

**Oracle Utilities Work and Asset Cloud  
Service**

Overview Guide

Release 20A

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Oracle Utilities Work and Asset Cloud Service Release 20A Overview Guide

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# Chapter 1

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## Oracle Utilities Work and Asset Cloud Service Overview

This guide provides an overview of the Oracle Utilities Work and Asset Cloud Service, including:

- [Welcome to Oracle Utilities Work and Asset Cloud Service](#)
- [Oracle Utilities Work and Asset Cloud Service Applications](#)
- [Oracle Utilities Work and Asset Cloud Service Documentation](#)
- [Supported Client Platforms and Browsers](#)
- [Supported Integrations](#)
- [High-Level Roles and Responsibilities](#)
- [Operational Readiness Advisory](#)

# Welcome to Oracle Utilities Work and Asset Cloud Service

Oracle Utilities Work and Asset Cloud Service is used to maintain information about assets and various features and functions around managing those assets. The solutions provides a means of recording asset acquisition, maintenance, procurement, installation and removal, and more.

Oracle Utilities Work and Asset Cloud Service comprises the following functional areas:

- Asset Management: functionality to manage the receipt, installation, maintenance, tracking and removal of assets
- Management of approval processing
- Tracking of purchasing transactions
- Tracking of inventory and resources
- Tracking of costs, accounting, and financial transactions
- Construction Work Management functionality that provides a comprehensive set of processes to facilitate the management of construction work.
- Oracle Utilities Cloud Service Foundation: tools used to orchestrate and automate infrastructure related processes and migrate data from legacy applications into the cloud service.
- Oracle Utilities Analytics Visualization: a suite of analytics applications that provides access to real-time data for self service exploration, discovery, visualization, and analysis. It includes rich pre-built analytical data models, metrics, and key performance indicators that allow you to derive strategic insights from your data.

# Oracle Utilities Work and Asset Cloud Service Applications

Oracle Utilities Work and Asset Cloud Service includes the following applications:

- Oracle Utilities Work and Asset Management Enterprise Edition
- Oracle Utilities Work and Asset Management Purchasing
- Oracle Utilities Work and Asset Management Construction Work Management
- Oracle Utilities Work and Asset Management Connector for Geospatial Information Systems
- Oracle Utilities Cloud Service Foundation
- Oracle Utilities Analytics Visualization
- Oracle Utilities Testing Accelerator
- Oracle BI Publisher

# Oracle Utilities Work and Asset Cloud Service Documentation

Configuration and use of Oracle Utilities Work and Asset Cloud Service is described in the following documentation:

- Oracle Utilities Work and Asset Management and Operational Device Management v2.2.0.6.1 Business User Guide
- Oracle Utilities Work and Asset Management and Operational Device Management v2.2.0.6.1 Administrative User Guide
- Oracle Utilities Cloud Services 20A documentation, including:
  - Oracle Utilities Cloud Service Foundation Administrative User Guide
  - Oracle Utilities Cloud Services Data Upload Support Guide
  - Oracle Utilities Cloud Services End User Provisioning Guide
  - Oracle Utilities Cloud Services Integration Guide
  - Oracle Utilities Cloud Services Object Storage Setup Guide
  - Oracle Utilities Cloud Services Development Operations Guide
  - Oracle Utilities Cloud Services REST Data Services Guide
- Oracle Utilities Testing Accelerator documentation
- Oracle Utilities Analytics Visualization User Guide

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# Supported Client Platforms and Browsers

Users access Oracle Utilities Work and Asset Cloud Service via a supported web browser.

Oracle Utilities Work and Asset Cloud Service supports the following operating system & web browser combinations:

<b>Operating System</b>	<b>Web Browser</b>
Windows 8.1	Firefox ESR 62+ Google Chrome for Enterprise 80+
Windows 10	Firefox ESR 62+ Google Chrome for Enterprise 80+
iPad2 iOS 10.x	Safari (selected flows and portals only)

The recommended monitor resolution is 1920 X 1080 or higher with the browser zoom level set at 100%. The application can be used with lower resolution monitors and/or at a greater than 100% browser zoom level, but users may need to use horizontal scrolling on some pages.



