

ITIL's roles and tools from a perspective of a Scientific Computing Centre

Dr. Holger Marten, Achim Grindler, <u>Tobias Koenig</u> HEPiX '09 | San Francisco | 29th October 2009

STEINBUCH CENTRE FOR COMPUTING - SCC



KIT – University of the State of Baden-Württemberg and National Laboratory of the Helmholtz Association

www.kit.edu

Outline of the remaining Talk



Introduction

- KIT
- SCC
- GridKa
- ITIL what is it?

Service Support Processes + Functions, roles and tools

- Configuration Management
- Incident Management
- Service Desk

With special emphasis on Grid(Ka) Services, roles, tools and experience.

Summary







Karlsruhe Institute of Technology (KIT):

Founded at 1st October 2009



University of the State of Baden-Württemberg and National Laboratory of the Helmholtz Association



3

Two Strong research areas

National Laboratory:

- Programmatic research on highest international level
- One of the largest and most successful science and engineering research institutions in Europe
- Member of the Helmholtz Association of National Research Centres

University:

- Winner of the Excellence Initiative 2006 launched by the Federal Republic of Germany and the federal states
- One of the universities strongest in research worldwide
- Highest acquisition of DFG third-party funds per capita in Germany







Figures



Employees Students 8.000 18.500 300 Professors 7000 annual budget in Million Euros







Steinbuch Centre for Computing

Steinbuch Centre for Computing (SCC)





Information Technology Centre of KIT

SCC at Research Centre

Merger of the Computing Centre of Karlsruhe University and Research Centre Karlsruhe

One of the largest scientific computing centres in Europe



Karl Steinbuch – information scientist right from the start





Karl Steinbuch (1917 – 2005)

- Professor at Karlsruhe University
- Creator of the term "Informatik"
- Co-founder of the first German faculty of informatics (Karlsruhe, 1972)
- Visionary of the information society

Established Works:

- Die informierte Gesellschaft, 1966 (The informed Society)
- Falsch programmiert, 1968 (Programmed falsely)
- Programm 2000, 1969
- Mensch Technik Zukunft, 1971 (Man Technology Future)



7

SCC – special roles: 9 ITIL coordinators





8



Outline of the remaining Talk



Introduction

- KIT
- SCC
- GridKa
- ITIL what is it?

Service Support Processes + Functions, roles and tools

- Configuration Management
- Incident Management
- Service Desk

With special emphasis on Grid(Ka) Services, roles, tools and experience.

Summary



IT Service Management



The IT Infrastructure Library (ITIL)

- Version 1 published in 1989 by the Central Computer and Telecommunications Agency of the British government, CCTA
- Version 2 (published 2000) is more and more process orientated
 next slides
- Version 3 (published 2007) is more and more service orientated. Focus: Service-Life-Cycle
- at the SCC we historically prefer V2, but you always implement from ITIL what ever you want. ITIL is only a best practice recommendation for IT Service Management.
- <u>Describes</u> IT management processes and <u>recommends</u> rules for their handling (quasi-standard in industry)
- Does *neither instruct or regulate* rules or tools nor their implementation

3 main goals of IT Service Management

- Increase IT service quality
- Decrease long term cost of IT service delivery
- Arrange IT services according to current and future requirements of the enterprise and its customers

Demands for professional IT Service Management





ITIL Service Management

ITIL Version2 has 2 blocks of Service Management Processes

Service Support	Service Delivery				
Service Desk *					
Incident Management	Service-Level Management				
Configuration Management	Finance Management				
Problem Management	Capacity Management				
Change Management	Continuity Management				
Release Management	Availability Management				
This talk	* A function rather than a process				

- <u>Daily</u> service operations and support
- Staff

- Mid / long term planning and optimization of service efficiency
- Management



Overview of ITIL Service Support







Configuration Management



Provides a logical model of the <u>whole</u> IT Infrastructure by Planning

• of strategies, roles, activities, tools, configuration data, resources, ...

Identification

• of all Configuration Items (CIs), their dependencies, documentation, persons in charge,...

- Control
 - that only authorized and identifiable CIs are accepted and comply with agreed, standardized specifications
- Fostering (status accounting)
 - of all CI changes, e.g. ordered, received, in test, in production, in repair, ...

