, service downtime had to be kept to a minimum, and I was also on-call to provide post-migration support and troubleshooting.

Developing a Lab Network for Technology Evaluation and Concept Development

Project:	Systems and Mine Evaluation Lab Network
Stakeholders:	Internal (up to Resource Planning Department), Information Management
Environment:	VMware ESXi; GNU/Linux and Windows Servers; Linux and Windows workstations
Role:	System Architect and Network Administrator

Project Overview
The aim of this project was to develop a computing environment that gave my team, and the wider Resource Planning Department, the ability to explore concepts that could not otherwise be investigated on the controlled production environment, and to enable the research and concept development needed to inform future projects, requirements and standards.

Scope
On this project, I assumed the roles of System Architect and Systems and Network Administrator.

As the architect, I was responsible for estimating current and future processing and network requirements, for assessing technology options, and for designing and securing the core infrastructure. I was also responsible for doing this in a way that complied with BHP Billiton's overarching policies and standards.

As the systems administrator, I was responsible for implementing the design, and for maintaining and expanding the computing environment.

I was heavily involved in explaining what the environment is and how it supported the department's current and future projects, and in preparing business cases. I also managed the planning necessary to maintain this capability after my department moved into BHP Billiton's new offices.

Establishing a Collins Class Submarine Replacement Combat System Laboratory

Project:	Submarine Replacement Combat System Laboratory and Test Facility
Stakeholders:	Defence Science and Technology Organisation(DSTO); Small-to-medium Australian developers of tactical software; Submarine Integration, Test and Training Facility, Royal Australian Navy (RAN)
Environment:	GNU/Linux, HP/UX and Solaris servers and workstations; Windows XP workstations
Role:	Systems Architect and Systems Integrator

Project Overview

The aim of this project was to establish a research laboratory that complemented the Royal Australian Navy's existing submarine integration, certification and training facilities. While the latter are used by the Navy to conduct formal integration, acceptance testing and operator and command-team training, the combat system laboratory was designed to support more detailed technical audits, and to conduct operational, performance and reliability analyses. Since being commissioned, it has also been used to investigate and resolve software bugs, to evaluate new tactics, and to investigate risk-mitigation strategies for hardware obsolescence and reductions in power and space requirements.

The laboratory consists of multiple versions of the combat system's key hardware and software components; a limited representation of the Collins-class submarine Control Room; the reference training simulator and an internally developed simulation suite; and the computing and networking infrastructure needed to inter-connect these systems and to support our internal experiments and analyses.

Scope

For this project, I assumed the dual roles of Systems Architect and Systems Integrator; the latter was a result of my arguments in favour of the work being performed in-house, rather than contracted out.

As the architect, I was responsible for liaising with the stakeholders to determine the end-users' requirements; for translating the resulting use-cases into a set of hardware, software and interface requirements; and for designing and documenting an extensible server infrastructure that could connect current and future versions of the tactical systems, simulators and exercise analysis systems despite conflicting IP addresses and shared hardware. To work around the long lead-time of one of the components, I also designed an interim solution which allowed us to access equipment in one of the Navy's facilities via a serial-over-IP link.

As the systems integrator, I was responsible for procuring and installing all of the hardware and software systems, and for ensuring our compliance with the relevant security and safety regulations. As the laboratory was to be located in a yet-to-be-built wing of the building, I was also responsible for reviewing part of the extension's plans and room de-signs. During the integration proper, I found several significant errors and omissions in the systems' documentation. To overcome these problems I employed a variety of troubleshooting techniques including analysing serial communication lines; inspecting software configuration files and raw executables; and working directly with the systems' developers.

By carrying out this work internally, DSTO gained a detailed understanding of the in-service combat systems and training simulators — an understanding which has strengthened the organisation's ability to assess new releases, to pro-vide advice on bug-fixes, hardware obsolescence and future requirements, and to develop concept demonstrators. The decision not to use an external contractor also allowed the laboratory to be established for less than 25% of the originally quoted price.