## Supported Integrations

Oracle Utilities Work and Asset Cloud Service supports integration with a number of other products. See the following sections for details:

- [Oracle Utilities Product Integrations](#)
- [Using Oracle Utilities Testing Accelerator with Oracle Utilities Work and Asset Cloud Service](#)

### Oracle Utilities Product Integrations

Oracle Utilities Work and Asset Cloud Service requires integration with a host application which sends activities and other information. Oracle Utilities Work and Asset Cloud Service can also integrate to other non-Oracle utility applications, such as a Customer Information Management, Customer Relationship Management, Asset Management System, etc. via a custom integration.

Supported integrations include:

Oracle Utilities Product	Versions	Integration Products
Oracle Utilities Work and Asset Management Connector for Enterprise Resource Planning (WAM - ERP)	SOA 12.1	<ul style="list-style-type: none"> <li>• Oracle Utilities Work and Asset Management</li> <li>• Enterprise Resource Planning</li> </ul>
Oracle Utilities Work and Asset Management GIS Integration	Esri ArcGIS v10.4.1	<ul style="list-style-type: none"> <li>• Oracle Utilities Work and Asset Management</li> <li>• Esri ArcGIS</li> </ul>
Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service Cloud	WACS 19C, 20A OIC 19.4.3 OFSC 19D	<ul style="list-style-type: none"> <li>• Oracle Utilities Work and Asset Manage or Oracle Utilities Work and Asset Cloud Service</li> <li>• Oracle Field Service Cloud</li> </ul>
Oracle Utilities Work and Asset Cloud Service/ Oracle Utilities Work and Asset Management Integration to Oracle Primavera	WACS 19C, 20A • Project Integration Framework - R19.9 • Oracle Primavera - 15.X and above	<ul style="list-style-type: none"> <li>• Oracle Utilities Work and Asset Manage or Oracle Utilities Work and Asset Cloud Service</li> <li>• Oracle Primavera</li> </ul>

### Using Oracle Utilities Testing Accelerator with Oracle Utilities Work and Asset Cloud Service

Oracle Utilities Testing Accelerator (OUTA) is a testing framework based on Java and Selenium used for automated testing of Oracle Utilities applications and cloud services. It allows for developing, managing and executing web service and user interface based automated tests, using meta-data based approach, without any programming language.

Oracle Utilities Testing Accelerator has a user friendly graphical web interface that enables people without much programming knowledge to develop automated test flows.

Along with the automation framework, Oracle Utilities Testing Accelerator includes an accelerator that supports automated testing of Oracle Utilities cloud services, such as Oracle Utilities Customer Cloud Service and Oracle Utilities Work and Asset Cloud Service. The accelerator contains several hundred re-usable components that are the modular building blocks of an automated test flow. The Oracle Utilities Testing Accelerator user interface allows for these components to be laced together to form an automated test flow. The test data can then be coupled to the automated test flow and executed using the browser-based execution engine within the Oracle Utilities Testing Accelerator web application.

The browser-based test execution engine should be used for the execution of web service based test automation flows. In addition to the web interface, Oracle Utilities Testing Accelerator includes an eclipse IDE plugin that supports the execution of tests from local desktops or laptops. This mode should be used for executing user interface based tests that are developed using the Oracle Utilities Testing Accelerator web application. The script generation engine in the Oracle Utilities Testing Accelerator web interface auto generates the scripts for user interface based tests, which can then be executed via the Eclipse IDE (with the Oracle Utilities Testing Accelerator plugin).

The following features of Oracle Utilities Testing Accelerator have been enhanced so that they work with Oracle Utilities cloud services:

1. For executing the web service based test automation flows, the Flow Configuration that contains the web service URL along with additional properties such as smtp server, etc is pre-defined to work with Oracle Utilities cloud services. Users need not create a new Flow Configuration.

See the **Executing Test Flows** and **Executing Test Flows Using a Browser** sections in the *Oracle Utilities Testing Accelerator User Guide* for more information.

