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| The MITRE Corporation |
| The OVAL® Language UNIX Component Model Specification |
| Version 5.11 |
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| **12/1/2014** |

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| The Open Vulnerability and Assessment Language (OVAL®) is an international, information security, community standard to promote open and publicly available security content, and to standardize the transfer of this information across the entire spectrum of security tools and services. By standardizing the three main steps of the assessment process: representing configuration information of systems for testing; analyzing the system for the presence of the specified machine state; and reporting the results of the assessment, the OVAL Language provides a common and structured format that facilitates collaboration and information sharing among the information security community as well as interoperability among tools. This document defines the UNIX platform-specific data model for the OVAL Language. |

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# Feedback

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# Introduction

## 1.1 Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in *RFC 2119* [1].

The following font and font style conventions are used throughout the remainder of this document:

* The Courier New font without formatting is used for writing constructs in the OVAL Language Data Model. When the font is **boldfaced**, it indicates commands on the UNIX command line.

Examples: generator (OVAL Construct), **ls –al** (UNIX command)

* The *'italic, with single quotes'* font is used for noting values for OVAL Language properties.

Example: *'does not exist'*

* The bold font and the keyword **Default Value:** are used to indicate a property's default value.

Example: **Default Value: -1**

* The bold font and the keyword **xsi:nil="true":** are used to indicate the meaning of an entity when the xsi:nil property is set to true.

Example: **xsi:nil="true"** indicates that the file\_object MUST collect the set of directories specified by the path entity. In addition, a value, for the filename entity, MUST NOT be specified.

This document uses the concept of namespaces[[3]](#footnote-3) to logically group OVAL constructs throughout both the Data Model section of the document, as well as other parts of the specification. The format of these namespaces is prefix:element, where the prefix is the namespace component, and the element is the name of the qualified construct. The following table lists the namespaces used in this document:

|  |  |  |  |
| --- | --- | --- | --- |
| Data Model | Namespace | Description | Example |
| OVAL Definitions | oval-def | The OVAL Definitions data model that defines the core framework constructs for creating OVAL Definitions. This is defined in the OVAL Language Specification [2]. | oval-def:TestType |
| OVAL System Characteristics | oval-sc | The OVAL System Characteristics data model, which defines the constructs used to capture the data collected on a target system. This is defined in the OVAL Language Specification. | oval-sc:ItemType |
| UNIX Definitions | unix-def | The UNIX Definitions data model defines the platform-specific constructs used in OVAL Definitions to make assertions about the state of UNIX systems. | unix-def:file\_test |
| UNIX System Characteristics | unix-sc | The UNIX System Characteristics data model defines the platform-specific constructs used in OVAL System Characteristics to represent the system state information collected from UNIX systems. | unix-sc:file\_item |

Lastly, each OVAL Test will contain a section titled "Known Supported Platforms" that specifies which platforms the OVAL Test is known to work on. This section is provided for convenience only and should not be considered a comprehensive list. In addition, there may be further known support restrictions specified for behaviors or entities that supersede the "Known Supported Platforms" section for the OVAL Test.

## 1.2 Document Structure

This document serves as the specification for the UNIX extension of the OVAL Language Specification and defines the platform-specific data model. This document is organized into the following sections:

* Section 1 – Introduction
* Section 2 – OVAL Language UNIX Component Model
* Appendix A – References
* Appendix B – Change Log
* Appendix C – Terms and Acronyms

# OVAL Language UNIX Component Model

The OVAL Language UNIX Component Data Model is the platform-specific extension of the OVAL Language Data Model for UNIX operating systems.

## Data Model Conventions

This document follows the data model conventions described in Section 4.1 of the OVAL Language Specification.

## unix-def:file\_test

The file\_test is used to make assertions about the metadata associated with the directories and files returned by either an **ls**[[4]](#footnote-4) command, **stat**[[5]](#footnote-5) command, or **stat()**[[6]](#footnote-6) system call, on file systems supported by UNIX operating systems. The file\_test MUST reference one file\_object and zero or more file\_states.



### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:file\_object

The file\_object construct defines the set of files and/or directories whose associated system state information should be collected and represented as file\_items. The file\_object is capable of collecting all UNIX file types (directory, regular file, character device, block device, fifo, symbolic link, and socket). The set of files to be evaluated may be identified with either a complete filepath or a path and filename. Only one of these options may be selected.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex file\_objects that are the result of logically combining and filtering the file\_items that are identified by one or more file\_objects.  The behaviors, filepath, path, filename, and filter properties MUST NOT be specified when this property is specified.  Please see the OVAL Language Specification for additional information. |
| behaviors | unix-def:FileBehaviors | 0..1 | false | Specifies the behaviors that direct how the file\_object collects file\_items from the system. |
| filepath | oval-def:  EntityObjectStringType | 0..1 | false | The absolute path to a file on the system.  A directory MUST NOT be specified for this property, and the path and filename properties MUST NOT be specified when this property is specified.  The max\_depth, recurse, and recurse\_direction behaviors MUST NOT be used in conjunction with this property as they are reserved for use with the path and filename properties. This is because the filepath property represents an absolute path to a particular file and it is not possible to recurse over a file.  Also, the recurse\_file\_system behavior MUST NOT be set to ‘defined’ when a pattern match is used with a filepath property. |
| path | oval-def:  EntityObjectStringType | 0..1 | false | The directory component of the absolute path to a directory or file on the system.  The filepath property MUST NOT be specified when this property is specified.  When a pattern match is used with a path entity, the max\_depth, recurse\_direction, and recurse behaviors MUST NOT be used.  Also, the recurse\_file\_system behavior MUST NOT be set to ‘defined’ when a pattern match is used with a path property. |
| filename | oval-def:  EntityObjectStringType | 0..1 | true | The name of a file to evaluate.  A filename SHOULD NOT contain the NUL or / characters[[7]](#footnote-7).  In addition, a filename SHOULD NOT 1) include control characters and shell metacharacters such as those in the set {\*, ?, :, [, ], ", <, >, |, (, ), {, }, &, ', !, \, ;} or 2) start with a dash (-)[[8]](#footnote-8), due to the potentially dangerous consequences associated with the unintended use of certain UNIX commands.  The filepath property MUST NOT be specified when this property is specified.  **xsi:nil="true"** indicates that the file\_object MUST collect the set of directories specified by the path entity. In addition, a value for the filename entity MUST NOT be specified or a var\_ref is used. |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of file\_items from the set of file\_items collected by a file\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def:FileBehaviors

The FileBehaviors construct defines the behaviors that direct how the file\_object collects file\_items from the system. Note that using these behaviors may result in some unique results. For example, a double negative type condition might be created where an object entity says include everything except a specific item, but a behavior is used that might then add that item back in.

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Possible Values | Description |
| max\_depth | integer | *< -1*  *-1*  *0*  *> 0* | Defines the maximum depth of file system traversal when the recurse\_direction behavior is set to a value other than *'none'*.  *< -1*: not permitted.  *-1***:** traverse the file system with no limitation.  *0***:** do not traverse the file system.  *> 0***:** traverse the file system for the specified number of levels.  **Default Value: -1** |
| recurse | string | *'none'*  *'files'*  *'files and directories'*  *‘symlinks’*  *‘directories’*  *‘symlinks and directories’* | Defines how to recurse into the path entity, i.e. what to follow during recursion. Options include symlinks, directories, or both. A max-depth other than 0 MUST be specified for recursion to take place.  *'none'*: **DEPRECATED (5.4)** None was originally intended to mean no recusion; however, this is already covered by the recurse\_direction attribute, and so it has been deprecated with removal in version 6.0.  *'files'*: **DEPRECATED (5.4)** This value has been deprecated in 5.4 and will be removed in version 6.0 because it is not possible to recurse files.  *'files and directories'*: **DEPRECATED (5.4)** This value has been deprecated in 5.4 and will be removed in version 6.0 because it is not possible to recurse files.  *‘symlinks’*: Traverse via only symlinks.  *‘directories’*: Traverse via only directories.  *‘symlinks and directories’*: Traverse via both symlinks and directories. |
| recurse\_direction | string | *'none'*  'up'  *'down'* | Defines the direction to recursively visit the directories on the file system.  *'none'*: do not traverse the file system.  'up':traverse the file system by recursively visiting the parent directories.  *'down'*:traverse the file system by recursively visiting the child directories.  An error MUST NOT be reported when the max\_depth behavior specifies a certain level of traversal and that level does not exist.  **Default Value: none** |
| recurse\_file\_system | string | *'all'*  *'local'*  *'defined'* | Defines the file system limitation of any searching. This applies to all operations as specified in the path or filepath entity.  In most cases it is recommended that the value of *‘local’* be used to ensure that file system searching is limited to only the local file systems, as searching ‘all’ file systems may have performance implications.  *'all'*:traverse both local and remote file systems.  *'local'*:only traverse the local file systems.  *'defined'*:only traverse the specified file system.  The value of *'defined'* MUST only be used in conjunction with the equality operation because the path or filepath entity must explicitly define a file system.  **Default Value: all** |