Verification and audits

- of the physical existence of CIs, the correctness of CMDB entries, ...
- Provides the solid basis for Incident, Problem, Change and Release Mgmt
- Uses a Configuration Management Database, CMDB, as THE central tool
 - giving a full <u>internal view</u>
 - for the *whole* management and staff
- Requires the central role of an empowered Configuration Manager
 - @ SCC: from division ISM, accompanied by one contact person (ITIL coordinator) per department that provides the services and components



Services consist of components







Steinbuch Centre for Computing





SCC CMDB – SCC development based on Open Wiki







Steinbuch Centre for Computing

SCC CMDB – Internal view of Service description for FTS







SCC CMDB – Internal view of Service description for FTS







SCC Website – External view of Service description for FTS





Fertig



SCC CMDB – Interface with already existing GridKa tools (at least) during initial development phase









Incident Management



An Incident

- Is an event that leads to a degradation or interruption of a service
- At appearance usually has an unknown cause

Incident Management

- Serves to <u>recover</u> normal service operation <u>as quickly as possible</u>
- Does <u>not</u> try to find / solve the problem
- Intimately relates to on-call procedures in case of 24x7 operations concepts

Usual workflow

- Detect
- Classify severity
- Inform
- Diagnose
- Recover
- Document / close
- Hand over to Problem Management (!)







Document defines

- Prime service hours
 - 8 a.m. 6 p.m., Monday Friday, except public holidays and scheduled laboratory closures
- On-call service hours
 - 8 a.m. 6 p.m.: remaining days of the year
 - 6 p.m. 8 a.m.: all days of the year
- Service Class Levels (SCL) with availability & max time to respond
 - SCL-0
 - Vitally important (power & cooling)
 - Average availability: 99.9%
 - Max time to respond: 15 mins







... service classes continued

SCL-1

- Critical (e.g. acceptance of Tier-0 LHC data); see MoU...
- Average annual availability: 99%
- Max time to respond: 2 hrs

SCL-2

- Important (e.g. scheduled simulations and reconstruction); see MoU
- Average annual availability: 98%
- Max time to respond: 2 hrs during prime service hours, next day during on-call service hours
- SCL-3
 - Others (e.g. GridKa CA)
 - Average annual availability: 95%
 - Max time to respond: next business day







Service Desk (SD): Central interface between users or external operations teams and the internal IT service management.

The goals of the SD are to

- accept incident notification
- provide a first assessment and categorization of the incident
- try to resolve the incident or assign it to a responsible local expert
- document the incident notification
- inform / communicate with users and external groups
- incident elimination
- provide periodic (e.g. monthly) incident reports

Service Desk

- is working during prime service hours
- uses the GGUS Service Desk System







- Local Incident Communicator (LIC): Appointed by the local expert. He/she keeps the expert free from answering to non-relevant requests, searching for other experts, writing notes etc. during incident resolution.
 - The LIC is preferably but not necessarily a member of the service desk team, and his/her duties are to
 - inform the service desk about the status and progress during incident elimination
 - intercept other requests to the expert working on the incident
 - escalate to more / other local expert or groups if required
 - hand over the incident to the next shift if required
 - close and document the incident resolution







Local System Expert (LSE) The LSE are running and maintaining the basic infrastructure at the site.

- Their responsibilities are
 - installation, development and maintenance of the central monitoring systems and installation tools
 - installation, daily operation, minor fixes, repair and updates of hardware and OS
 - routinely check the base functionalities
 - attend relevant internal operations and project meetings
 - teaching and training

The LSEs

- are working during prime service hours
- routinely check the information pages of the Local Monitoring Systems
- work on notifications and alarms by Local Monitoring Systems, the Service Desk or other Local Experts







Local Application Expert (LAE) ("application" = service). The Local (Service) Application Experts are running and maintaining one or more of the services.

Their responsibilities are

- installation and update of the service
- routinely check the service functionality
- attend relevant meetings and working groups
- incident resolution
- debug and solve problems
- escalation to service developers or other relevant parties
- user support, teaching and training

The LAEs

- are working during prime service hours
- routinely check the information pages relevant to their service
- work on notifications and alarms by Local Monitoring Systems, the Service Desk or other Local Experts.