(UTA\_User\_Guide\_6.0.0.1.pdf document, section : ),

2. For generating components using the component generator tool, the complete WSDL URL need not be specified in the field, only the web service end point name needs to be provided.

See the **Development Accelerator Tools** and **Component Generation Tool** sections in the *Oracle Utilities Testing Accelerator User Guide* for more information.

3. For fetching test data from the Oracle Utilities cloud services, the WSDL URL need not be specified, only the web service end point name should be specified.

See the **Fetching Test Data From an Utilities Application** section in the *Oracle Utilities Testing Accelerator User Guide* for more information.

4. Oracle Utilities Testing Accelerator is integrated with Oracle Identity Cloud Service when using it with cloud services. The management of users in Oracle Utilities Testing Accelerator web application should be done through Oracle Identity Cloud Service. See the *Oracle Utilities Cloud Services End User Provisioning Guide* for more information about creating and managing users.

## High-Level Roles and Responsibilities

This section outlines high-level roles and responsibilities involved in the deployment, configuration, and maintenance of Oracle Utilities cloud services, and the party responsible for each. The **Owner** column in the tables below indicates the party responsible for each role and responsibility.

### Hardware, Storage, Technology, and Application Software

Role and Responsibility	Owner
Provide, deploy and monitor hardware and storage	Oracle
Provide, deploy, run and monitor all required technology (e.g containers, operating systems, databases, clustering, monitoring, tracing)	Oracle
Provide, deploy, run and monitor all Oracle Utilities base application software	Oracle

### Security

Role and Responsibility	Owner
Monitor cloud service infrastructure security	Oracle
Administer Oracle network security	Oracle
Administer customer network security, including integrating with the Oracle networks	Customer
Configure & maintain cloud service users and access	Customer
Integrate with Oracle networks	Customer

### Database

Role and Responsibility	Owner
Database administration services (monitoring, administration, etc)	Oracle
Backup and Restore	Oracle
Backup retention	Oracle
Data replication for Disaster Recovery (where applicable)	Oracle
Disaster Recovery database fail-over	Oracle
Refresh of TEST DB from PROD (upon request and within prescribed limits)	Oracle

<b>Role and Responsibility</b>	<b>Owner</b>
Information Lifecycle Management	Customer

## Implementation, Configuration, and Extensions

<b>Role and Responsibility</b>	<b>Owner</b>
Plan and execute implementation project	Customer
Perform configuration of enterprise software features and functions	Customer
Execute functional, system, load and performance testing of configuration and extensions	Customer
Ensure operational readiness	Customer
Schedule all gate review services	Customer

## Patching and Upgrading

<b>Role and Responsibility</b>	<b>Owner</b>
Patch and upgrade underlying infrastructure software	Oracle
Patch and upgrade Oracle Utilities base application software	Oracle
Decide the cloud service upgrade schedule (within prescribed limits)	Customer
Trigger environment upgrades (Development, Test and Production)	Customer
Perform regression testing of configuration and extensions after patching / upgrades	Customer

## Batch Processing

<b>Role and Responsibility</b>	<b>Owner</b>
Monitor underlying batch infrastructure	Oracle
Provide infrastructure logs for batch incidents	Oracle
Resolve infrastructure batch issues	Oracle
Determine batch schedule	Customer
Monitor batch stream/job completion	Customer
Perform first level investigation of batch issues	Customer
Provide customer logs of batch incidents	Customer

<b>Role and Responsibility</b>	<b>Owner</b>
Resolve functional batch issues and stream/job restart	Customer
Resolve data issues	Customer

## Support

<b>Role and Responsibility</b>	<b>Owner</b>
Triage, analyze, and resolve issues with the cloud service	Oracle
Triage, analyze, and resolve issues with configuration and extensions	Customer
Raise Service Requests via My Oracle Support and provide all requested information	Customer

## Integration

<b>Role and Responsibility</b>	<b>Owner</b>
Provide productized integrations (where explicitly agreed)	Oracle
Integrate Oracle Utilities cloud services with all other services or applications	Customer

# Operational Readiness Advisory

This section outlines suggested validations as part of operational readiness testing:

- Confirm that all batch processes have been successfully executed
- Confirm production converted data has successfully been tested through key work flows
- Confirm all system triggered notifications have been tested for initiation and completion

# Chapter 2

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## Implementation Support and Live Operate Services

This chapter describes implementation support and live operate services for Oracle Utilities Work and Asset Cloud Service:

- [Implementation Support Services](#)
- [Live Operate Services](#)

# Implementation Support Services

Implementation Support Services are services that relate to the initial set up of Oracle Utilities cloud services. If Implementation Support Services are included in your Oracle Utilities cloud service(s), it will be stated in the relevant services descriptions.