## unix-def:file\_state

The file\_state construct is used by a file\_test to specify the system state information, associated with files or directories, to check on file systems that are supported by UNIX platforms. All of the parameters here can be found via the stat command[[9]](#footnote-9) and system call on a per file basis, or for all files and directories, **ls –al**, **ls –alu**, or **ls –alc** where appropriate[[10]](#footnote-10) (except for the group and user numbers). For convenience in identifying permissions, the user that each permission refers to is underlined and boldfaced (owner/user, group, or other) as part of the ten character string outputted from the command **ls –l**, drwxrwxrwx. For example, the d in **d** rwx rwx rwx represents a directory. For the s and t bits, capitalized letters (S and T) indicate that the execute permission is OFF, whereas lowercase letters indicate that the execute permission is ON[[11]](#footnote-11).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| filepath | oval-def:EntityStateStringType | 0..1 | false | The absolute path to a file on the system.  A directory MUST NOT be specified for this property.  The max\_depth and recurse\_direction behaviors MUST NOT be used in conjunction with this property as they are reserved for use with the path and filename properties. |
| path | oval-def:EntityStateStringType | 0..1 | false | The directory component of the absolute path to a directory or file on the system. |
| filename | oval-def:EntityStateStringType | 0..1 | false | The name of a file to evaluate.  A filename SHOULD NOT contain the NUL or / characters[[12]](#footnote-12).  In addition, a filename SHOULD NOT 1) include control characters and shell metacharacters such as those in the set {\*, ?, :, [, ], ", <, >, |, (, ), {, }, &, ', !, \, ;} or 2) start with a dash (-)[[13]](#footnote-13), due to the potentially dangerous consequences associated with the unintended use of certain UNIX commands.  The filepath property MUST NOT be specified when this property is specified. |
| type | oval-def:EntityStateStringType | 0..1 | false | The file's type: regular file (regular), directory, named pipe (fifo), symbolic link, socket or block special. In the output for the **stat** command, this information is found right after the IO Block field[[14]](#footnote-14), and for the output of the **ls –l** command[[15]](#footnote-15), **d** rwx rwx rwx. |
| group\_id | oval-def:EntityStateIntType | 0..1 | false | The group owner of a file, by group number. This can be found via the **stat** command[[16]](#footnote-16). |
| user\_id | oval-def:EntityStateIntType | 0..1 | false | The numeric user id, or uid, is the third column of each user’s entry in /etc/passwd. This element represents the owner of the file. This can be found via the **stat** command[[17]](#footnote-17). |
| a\_time | oval-def:EntityStateIntType | 0..1 | false | The time that the file was last accessed, in SECONDS, since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –lu** or **stat** commands. |
| c\_time | oval-def:EntityStateIntType | 0..1 | false | The time that the file's inode was changed, in SECONDS, since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –lc**, or **stat** commands, or the **stat** system call. |
| m\_time | oval-def:EntityStateIntType | 0..1 | false | The time, in seconds, that the file was last modified since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –l** or **stat** commands. |
| size | oval-def:EntityStateIntType | 0..1 | false | The size of the file in bytes. Both are indicated in the output of the **ls –l** and **stat** commands. |
