

Cfengine and COBIT

A Business White Paper

The Control Objectives for Information and related Technology (COBIT) are a set of best practices (framework) for Information Technology (IT) management. You can use COBIT to develop appropriate IT governance and control in a company. As with all IT-related frameworks and processes, the overall goal is to automate as many processes as possible, leave the work to the computers while human beings do the creative work of designing and improving the overall operations. This white-paper shows how Cfengine can help you automate part of some of the proposed COBIT-processes.

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The 4 domains of COBIT

COBIT defines IT activities in a generic process model within four domains. These domains are (1) Plan and Organize, (2) Acquire and Implement, (3) Deliver and Support and (4) Monitor and Evaluate.



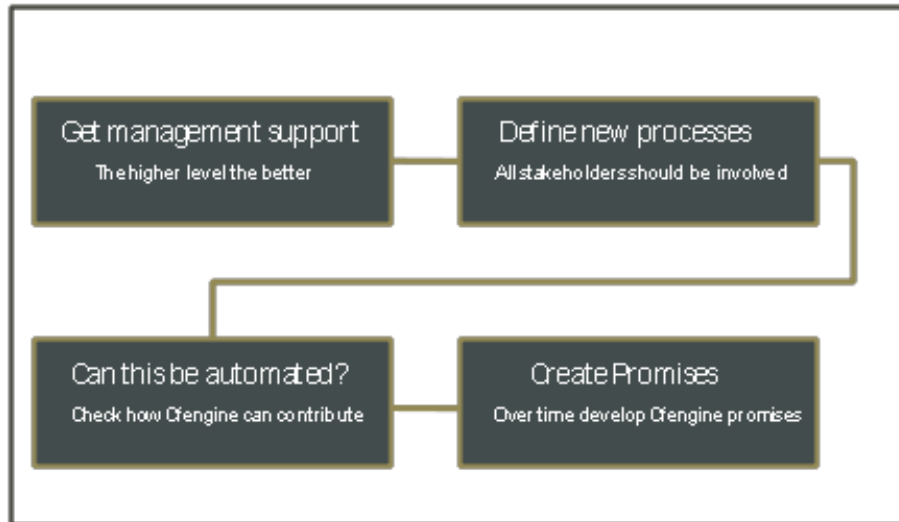
The illustration shows these four domains and how they interrelate. Marked in red we have indicated the areas in which Cfengine can be used for automation. Across the 4 domains, COBIT has identified 34 IT processes that are generally used. Below is a short summary of some of these processes with suggestions on how Cfengine can help you achieve your COBIT-goals more effectively. First comes an introduction on how to adopt Cfengine in the light of COBIT.

Cfengine and COBIT

Adopting a COBIT-process is not a journey with a simple ending, and should be thought of as a process of evolution. This is the same way we recommend organization use Cfengine. The earlier an organization takes on Cfengine in the process, the more of it can be automated.

The capabilities of Cfengine can easily be overwhelming to a novice, but many processes can be wholly or partly automated. For every business and IT-process, best-practice would be to see that process in the light of Cfengine, and maximize what can be automated.

The generic model for using Cfengine in automation proposes first getting management support. The next step is to define new internal processes (using GAP-analysis and other tools appropriate to decide where you want to end.) This must involve all stake-holders. For each new process, the domain of Cfengine automation should be defined, and then gradually over time, these processes should be automated by developing them as Cfengine promises. The illustration below shows how to use Cfengine in your IT/Business compliance process



The COBIT-processes

There are 34 processes defined within the COBIT-framework. These belong to one of the four main domains of COBIT. To see where Cfengine can contribute to automation, below some of these processes are highlighted specially.

COBIT-process A14: Enable operation and use

Knowledge about new systems is made available. This process requires the production of documentation and manuals for users and IT, and provides training to ensure proper use and operations of applications and infrastructure.

How Cfengine can help:

Cfengine Knowledge map is about knowledge transfer. It ensures that knowledge remains in the organization and not merely in the head of a few employees on which the organization runs the risk of becoming dependent.

When working with Cfengine, you are also working with the documentation, as these two things are tightly intertwined. All your settings and the intentions behind them can be traced through the implementation. Documentation tends to become quickly obsolete, but with Cfengine, you automatically create the documentation. The Knowledge Map can even be extended to include external documentation and references for third party applications and processes.

COBIT process A16: Manage change

All changes, including emergency maintenance and patches, relating to infrastructure and applications within the environment are formally managed in a controlled manner. Changes are logged, addressed, and authorized prior to implementation.

How Cfengine can help:

Many organizations use Cfengine for Change Management. The commercial versions of Cfengine come with enhanced 'tripwire' functionality to detect and even repair such unauthorized changes. Using access-control lists (ACLs), you can tailor file privileges throughout

your organization (Linux, Solaris and Windows). By default, you can have all your directories and files locked, report all changes, keep logs for later analysis and use Cfengine's self-repair functionality to prevent accidentally changes in the ACLs or other settings. Cfengine also enables version control and supports staging (from development to production systems).

COBIT process DS1: Define and manage service levels.

Effective communication between IT management and business customers regarding services required is enabled by a documented definition of and agreement on IT services. This process also includes monitoring and timely reporting to stakeholder on the accomplishment of service levels.

How Cfengine can help:

Cfengine is all about promises. Everything in Cfengine is defined in terms of promises, derived from our Promise Theory model. Promises are like 'SLAs' or Service Level Objectives (SLOs). By structuring and defining the Cfengine promises in accordance with your other compliance requirements, SLA monitoring and management is taken care of automatically.

