

Continue Service Improvement at CERN Computing Centre

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Abstract: Using the framework of ITIL best practises, the service managers within CERN-IT have engaged into a continuous improvement process, mainly focusing on service operation. This implies an explicit effort to understand and improve all service management aspects in order to increase efficiency and effectiveness. We will present the requirements, how they were addressed and share our experiences. We will describe how we measure, report and use the data to continually improve both the processes and the services being provided. The focus is not the tool or the process, but the results of the continuous improvement effort from a large team of IT experts providing services to thousands of users, supported by the tool and its local team. This is not an initiative to address user concerns in the way the services are managed but rather an on-going working habit of continually reviewing, analysing and improving the service management processes and the services themselves, having in mind the currently agreed service levels and whose results also improve the experience of the users about the current services.

1. Introduction

This paper will summarize the effort started 2 years ago by the CERN IT Platform and Engineering Services (PES) group to establish a continuous service improvement cycle as part of the service management procedures, based on ITIL (Information Technology Infrastructure Library) best practices.

We will describe the motivation for such activity, the processes involved and the early results, showing a net reduction of the incidents solved at expert level, and a better understanding of incident types.

2. Background

The Platform and Engineering Services group provides batch, interactive and specialized services to the users of the physics and engineering communities at CERN; examples of these services are batch and grid services, engineering tools, and version control services.

The service manager role includes support, consolidation and evolution of the services. The support load was substantial and the first goal was to find ways to optimize it, so more time could be dedicated to service consolidation and evolution. Measured in terms of tickets, including incident and requests, the average is 100 a week for all services, with peaks reaching 160. Even if the number might not seem massive, every support ticket introduces an interruption in the daily activity that substantially increases the time dedicated to support, reaching more than 50% working time for many services.



The support structure consists of 4 levels:

A 1st level, performed by the CERN-wide Service Desk, responsible for the registration, classification and prioritization of incident and request tickets, and applicable to most CERN services.

A second level, performed by a team called IT Helpdesk, providing a general support for most services in the IT department.

The 3rd level consists of a weekly rota of service managers in the group.

And the 4th level is the service experts.

<p>1st level: Service Desk CERN wide Service desk. Ticket assignment and make sure all needed information is there</p>
<p>2nd level: IT Helpdesk IT specific Helpdesk, Below engineer level. Most services go through them</p>
<p>3rd level: Service Manager rota 1 service manager (engineer) on duty per week for all services</p>
<p>4th level: Experts Engineer level service managers, 1-2 per service</p>

Figure 1: Structure of support levels

Most services have these 4 levels, and the objective is to structure the support for all of them in this way. The exceptions come from tickets reported through mail that go directly to 2nd level, and from services where the 2nd level IT helpdesk team has not been introduced yet.

3. Objectives

The objectives we wanted to achieve with this continuous service improvement activity were several:

First, to advance in the use of ITIL best practices, and so maximize the profit of the ITIL compliant tool (ServiceNow) and processes just introduced at CERN.

Next was to document and share experts' knowledge among all the team members, so there are always several people able to act on an incident or emergency.

Another important objective was to give the 2nd level general support team all the material needed so they perform they work at their best, well trained and equipped with proper documentation and tools.

And last, the final objective was to decrease the number of incidents through monitoring and prevention, and decrease the ticket solution time.

4. Implementation

Following the “7-Step Continual Service Improvement” process is a best practice for improving IT services. It has the following steps:



Figure 2: Continual Service Improvement (CSI) Process

Step 1: Decide what should be measured. The first step was to define what we wanted to measure.

Step 2: Decide what can be measured. For this we needed to take into account how to measure it, and what we were able to measure in an easy way. We focused on weekly number of open and closed incidents per service, number of open and closed requests per service, number and percentage of those solved by each support level, and ticket solution time.

Step 3: Gather data. The gathering of the data was done with the ServiceNow Reports application to create and run custom reports. The reports are periodically run once a week, and additionally can be triggered manually at any point in time.

Step 4: Process data. The data gathered weekly is summarized in a table, where a row is added every week.