| suid | oval-def:EntityStateBoolType | 0..1 | false | Indicates the program runs with the uid (thus privileges) of the file’s owner, rather than the calling user. For the output of the **ls –ld** or **stat** command[[18]](#footnote-18), it is indicated by d rw**s** rwx rwx where s replaces the first x. |
| sgid | oval-def:EntityStateBoolType | 0..1 | false | Indicates the program runs with the gid (thus privileges) of the file’s group owner, rather than the calling user’s group. For the output of the **ls –ld** or **stat** command[[19]](#footnote-19) it is indicated by d rwx rw**s** rwx where s replaces the second x. |
| sticky | oval-def:EntityStateBoolType | 0..1 | false | Indicates that the users can delete each other’s files in this directory, when said directory is writable by those users. For the output of the **ls –ld** or **stat** command[[20]](#footnote-20) it is indicated by d rwx rwx rw**t** where t replaces the final x for a directory. |
| uread | oval-def:EntityStateBoolType | 0..1 | false | Indicates the owner (user owner) of the file can read this file, or if a directory, read the directory contents. For the output of the **ls –l** or **stat** command[[21]](#footnote-21) it is indicated by d **r**wx rwx rwx. |
| uwrite | oval-def:EntityStateBoolType | 0..1 | false | Indicates the owner (user owner) of the file can write to this file, or if a directory, write to the directory. For the output of the **ls –l** or **stat** command[[22]](#footnote-22) it is indicated by d r**w**x rwx rwx. |
| uexec | oval-def:EntityStateBoolType | 0..1 | false | Indicates the owner (user owner) of the file can execute it or, if a directory, change into the directory. For the output of the **ls –l** command[[23]](#footnote-23) it is indicated by d rw**x** rwx rwx. |
| gread | oval-def:EntityStateBoolType | 0..1 | false | Indicates the group owner of the file can read this file, or if a directory, read the directory contents. For the output of the **ls –l** command[[24]](#footnote-24) it is indicated by d rwx **r**wx rwx. |
| gwrite | oval-def:EntityStateBoolType | 0..1 | false | Indicates the group owner of the file can write to this file, or if a directory, write to the directory. For the output of the **ls –l** command[[25]](#footnote-25) it is indicated by d rwx r**w**x rwx. |
| gexec | oval-def:EntityStateBoolType | 0..1 | false | Indicates the group owner of the file can execute it or, if a directory, change into the directory. For the output of the **ls –l** command[[26]](#footnote-26) it is indicated by d rwx rw**x** rwx. |
| oread | oval-def:EntityStateBoolType | 0..1 | false | Indicates that all other users can read this file, or if a directory, read the directory contents. For the output of the **ls –l** command[[27]](#footnote-27) it is indicated by d rwx rwx **r**wx. |
| owrite | oval-def:EntityStateBoolType | 0..1 | false | Indicates that all other users can write to this file, or if a directory, write to the directory. For the output of the **ls –l** command[[28]](#footnote-28) it is indicated by d rwx rwx r**w**x. |
| oexec | oval-def:EntityStateBoolType | 0..1 | false | Indicates that all other users can execute the file or, if a directory, change into the directory. For the output of the **ls –l** command[[29]](#footnote-29) it is indicated by d rwx rwx rw**x**. |
| has\_extended\_acl | oval-def:EntityStateBoolType | 0..1 | false | Indicates the file or directory has ACL permissions[[30]](#footnote-30) applied to it. For the output of the **ls –l** or stat commands is it indicated by a plus sign (+) appended to the end of the d rwx rwx rwx string[[31]](#footnote-31) as in d rwx rwx rwx **+**. If the file or directory doesn’t have an ACL, or it matches the standard UNIX permissions, the value will be *false*. Otherwise if a file or directory has an ACL, the value will be *true.* |