The scope of the Implementation Support Services provided by Oracle is limited and currently includes (but it not limited to) the following:

Oracle will work to:

- Provide pre-configured templates (where available). These templates may be limited in scope (and may not completely align with the scope of the implementation project) and may only be available in the English language.
- Provide Utility Reference Model and other documentation describing the business processes that are the basis for the template configuration.
- Conduct any mandatory gate reviews
- To the extent necessary and under exceptional circumstances, execute scripts (authored by the customer) to resolve data issues.
  - Scripts submitted for execution to correct data issues will be subject to review for compliance with Oracle's Software Security Assurance standards. Scripts that do not comply will be returned for correction; resubmission will require a further compliance review with approval before execution will be scheduled.
  - There is a limit of four (4) script reviews in any calendar month. Review requests beyond this entitlement may be subject to additional fees.

Customers/Implementers retain complete responsibility for all other aspects of implementing the cloud service, including (but not limited to):

- Overall setup project management, including responsibility for management of the scope, the project plan/schedule and budget.
- End-user training activities and organizational change management.
- Leading and managing the user system review.
- Designing and testing all configurations and extensions to ensure they do not adversely affect performance.
- Identifying, designing, documenting and implementing any business process changes and system operation processes.
- Coordinating with external vendors or service providers to manage dependencies that could impact the overall project scope and schedule.
- Designating a project manager who shall be responsible for coordinating all customer/implementation related activities and responsibilities with respect to provisioning these Oracle Cloud Services.
- Business process change activities including end-user communication (e.g., status updates, newsletters, forums, etc.).
- Planning and executing all testing activities.
- All cut-over and roll-out activities.



- Business intelligence or data warehouse implementation/integration (if required).
- Procuring, setting up or otherwise provisioning any additional hardware, software or services as required.
- Providing any network hardware and/or software that may be required to connect to the Oracle Utilities cloud service(s).
- Scheduling any mandatory gate reviews, and ensuring that the customer and implementation meets any specified gate review entry conditions or other criteria.
- All data conversion/migration/cleansing activities such as:
  - Extracting, transforming and loading data into migration staging tables
  - Using cloud service data conversion tools (where available) to load data into the production environment
  - Creating or updating any required validation scripts
  - Any/all data cleansing activities that may be required (NB: these must be done in the source application(s) and not directly in the cloud service environment(s))
- Providing all in-scope data conversions and interfaces in formats supported by the relevant Oracle Utilities cloud service(s).
- The following interface/integration related activities:
  - Building and testing of any interfaces to or from the Oracle Utilities cloud service(s) (unless stated otherwise)
  - Any ongoing synchronization and interface monitoring activities between customer owned Customer Information System(s) (CIS) and Oracle Utilities cloud service(s)
  - Complete end to end integration flows using template interfaces
  - Any configuration of interfaces external to the Oracle Utilities cloud service(s) that are required to match the published specification for interfacing with the Oracle Utilities cloud service(s)

The provision of these Implementation Support Services is contingent on the following:

- Any integration middleware used to implement any integration will not be hosted within any Oracle Utilities cloud service(s).
- Turnaround time will be no longer than two (2) working days unless otherwise agreed. Turnaround time refers to time taken by the customer/implementation team to respond to and confirm design elements and decision points during the performance of the Implementation Support Services.

# Live Operate Services

Live Operate services are services that Oracle provides to assist you with the ongoing operation of supported Oracle Utilities cloud services, once live and in production. If Live Operate Services are included in your Oracle Utilities cloud service(s), it will be stated in the relevant services descriptions.