Week	Open Tasks (INC/REQ)	Open INC	Open REQ	Closed tasks (INC/REQ)	INC (2nd level=IT helpdesk/solved/SD)	REQ (2nd level=IT helpdesk/solved/SD)
16-Dec-2013	106 (45/61)	VCS (7)	VCS (27), config Mgt (7)	113 (54/59)	43/25/3 (80%/58%)	33/21/4 (56%/63%)
09-Dec-2013	138 (65/72)	VCS (21)	VCS (26), config Mgt (12)	134 (64/70)	36/7/7 (56%/19%)	43/34/3 (61%/79%)
02-Dec-2013	144 (76/68)	batch (19), elfms(9)	VCS (23), config Mgt (12)	140 (68/72)	45/31/2 (66%/69%)	51/41/1 (71%/80%)
25-Nov-2013	125 (56/69)	elfms (9), VCS (9)	VCS (32)	144 (67/77)	48/25/6 (72%/52%)	65/41/1 (77%/84%)
18-Nov-2013	169 (83/86)	Batch (35), VCS (10)	VCS (49)	119 (41/78)	33/18/3 (80%/55%)	60/40/3 (77%/67%)
11-Nov-2013	143 (58/85)	Batch (12), Twiki (10)	VCS (44)	102 (41/61)	36/15/0 (88%/42%)	51/37/3 (84%/73%)
04-Nov-2013	113 (48/65)	Batch (12), Twiki (9)	VCS (29)	149 (54/95)	42/17/2 (78%/41%)	70/39/2 (74%/56%)
15-Oct-2013	127 (64/63)	Batch (14)	VCS (33), JIRA (12)	75 (25/50)	14/5/1 (56%/36%)	35/19/2 (70%/54%)
08-Oct-2013	98 (40/58)	VCS (8)	VCS (20), JIRA (11)	98 (45/53)	29/11/2 (64%/38%)	35/21/2 (66%/60%)
01-Oct-2013	103 (47/56)	Config mgt (6)	VCS (19)	132 (56/76)	33/16/3 (59%/49%)	61/49/2 (80%/80%)
24-Sep-2013	135 (56/79)	VCS (7), batch(7)	VCS (44)	106 (48/58)	35/13/2 (73%/37%)	50/41/2 (86%/82%)
17-Sep-2013	121 (50/71)	VCS (12), plus (10)	VCS (39)	97 (40/57)	23/14/1 (58%/61%)	41/30/1 (72%/73%)
09-Sep-2013	93 (43/50)	VCS (9), JIRA (6), math (6)	VCS (26)	67 (33/34)	23/10/1 (70%/44%)	24/14/1 (70%/58%)
02-Sep-2013	82 (47/35)	VCS (8), batch (8), plus (6)	VCS (13), JIRA (8)	78 (38/40)	26/13/3 (68%/50%)	39/22/0 (97%/56%)
12-Aug-2013	90 (54/36)	VCS (16), batch (7), plus (7)	VCS (22)	101 (51/50)	37/17/1 (73%/46%)	39/16/0 (78%/41%)
05-Aug-2013	83 (39/44)	VCS (9), batch (7)	VCS (23)	101 (41/60)	26/12/1 (63%/46%)	29/11/0 (48%/38%)
08-Jul-2013	105 (49/56)	VCS (15), EDA (7)	VCS (26), Jira (12)	72 (55/17)	42/25/4 (76%/60%)	12/2/0 (71%/17%)
01-Jul-2013	145 (64/81)	VCS (23), plus (11), twiki (8)	VCS (49)	142 (90/52)	64/35/11 (71%/55%)	43/11/0 (83%/26%)

Figure 3: weekly statistics table

Step 5: Analyse data. To understand and increase the number of tickets solved by the second level support team (generic IT helpdesk) we decided to analyse the tickets solved every week, to raise and discuss with them the ones that could have been solved by them and weren't. Very soon this task was taking more time, and a weekly IT-PES Service Meeting was established to go systematically through all tickets and analyse them with 2nd and 3rd support levels together.

Step 6: Present the results. In this step we are going to interpret the data gathered, so we can later use it to take corrective actions. The results are presented weekly, through the weekly IT-PES Service Meeting, to the different support teams and service managers, so they know the evolution of the support activity for their services. In addition, summaries are also presented weekly to the management, and yearly to summarize progress.

Step 7: Implement corrective actions. The outcome of the weekly IT-PES Service Meetings is a list of tasks that are tracked and closely followed up, including documentation, tools to automate some routine checks to be used by the second level team or the users directly, scheduled tutorials, etc. The meeting lasts a maximum of half an hour, and is the forum to exchange information between support teams, and also between services, sharing experience, best practices and lessons learnt. In summary, the meeting implements a basic problem management flow, where recurrent incidents are identified, analysed, and the required change logged and followed up till the end.