On-call Engineer (OCE) Rotating role among Local System and Application Experts. Several OCEs belonging to different thematic oncall circles at the same time. They are responsible for incident handling during on-call service hours.

OCEs have the following responsibilities:

- incident response for Service Class Levels 0, 1, and 2 on notification via SMS from Local Monitoring Systems
- trouble shooting and recovery on the basis of predefined incident procedures
- problem record tracking in the central service desk system
- escalation to and communication with other on-call circles if required
- escalation to the site management
- handover of unresolved incidents

The OCEs

are equipped with mobile phones and laptops for remote access







KIT Alarm Centre: The FZK Alarm Centre (or more precisely: building control centre) is an infrastructure unit for the whole KIT Campus North (24x7 operations, with different shifts and on-call teams).

It is responsible for

- general security, safety and fire detection and fire defense
- intervention in case of loss of electricity and cooling
- The FZK Alarm Centre operates own monitoring systems with interfaces to the Local Monitoring System of the computing centre.









- Local Monitoring Systems (LMS) If this LMS recognizes an incident an Email is send to the LSE and LAE. During on call service hours an SMS to the Mobile of the OCE is sent.
 - LMS = Nagios + few specialized tools for network monitoring.
 - > 21.000 service monitors
- It has an input interface from
 - the monitoring system of the FZK Alarm Team and
 - provides a web front-end for the daily work of LSEs
 - automatically assigns failures to LSEs and LAEs
 - respectively notifies the Service Desk
 - During on-call service hours it is switched over to generate SMS to OCEs upon SLC-0/1/2 incidents.







Incident Management roles & responsibilities

Roles

- LIC, LSE, LAE, OCE
 see previous slides
- SCC-central Incident Manager
- But GridKa / VSG ITIL coordinator for

Documentation, reporting, 24x7 hand-over, ...

- Different Workflows for incident handling because of different responsibilities
 - During prime service hours
 - During on-call service hours

Observation

Dependency Incident/Configuration Management:

Incidents certainly requires subsequent change in SCC-central CMDB







External view and tools

- Notification
 - Change log on GridKa Monitoring Web Page
 - Service Desk GGUS / Ticket system
 next slides
 - Whole suite of EGEE broadcasts and tools
- Detection
 - Service Availability Monitoring (SAM)
 - GridKa Monitoring Web Page ⇒ next slides

Internal view and tools

- Detection
 - Nagios, Ganglia, SAM
 - Nagios triggers SMS to on-call engineers
- Notification / documentation
 - Internal part of Service Desk / Ticket System
 - GridKa wiki ⇔ next slides
 - Weekly reports, internal 24x7 hand-over