Designing and Implementing a Minimal Fault-Tolerant Concept Demonstration Environment

Project:	Design and Implement a Minimal Fault-Tolerant Concept Demonstration Infrastructure
Stakeholders:	Defence Science and Technology Organisation; Submarine Combat Systems Forum, Royal Australian Navy
Environment:	VMware vSphere; redundant iSCSI-based SAN; GNU/Linux and Windows servers
Role:	Systems Architect and Systems and Network Administrator

Project Overview

While the submarine combat systems used by the Royal Australian Navy implement some forms of application-level fault tolerance, they are still vulnerable to the loss of individual servers and issues have been found with the operating system configurations intended to implement higher availability. The aim of this project was to produce a prototype of a general-purpose computing environment which implements fault tolerance at the host level using industry-standard techniques. The preferred options were VMware's vSphere virtualisation platform and its fault tolerance extensions, however the very limited space and power budgets allocated to DSTO onboard the submarines meant that a novel approach had to be found to implement redundant shared storage and host-level fault tolerance using just two physical computers.

Scope

I was responsible for all aspects of this project from investigating available technologies to sourcing the hardware and implementing potential solutions. The final solution used a combination of VMware vSphere running on the physical servers, GNU/Linux-based distributed RAID and iSCSI servers running within virtual machines, and a cluster-based filesystem to bootstrap the shared storage and allow the two hosts to access the distributed RAID device concurrently. The concept demonstrators proper ran within fault-tolerant virtual machines which can continue to function even if one of the physical hosts fails.

Aside from proving that host-level fault tolerance can, indeed, be used to implement a robust and redundant general-purpose computing environment, this project, together with my earlier work on virtualising other in-service tactical systems, has allowed DSTO to take a leading role, internationally, in the use of virtualisation to increase combat system reliability, to decrease power consumption on board the submarines, and to address the issues of hardware failure and obsolescence.

Developing an Indigenous Open Combat System Architecture and Software Development Kit

Project:	Generic Open Architecture for New Naval Applications (GOANNA)
Stakeholders:	Defence Science and Technology Organisation; Combat Systems Forum, Royal Australian Navy; Academia and small-to-medium Australian developers of tactical software
Environment:	GNU/Linux clusters for back-end processing; Linux and Windows XP display consoles
Role:	System Architect and Senior Software Engineer

Project Overview

Traditionally, military command and control systems have consisted of proprietary computing hardware running large, single-vendor software suites. While the custom hardware has been largely replaced by commercial-off-the-shelf computers, the majority of software architectures and middleware remain closed to third-party developers due to concerns about intellectual property and integration risks. The goal of the Open Architecture movement is to address these restrictions through the use of unencumbered specifications and standards-based technologies.

The Generic Open Architecture for New Naval Applications (GOANNA) is an open, modular and standards-based combat and sonar system architecture that was developed by the Defence Science and Technology Organisation for Australia's Collins class submarines. Its objective was to provide the Commonwealth, industry partners and academia with an alternative architecture and software environment which can be used to develop, assess and trial concept demonstrators and prototypes.

Scope

On this project, I assumed the dual roles of System Architect and Senior Software Engineer.

As a system architect, I was responsible for determining the higher-level requirements as well as co-authoring the core architectural documents. I also helped to set the direction of the architecture by arguing for the inclusion of multiple models of distributed computing and support for location independence.

I was solely responsible for planning, and conducting or managing, the technology reviews, and for designing and documenting the more advanced aspects of the GOANNA including its service discovery and execution management protocols; a data-validating and bandwidth-limiting interface to the primary combat system; support for multiple distributed computing models; and a framework for managing its graphical modules.

As a senior software engineer, I was also responsible for liaising with industry partners and members of other internal groups to determine their performance requirements, and for the design, specification and acceptance testing of the supporting software development kit.