Number	Short Description	Assignment group	Assigned to	Task type	Incident state [Incident]	Request State [Request Fulfillment]
Functional Element: BDII (2)						
Functional Element: CERN-PROD Nagios Instance (1)						
Functional Element: Configuration Management (8)						
Functional Element: CVMFS (6)						
Functional Element: DNS Load Balancing (4)						
Functional Element: Electronics Design Automation tools (5)						
Functional Element: ELF ms (2)						
Functional Element: FTS (1)						
Functional Element: JIRA Issue Tracking (18)						
Functional Element: LXBATCH (4)						
Functional Element: LXPLUS (12)						
Functional Element: Mathematics tools (1)						
Functional Element: Mechanical Engineering tools (6)						
RQF0264371	Ansys support	Mechanical Engineering tools 2nd Line Su...	Lionel Dieu	Request Fulfillment		Waiting for user
INC399697	Solid Works- PCTE23612	Mechanical Engineering tools 3rd Line Su...	Guy Boch	Incident	Resolved	
RQF0263920	to install Matlab and SolidWorks	Service Desk	Agata Mankowska	Request Fulfillment		Resolved
RQF0263640	new computer	Mechanical Engineering tools 3rd Line Su...	Guy Boch	Request Fulfillment		Waiting for user
INC398499	Autodesk-Inventor2013: problems with online help - TERAROSSANA2	Mechanical Engineering tools 2nd Line Su...	Ulrike Lemard	Incident	Resolved	
INC397169	Uninstallation of ANSYS 14.5	Mechanical Engineering tools 3rd Line Su...	Guy Boch	Incident	In progress	
Functional Element: Twiki (3)						
Functional Element: Version Control Systems (30)						
Functional Element: VOBBox infrastructure support (4)						
Functional Element: VOMS (2)						

Figure 4: Weekly summary of tickets for Service Meeting

After 2 years running the IT-PES service meeting and weekly gathering and analyzing the ticket monitoring data, the percentage of tickets solved by the 2nd level team has improved from 25% till 43%, which means they have solved around 1000 tickets more in the last 2 years.

There are some fluctuations depending on the week due to the introduction of new services, or of major changes or new features in existing services (e.g. change from SL5 to SL6 in batch and interactive service) which cause a peak in the number of incidents and where the 2nd level team is not trained yet to handled them.

Additionally, ten tutorials have been given in the last year, and around 50 new FAQs written for the different services, as tasks originated in the weekly Service Meeting.

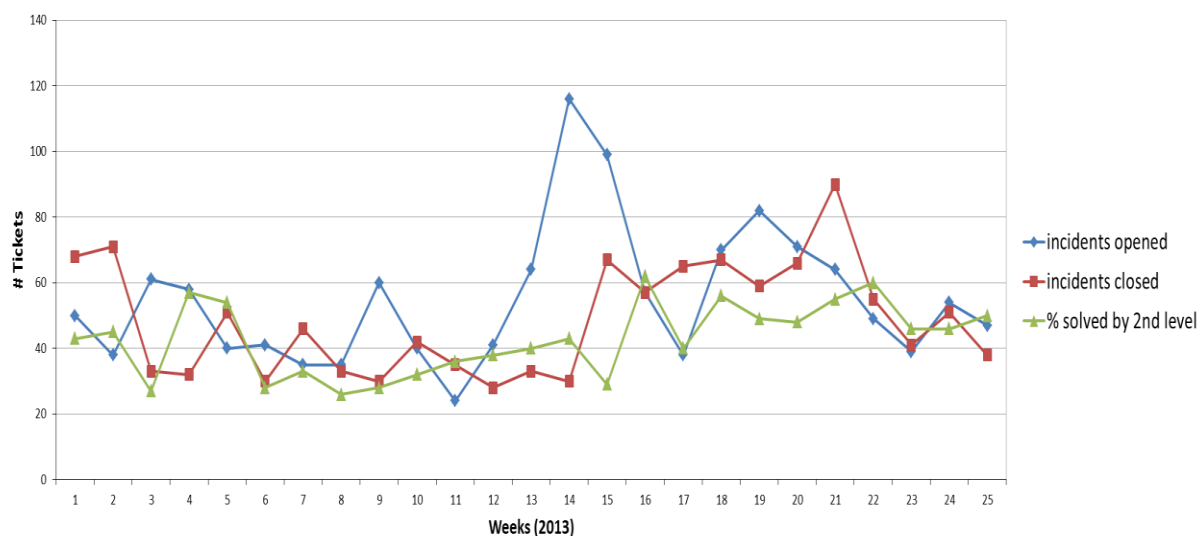


Figure 5: weekly 2013 ticket statistics

Once per year, we extract data for each service to see the evolution during the 12 months: number of tickets, solution time, support levels involved in solving the tickets. Some manual analysis is also done to categorize all tickets, identify the functional areas where most tickets are, and analyse the causes.