The scope of the Live Operate Services provided by Oracle is limited and currently includes the following:

Oracle will work to:

- Assign a Customer Success Manager ("CSM") to manage delivery of the Oracle Utilities cloud service(s). The CSM will be the primary point of contact, will act as the first point for escalations, will monitor the progress of any related service requests ("SR") and confirm that all Oracle Utilities cloud services are performed in accordance with targets.
- Provide access to information about incidents and changes made to any of your Oracle Utilities cloud service environment(s).
- Upon request, create and deliver a Quarterly Status Report summarizing the activities undertaken over the past quarter and those scheduled as major future events.
- Upon request, offer quarterly meetings with customer/implementation oversight team to present, review and discuss the Quarterly Status Report.
- Monitor infrastructure and application availability and resolve any incident that is within Oracle's scope or responsibility.
- Provide primary Help Desk Services from 08:00 to 17:00 your local time on Oracle working days.
- Respond to severity 1 incidents 24 hours per day, 365 days per year.
- Provide incident management and problem management services for events related to Oracle Utilities Cloud Services, including:
  - Analyzing issues and resolving any incidents that are within Oracle's scope or responsibility
  - Escalating any issues not within Oracle's scope or responsibility to you for resolution
  - Provide infrastructure logs to assist in the diagnosis and remediation of incidents within your scope or responsibility. NB: these logs may be scrubbed for security purposes and other sensitive data.
  - Executing scripts authored by You to resolve data issues, but only to the extent such execution is necessary and the circumstances necessitating execution are exceptional
    - Scripts submitted for execution to correct data issues will be subject to review for compliance with Oracle's Software Security Assurance standards. Scripts that do not comply will be returned for correction; resubmission will require a further compliance review with approval before execution will be scheduled.
    - There is a limit of two (2) script reviews in any calendar month.

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Customers remain completely responsible for all other aspects of using or otherwise operating the cloud service. Examples of customer obligations in this regard would be to:

- Assign a manager to act as the primary conduit for all issues relating to the delivery of these services.
- Provide Oracle with the dates for key business and technology events (i.e. testing calendar, refresh schedule etc.) at least thirty (30) days prior to the event.
- Assign appropriate resources to support your activities.
- Support scheduling of meetings as required.
- Participate in all scheduled meetings.
- Manage all activities, including:
  - Prioritizing work activities
  - Providing coordination across any teams and/or interested parties external to Oracle.
  - Escalation of issues to the Oracle CSM in a timely manner.
  - Providing any information required to progress service requests. Oracle is not responsible for meeting any agreed (or stated) targets or objectives if required or requested information is not forthcoming in a timely manner.
  - Assigning appropriate resources to conduct all required acceptance testing for all software packages delivered.
  - Accepting all software packages prior to promotion to the Production environment.
  - Maintaining a contact list for all persons performing governance functions.
  - Participating in Oracle's internal quality assurance processes on a mutually agreed schedule.
- Manage the Oracle Utilities cloud services, including:
  - Defining and (as necessary) modifying batch schedules to meet business needs.
  - Monitoring batch and interface processes to confirm and verify completion.
  - Defining, implementing, testing and deploying any changes to the configuration and extensions required to:
    - Resolve incidents or problems within the customers scope or responsibility
    - Meet evolving business needs
    - Conform with upgrades, patches or any other Oracle Utilities cloud service requirements or prerequisites.
- Notify Oracle of any incidents detected.
- Action each SR in accordance with the relevant Oracle Cloud Hosting and Delivery Policies.
- Establish the method of communication between the incident management team and the Oracle team for each incident.
- Redirect any SRs to the correct (non- Oracle) support team if the SR is not within the scope of the Oracle Utilities cloud service(s).