## unix-sc:file\_item

The file\_item construct defines the system state information associated with files and directories on file systems supported by the UNIX platform. All of the parameters here can be found via the stat command[[32]](#footnote-32) on a per file basis, or for all files and directories, **ls –al**, **ls –alu**, or **ls –alc** where appropriate[[33]](#footnote-33) (except for the group and user numbers). For convenience in identifying permissions, the user that each permission refers to is underlined and boldfaced (owner/user, group, or other) as part of the ten character string outputted from the command **ls –l**, drwxrwxrwx. For example, the d in **d** rwx rwx rwx represents a directory. For the s and t bits, capitalized letters indicate that the execute permission is OFF, whereas lowercase letters indicate that the execute permission is ON[[34]](#footnote-34).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| filepath | oval-sc:EntityItemStringType | 0..1 | false | The absolute path to a file on the system.  A directory MUST NOT be specified for this property.  The max\_depth and recurse\_direction behaviors MUST NOT be used in conjunction with this property as they are reserved for use with the path and filename properties. |
| path | oval-sc:EntityItemStringType | 0..1 | false | The directory component of the absolute path to a directory or file on the system. |
| filename | oval-sc:EntityItemStringType | 0..1 | false | The name of a file to evaluate.  A filename SHOULD NOT contain the NUL or / characters[[35]](#footnote-35).  In addition, a filename SHOULD NOT 1) include control characters and shell metacharacters such as those in the set {\*, ?, :, [, ], ", <, >, |, (, ), {, }, &, ', !, \, ;} or 2) start with a dash (-)[[36]](#footnote-36), due to the potentially dangerous consequences associated with the unintended use of certain UNIX commands.  The filepath property MUST NOT be specified when this property is specified. |
| type | oval-sc:EntityItemStringType | 0..1 | false | The file's type: regular file (regular), directory, named pipe (fifo), symbolic link, socket or block special. In the output for the **stat** command, this information is found right after the IO Block field[[37]](#footnote-37), and for the output of the **ls –l** command[[38]](#footnote-38), **d** rwx rwx rwx. |
| group\_id | oval-sc:EntityItemIntType | 0..1 | false | The group owner of a file, by group number. This can be found via the **stat** command[[39]](#footnote-39). |
| user\_id | oval-sc:EntityItemIntType | 0..1 | false | The numeric user id, or uid, is the third column of each user’s entry in /etc/passwd. This element represents the owner of the file. This can be found via the **stat** command[[40]](#footnote-40). |
| a\_time | oval-sc:EntityItemIntType | 0..1 | false | The time that the file was last accessed, in SECONDS, since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –lu** or **stat** commands. |
| c\_time | oval-sc:EntityItemIntType | 0..1 | false | The time that the file's inode was changed, in SECONDS, since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –lc** or **stat** commands. |
| m\_time | oval-sc:EntityItemIntType | 0..1 | false | The time, in seconds, that the file was last modified since the UNIX epoch, which is the time 00:00:00 UTC on January 1, 1970. Found via the **ls –l** or **stat** commands. |
| size | oval-sc:EntityItemIntType | 0..1 | false | The size of the file in bytes. Both are indicated in the output of the **ls –l** and **stat** commands. |
| suid | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the program runs with the uid (thus privileges) of the file’s owner, rather than the calling user. For the output of the **ls –ld** or **stat** command[[41]](#footnote-41) it is indicated by d rw**s** rwx rwx where s replaces the first x. |
| sgid | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the program runs with the gid (thus privileges) of the file’s group owner, rather than the calling user’s group. For the output of the **ls –ld** or **stat** command[[42]](#footnote-42) it is indicated by d rwx rw**s** rwx where s replaces the second x. |
| sticky | oval-sc:EntityItemBoolType | 0..1 | false | Indicates that the users can delete each other’s files in this directory, when said directory is writable by those users. For the output of the **ls –ld** or **stat** command[[43]](#footnote-43) it is indicated by d rwx rwx rw**t** where t replaces the final x for a directory. |
| uread | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the owner (user owner) of the file can read this file, or if a directory, read the directory contents. For the output of the **ls –l** or stat command[[44]](#footnote-44) it is indicated by d **r**wx rwx rwx. |
| uwrite | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the owner (user owner) of the file can write to this file, or if a directory, write to the directory. For the output of the **ls –l** or **stat** command[[45]](#footnote-45) it is indicated by d r**w**x rwx rwx. |
| uexec | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the owner (user owner) of the file can execute it or, if a directory, change into the directory. For the output of the **ls –l** command[[46]](#footnote-46) it is indicated by d rw**x** rwx rwx. |
| gread | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the group owner of the file can read this file, or if a directory, read the directory contents. For the output of the **ls –l** command[[47]](#footnote-47) it is indicated by d rwx **r**wx rwx. |
| gwrite | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the group owner of the file can write to this file, or if a directory, write to the directory. For the output of the **ls –l** command[[48]](#footnote-48) it is indicated by d rwx r**w**x rwx. |
| gexec | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the group owner of the file can execute it or, if a directory, change into the directory. For the output of the **ls –l** command[[49]](#footnote-49) it is indicated by d rwx rw**x** rwx. |
| oread | oval-sc:EntityItemBoolType | 0..1 | false | Indicates that all other users can read this file, or if a directory, read the directory contents. For the output of the **ls –l** command[[50]](#footnote-50) it is indicated by d rwx rwx **r**wx. |
| owrite | oval-sc:EntityItemBoolType | 0..1 | false | Indicates that all other users can write to this file, or if a directory, write to the directory. For the output of the **ls –l** command[[51]](#footnote-51) it is indicated by d rwx rwx r**w**x. |
| oexec | oval-sc:EntityItemBoolType | 0..1 | false | Indicates that all other users can execute the file or, if a directory, change into the directory. For the output of the **ls –l** command[[52]](#footnote-52) it is indicated by d rwx rwx rw**x**. |
| has\_extended\_acl | oval-sc:EntityItemBoolType | 0..1 | false | Indicates the file or directory has ACL permissions[[53]](#footnote-53) applied to it. For the output of the **ls –l** or stat commands is it indicated by a plus sign (+) appended to the end of the d rwx rwx rwx string[[54]](#footnote-54) as in d rwx rwx rwx **+**.  If a system supports ACLs and the file or directory doesn't have an ACL, or it matches the standard UNIX permissions, the entity will have a status of *'exists'* and a value of *'false'*.  If the system supports ACLs and the file or directory has an ACL, the entity will have a status of *'exists'* and a value of *'true'*.  Lastly, if a system doesn't support ACLs, the entity will have a status of *'does not exist'*.  If the file or directory doesn’t have an ACL, or it matches the standard UNIX permissions, the value with be *false*. Otherwise if a file or directory has an ACL, the value will be *true.* |