Twiki service (2013)

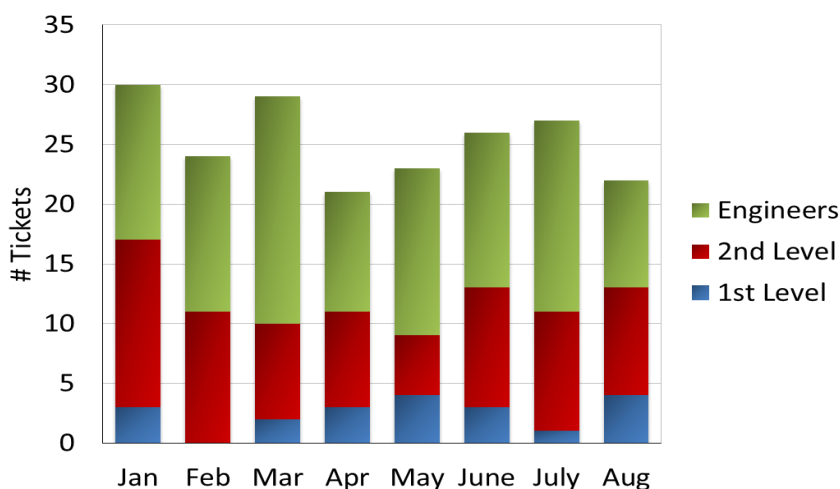


Figure 6: Tickets solved by support level for the Twiki service

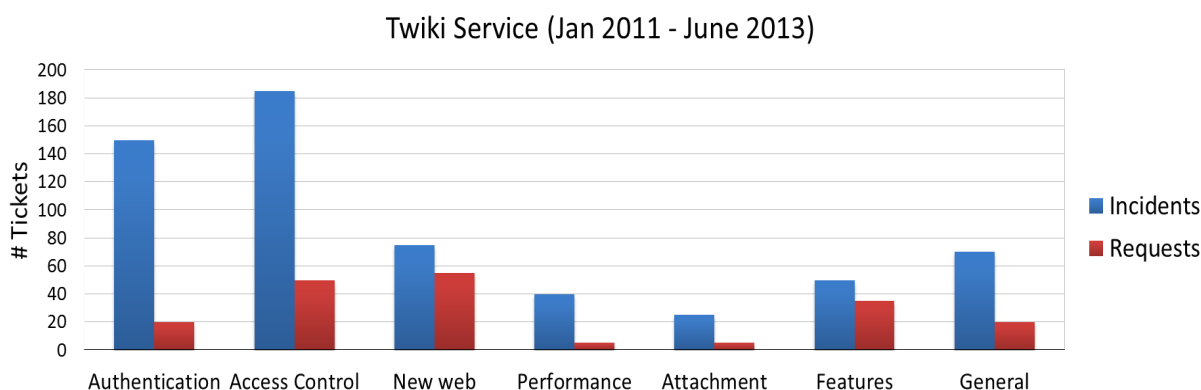


Figure 7: Analysis of ticket category for the Twiki service

And once an Improvement Process cycle is finished, it will start over again, with the re-definition of the goals and associated measurements.

5. Conclusion

The monitoring of the incident and request management processes is essential for the service support area.

The choice of metrics and the automation of the measurements so they can be quickly extracted and analyzed is a first step. The choice of a support structure that allows for knowledge exchange and that does only involve experts exceptionally at the end of the chain, is very valuable in most services, even on the most complex ones, as there is always place for automation, documentation, and identification of routine tasks that can be performed by more general support teams, and that will avoid continuous interruptions on experts service managers, which will have more time to consolidate the service and so make it more resilient against incidents.

It is challenging to estimate how much time has been already saved with this initiative, as new services have been introduced and so the annual number of tickets did not decrease (3919 in 2011, 4274 in 2012, and 4485 in 2013). What we have seen is a clear increase of the tickets solved by the 2nd level (IT Helpdesk) team, mostly in services where there has been an effort to automate routine tasks (e.g. create repositories, grant user access) and to do a close follow up of training and documentation needs. When all this is done through a weekly face to face meeting, the communication between the teams improves, and so does the information/knowledge exchange between both, and it makes easier the adoption of best practices among all services in the group.

Problem management is an essential piece of the puzzle of continuous service improvement; it is important to have a central role to follow it up, with weekly meetings and tracking of the resulting changes till the end, so incidents are not repeated over time.