- Assist the Oracle team with SR analysis of data originating outside the applications.
- Correct business data as reasonably requested by Oracle to achieve closure of an identified problem.
- Monitor customer network and network connections to ensure sufficient bandwidth and performance.
- Conduct all functional, regression, performance, system integration, acceptance and/or user acceptance testing as appropriate, and accept and approve all software changes, prior to the production roll out of any change, in accordance with any agreed-on release management process, for any change resulting from:
  - An incident remedy or fix, or
  - Any service pack update or upgrade.
- Provide authorizations and/or validations for data correction and/or adjustments to the supported environments.
- Apply configuration changes that are within the customer's or implementation's scope as recommended by Oracle to prevent recurring incidents.
- At Oracle's request, provide approval through the environment change management process for the installation of fixes to prevent recurring incidents.
- Initiate documented escalation processes when the urgency of the incident has increased due to business requirements.
- Provide incident support where the remediation is within Oracle's scope or responsibility, specifically:
  - Provide Oracle with access to the user who reported the problem.
  - Provide all information as reasonably requested by Oracle and participate in diagnostics.
  - Provide a test case and access to an environment where the SR incident is reproducible.
- Provide Oracle, as necessary, with access to any other support teams.
- Acknowledge that the supplied break-fix resolves the incident or problem and accept the SR closure.
- Provide internal approvals to Oracle before the migration of any change recommended by Oracle into a production environment.
- When an incident or problem is determined by Oracle to be unrelated to an Oracle Utilities cloud service or to be caused by data problems arising from data conversion or some other error, a separate, paid contract may be required to cover Oracle's time spent investigating and, if relevant, correcting the problem at Oracle's prevailing time and materials rates, and to reimburse Oracle for all reasonable out of pocket expenses.

# Chapter 3

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## Oracle Utilities Cloud Services Third Party Software and Licenses

This chapter information regarding third-party software used in Oracle Utilities cloud services, including:

- [Third Party Software Notices](#)
- [Third Party Software Licenses](#)

Refer to the *Oracle Utilities Work and Asset Management v2.2.0.6 Licensing Information User Manual* for additional third-party licensing information.

## Third Party Software Notices

Required notices for open source or other separately licensed software products or components distributed in this product are identified in the following table along with the applicable licensing information. Additional notices and/or licenses may be found in the included documentation or readme files of the individual third party software.

**Note:** A copy of each license appears in the Third-Party License section, unless otherwise noted.

Provider	Component	Version	License Information
Apache	Apache Commons JEXL	3.1	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Commons Codec	1.11	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Commons FileUpload	1.3.3	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Commons HttpClient	4.1.2	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	commons-cli	1.3.1	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	HttpCore	4.4.11	Copyright 2005-2019 The Apache Software Foundation
Apache	httpd	2.4.39	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Kafka	2.1.0 2.3.0	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Log4j	2.8.2 2.10.0	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	lz4-java	1.4	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	org.yaml/snakeyaml	1.19	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	Tomcat Embed	9.0.12	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache	ZooKeeper	3.4.14 3.5.4	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
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The Apache Software Foundation	Apache Portable Runtime (apr)	1.6.5	Copyright 2019 The Apache Software Foundation.
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The Apache Software Foundation	Velocity Engine	2.1	Copyright (C) 2000-2007 The Apache Software Foundation Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Aslak Helleøy	Gherkin	6.0.14	Copyright (c) Cucumber Ltd, Gaspar Nagy, Björn Rasmusson, Peter Sergeant
cliftonlabs	json-simple	3.0.2	Apache License, Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Codehaus	animal-sniffer-annotation	1.14	Released under the MIT license
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The `_random` module includes code based on a download from <http://www.math.sci.hiroshima-u.ac.jp/~m-mat/MT/MT2002/emt19937ar.html>. The following are the verbatim comments from the original code:

A C-program for MT19937, with initialization improved 2002/1/26.

Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using `init_genrand(seed)` or `init_by_array(init_key, key_length)`.

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Modified by Jack Jansen, CWI, July 1995:

- Use binascii module to do the actual line-by-line conversion between ascii and binary. This results in a 1000-fold speedup. The C version is still 5 times faster, though.
- Arguments more compliant with Python standard

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Original location:

<https://github.com/majek/siphash/>

Solution inspired by code from:

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djb ([supercop/crypto\\_auth/siphash24/little2](https://github.com/supercop/crypto_auth/siphash24/little2))

Jean-Philippe Aumasson (<https://131002.net/siphash/siphash24.c>)

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