## unix-def:uname\_test

The uname\_test is used to make assertions about information associated with the hardware the UNIX-based machine is running on[[55]](#footnote-55). The uname\_test MUST reference one uname\_object and zero or more uname\_states.  


### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:uname\_object

The uname\_object construct defines the system information[[56]](#footnote-56) that should be collected and represented as uname\_items. Since there is only one object relating to system information (the system as a whole), there are no child entities defined for this object, so it is considered empty.



## unix-def:uname\_state

The uname\_state construct is used by a uname\_test to specify system information[[57]](#footnote-57) on UNIX platforms. In getting information about a specific field, a system administrator can use the **uname** command or system call[[58]](#footnote-58).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| machine\_class | oval-def:  EntityStateStringType | 0..1 | false | This property specifies a machine hardware name. This corresponds to the command **uname -m.** |
| node\_name | oval-def:  EntityStateStringType | 0..1 | false | This property specifies a host name. This corresponds to the command **uname -n**. |
| os\_name | oval-def:  EntityStateStringType | 0..1 | false | This property specifies an operating system name. This corresponds to the command **uname –s**. |
| os\_release | oval-def:  EntityStateStringType | 0..1 | false | This property specifies a build version. This corresponds to the command **uname -r**. |
| os\_version | oval-def:  EntityStateStringType | 0..1 | false | This property specifies an operating system version. This corresponds to the command **uname -v**. |
| processor\_type | oval-def:  EntityStateStringType | 0..\* | false | This property specifies a processor type. This corresponds to the command **uname -p**. |