External View: Service Desk GGUS





GridKa

33



Datei Dearbeiten Ansicht	Chronik L	seasaichen Extras Life							.*.
		esezeichen Extras Hiire							
		http://www.gridka.de/monitoring/main.html				রি • Google	\sim		
🔎 Meistbesuchte Seiten 🌮	Erste Schritte	🚵 Aktuelle Nachrichten							
+ + +	• Overall s	tatus: nood 449 out of 5	ingn inhe ha	ve a chulelansi	ed time i	ratio < 0.2	(I act chack done	- 14-00)	-
GridKa						D0: word		aha Daham wasi Aunam wa	
Grana	Alice: fai	r Atlas: good CMS: g	ood LHCI	DE Tair CDF:	good	DU: good	Compass: no j	obs Babar: good Auger: no	jobs
Monitoring	All values	are calculated for jobs with an e	elapsed time >	3 minutes only!					
Version 1.8							-		
	SAM mo	nitored LCG/gLite services	(OPS)	VILepton	eresults	3		Posting Gri	dKa
Planned interventions and	Convice st	atus is updated every 10 mins. F	For detailed te	st results, click on	link belov	ν.	Incid	dents, mainte	nance et
current problems	Service	Host	Status	Timestamp	(UTC)	4.0			
Overview	SRMV2	atiassrm-tzk.gridka.de	OK	2009-05-07	11:49	19 57		also her	е
Cluster/Jobs		poli-izk.gridka.de	UK OK	2009-05-07	11:37	:07 :40			
cpu/elapsed time ratio		ce-1-izk.griuka.de	UK OK	2009-05-07	11.40	.10			_
PBS job statistics		ce-3-fzk.gridka.de	ok	2009-00-07	11.47	.30 176			
Faireshare		ce-4-fzk.gridka.de	ok	2003-03-07	11:48	10			
VO secific SAM results	ETS	fis-fzk gridka de	ok	2009-05-07	11.47	····04			
dCaaba	sBDII	aiis-fzk.aridka.de	ok	2009-05-07	11:37	:57			
- dCache I/O history	SRMv2	gridka-dCache.fzk.de	ok	2009-05-07	11:47	:38			
- Server Ganglia graphs	LFC L	lfc-fzk.gridka.de	ok	2009-05-07	11:51	:08			
- space tokens	CE	- test-mw-2-fzk.gridka.de	ok	2009-05-07	11:49	:19			
Tape transfers	gRB	wms-1-fzk.gridka.de	ok	2009-05-07	11:49	:51			
- Atlas	gRB	wms-2-fzk.gridka.de	ok	2009-05-07	11:47	:38			
- CMS - LHCb	gRB	wms-3-fzk.gridka.de	ok	2009-05-07	11:48	:11			
Directory tags (CMS)									
WAN	Services f	or which only one test is run and	d no overall se	rvice status is prov	vided by S	SAM:			
FTS 2.1	Service	Host	T	'est Sta	atus	Timestamp (UTC)		
- FTM	RGMA	monbox-fzk.gridka.de	RGMA-host	-cert-valid O	k	2009-05-07	11:50:26		
	8888				L.	2000 05 07	44.40.44		



Internal View: GridKa Wiki











- The incident alarm type depends on its source. For each alarm/incident another SMS-Text is send to the mobile of the OCE:
- Nagios alarm: Service of Service Class Level 0 (SCL-0), SCL-1 or SCL-2 effected and detected by the local internal monitoring system.
- ROC DECH alarm ticket: The OCE gets an SMS about an external raised alarm via a GGUS ticket.
- GridKa alert: There is a problem seen from outside and the OCE has to look for an available expert.
- Test SMS: This SMS is testing the OCE's mobile alarming workflow before the weekend.



Internal View: GridKa Wiki: Workflow for On-call Engineers







Overview roles and tools at GridKa/SCC



	ITIL Processes at GridKa						
	Configuration Management	Incident Management	Problem Management	Change Management			
		Help Desk 1st Level Support					
Respon- sibility	Configuration Manager	Incident Manager	Problem Manager (GridKa Project Leader)	Change Manager			
(internal roles and groups)		Technical experts 2nd Level Support LAE/LSE/OCE	GridKa Technical Advisory Board (TAB)	CAB Change Advisory Board			
	GridKa Contact Person	GridKa regular meeting	GridKa "ad hoc" meeting				
External view	Services	External Monitoring / SAM tests International Service Desk platform / GGUS		Change calendar for Maintenances			
	SLA/SCL	Ticket Systems					
Internal view	Service components	Internal ticket system/	Standard RfC				
		Internal Monitoring / Nagios		Planned RfC			
		GridKa Wiki / Knowledgebase		Emergency RfC			
	CMDB (CIs: Services, Service components, HW, SW, RfCs)						



Summary: My very personal view



- It takes time to convince all colleagues.
- But it is worth to investigate. Modern processes across department borders need binding rules and efficient management
- ITIL does not mean:
 - Your company is watching you
 - Control of your personal efficiency
 - More paper work for nothing
- Added value:
 - All required data (Service Descriptions, RFCs, incident solutions) are stored once a time. Next time it can be a template for another Service Description, RFC or incident solution
 - The help desk becomes more and more efficient
 - The CMDB grows and grows and becomes more and more up-todate. Strong relation between Config./Change Management





Thank you for your attention!

For further questions you can contact the SCC's ITIL project leader (achim.grindler@kit.edu) or me (tobias.koenig@kit.edu) via Email.

STEINBUCH CENTRE FOR COMPUTING - SCC



www.kit.edu