For instance assume one of your SLAs relates to free disk space: 'XX must at all times have at least XX GB of disk space free'. This SLO might be turned into a Cfengine promise stating that if the disk-space is less than XX+10%, Cfengine must begin collecting garbage or activate another node to ensure the free disk space never falls below the agreed amount. These actions can be reported if required.

COBIT process DS3: Manage performance and capacity.

The need to manage performance and capacity of IT resources requires a periodical review of current state. This process includes forecasting future needs based on workload, storage and contingency requirements.

How Cfengine can help:

Cfengine can be used to measure and manage system usage, performance and capacity. Conditional operations can be automatically executed based on results compared to defined goals. Cfengine agents typically run on every machine, physical or virtual, making it suitable for performance and capacity planning. Thanks to self-learning capabilities, anomalies can be detected and trend-analyses emerge out-of-the box. With Cfengine you will quickly be able to detect trends that need special attention or further planning.

COBIT-process DS4: Ensure Continuous Service.

The need to providing continuous IT services requires the development maintenance and testing of IT continuity plans, utilizing offsite backup storage and providing periodic continuity plan training.

How Cfengine can help:

IT continuity plan involves setting up Cfengine to take appropriate actions based on immediate criteria. For instance use Cfengine to activate a mirror-site and redirect pointers to the new site in case certain process unavailability. A simple webserver plan might look like this:



- Ensure server processes are always running
 1. If a process is not running, try to restart the process
 2. If a process does not restart after 4 times, move to mirror-site, create log
- Ensure there is enough disk-space on webservers
 1. If less than 20% disk-space, report (or activate new virtual guest)
 2. Frequently delete certain directories (tmp, trash, etc.)
- Ensure CPU-utilization is within 2 standard deviations
 1. If high CPU-utilization over time, automatically add new resources (virtual guest)
 2. Send CPU trend-reports to management on a daily basis

Such a plan can easily be extended to include more advanced features and details. The importance of various details varies from organization to organization, and is typically learned over time. This is what Cfengine does well - learning from past behavior and enabling for more predictable operations by seeing the system in a wider context.

COBIT-process DS5: Ensure systems Security.

The need to maintain the integrity of information and protect IT assets requires a security management process. This process includes establishing and maintaining IT security roles and responsibilities, policies, standards and procedures. Security management also includes performing security monitoring and periodic testing.

How Cfengine can help:

Cfengine performs system security reporting and can execute responses to potential breaches. The solution is suitable for logging at various levels from high-level to low-level. Use the logs and analysis to further improve system security. All logs and reports are available in the Knowledge Map. We recommend starting off by looking at the PCI-DSS requirements found on or website to get a good starting point for your security management. PCI-DSS, The Payment Card Industry Data Security Standard, includes a set of comprehensive requirements for enhancing payment account data security, assuring a high level of system security.

COBIT-process DS9: Manage the configuration.

Ensuring the integrity of hardware and software configurations requires the establishment and maintenance of an accurate and complete configuration repository. This process includes collecting initial configuration information, establishing baselines, verifying and auditing configuration information, and updating the configuration repository as needed.

How Cfengine can help:

With Cfengine misconfigurations can be avoided. Ensure proper records are always kept prior to a change. Cfengine dry-run function can be used to test any change and unauthorized changes are prevented. Use Cfengine to configure all systems. The solution runs on all common operating systems. Analysis and reports are automatically created to become the foundation for further improvements while Cfengine do the actual work of ensuring configuration compliance throughout your sites.



COBIT-process DS13: Manage operations.

Complete and accurate processing of data requires effective management of data processing procedures and diligent maintenance of hardware. This process includes defining operating policies and procedures for effective management of scheduled processing, protecting sensitive output, monitoring infrastructure performance and ensuring preventive maintenance of hardware.

How Cfengine can help:

Use Cfengine to schedule your backup and any other application. Cfengine ensures all your services are run on time, and reports are automatically created for later audits. By using Cfengine as your scheduling tool, you only need to look one place to get a complete overview of scheduled applications, outputs and reducing the need for manual interventions and manual ad-hoc operations. Scheduling is easy with Cfengine. A list of all jobs can easily be viewed.

COBIT-process ME1: Monitor and Evaluate IT Performance.

Effective IT performance requires a monitoring process. This process includes defining relevant performance indicators, systematic and timely reporting of performance, and prompt action upon deviations. Monitoring is needed to make sure that the right things are done and are in line with the set directions and policies.

How Cfengine can help:

Nova comes with enhanced monitoring capabilities. All you configurations-settings, application-behavior, process management, and much more can be automatically monitored and reported on. All Cfengine promises can create detailed reports and logs, which can be used to evaluate your operations and design them in a more predictable and proactive way.

COBIT-process ME3: Ensure Compliance with External requirements.

Effective oversight of compliance requires the establishment of a review process to ensure compliance with laws, regulations and contractual requirements. This process includes identifying compliance requirements, optimizing and evaluating the response, obtaining assurances that the requirements have been complied with, and finally, integrating ITs compliance reporting with the rest of the business.

How Cfengine can help:

Create Cfengine policies in accordance with external requirements and you will automatically get compliance and necessary reports and log to prove it. Effective and successful audits come automatically with Cfengine. Provide the auditor with your policies and their intentions, and you can rest assured Cfengine will do the actual work. Documentation of Cfengine promises often is good enough proof in a compliance audit.

Conclusions

The principles of COBIT enable organizations to more easily connect business and IT operations. In the world of increasing demand for compliance and evidence of IT-value, COBIT stands out as a good choice for many. Underneath the human processes, there are several



areas that can be optimized through automation. The goal of Cfengine is to automate as many of these as is reasonable.