## unix-sc:uname\_item

The uname\_item construct specifies system information about UNIX platforms[[59]](#footnote-59). In getting information about a specific field, a system administrator can use the **uname** command or system call[[60]](#footnote-60).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| machine\_class | oval-sc:  EntityItemStringType | 0..1 | false | This property specifies a machine hardware name. This corresponds to the command **uname -m.** |
| node\_name | oval-sc:  EntityItemStringType | 0..1 | false | This property specifies a host name. This corresponds to the command **uname -n**. |
| os\_name | oval-sc:  EntityItemStringType | 0..1 | false | This property specifies an operating system name. This corresponds to the command **uname –s**. |
| os\_release | oval-sc:  EntityItemStringType | 0..1 | false | This property specifies a build version. This corresponds to the command **uname -r**. |
| os\_version | oval-sc:  EntityItemStringType | 0..1 | false | This property specifies an operating system version. This corresponds to the command **uname -v**. |
| processor\_type | oval-sc:  EntityItemStringType | 0..\* | false | This property specifies a processor type. This corresponds to the command **uname -p**. |

## unix-def:runlevel\_test

The runlevel\_test is used to make assertions about the information of which runlevel specified services are scheduled to exist at. A runlevel is defined as a software configuration of the system that allows only a selected group of processes to exist[[61]](#footnote-61). To get the runlevel, run the **init** command, or use the **chkconfig --list** command, which lists the services and runlevels that they can run at[[62]](#footnote-62). A system administrator must be logged on as root and have root in its own shell (via the commands **su root** followed by **su -** ) or he will get the "command not found" message. The runlevel\_test MUST reference one runlevel\_object and zero or more runlevel\_states.



### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:runlevel \_object

The runlevel\_object construct defines the set of services/runlevel combinations whose associated system state information should be collected and represented as runlevel\_items. One can use the **chkconfig –list** command to obtain the list of services and the runlevels they can run on[[63]](#footnote-63).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex runlevel\_objects that are the result of logically combining and filtering the runlevel\_items that are identified by one or more runlevel\_objects.  Please see the OVAL Language Specification for additional information. |
| service\_name | oval-def:  EntityObjectStringType | 0..1 | false | The name associated with a service. This name is usually the filename of the script file located in the /etc/init.d directory. |
| runlevel | oval-def:  EntityObjectStringType | 0..1 | false | The system runlevel to evaluate. A runlevel is defined as a software configuration of the system that allows only a selected group of processes to exist. |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of file\_items from the set of file\_items collected by a file\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def: runlevel\_state

The runlevel\_state construct is used by a runlevel\_test to specify the runlevel information associated with services that should be checked on file systems that are supported by UNIX platforms. One can use the **chkconfig –list** command to obtain the list of services and the runlevels they can run on[[64]](#footnote-64).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| service\_name | oval-def:EntityStateStringType | 0..1 | false | The name associated with a service. This name is usually the filename of the script file located in the /etc/init.d directory. |
| runlevel | oval-def:EntityStateStringType | 0..1 | false | The system runlevel to evaluate. A runlevel is defined as a software configuration of the system that allows only a selected group of processes to exist. |
| start | oval-def:EntityStateBoolType | 0..1 | false | A process is scheduled to be spawned at the specified runlevel. |
| kill | oval-def:EntityStateBoolType | 0..1 | false | A process is scheduled to be killed at the specified runlevel. |

## unix-sc:runlevel\_item

The runlevel\_item construct defines the system state information associated with files and directories on file systems supported by the UNIX platform. One can use the **chkconfig –list** command to obtain the list of services and the runlevels they can run on[[65]](#footnote-65).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| service\_name | oval-sc:EntityItemStringType | 0..1 | false | The name associated with a service. This name is usually the filename of the script file located in the /etc/init.d directory. |
| runlevel | oval-sc:EntityItemStringType | 0..1 | false | The system runlevel to evaluate. A runlevel is defined as a software configuration of the system that allows only a selected group of processes to exist. |
| start | oval-sc:EntityItemBoolType | 0..1 | false | A process is scheduled to be spawned at the specified runlevel. |
| kill | oval-sc:EntityItemBoolType | 0..1 | false | A process is scheduled to be killed at the specified runlevel. |

## unix-def:process\_test

The process\_test is used to make assertions about processes on a UNIX system, especially information given as output via the **ps** command[[66]](#footnote-66). Notice that the ps command may have different implementations across platforms depending on the flags and outputs set by the vendor[[67]](#footnote-67). The process\_test MUST reference one process\_object and zero or more process\_states.



### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:process\_object

The process\_object construct defines the set of processes whose associated information should be collected and represented as process\_items[[68]](#footnote-68).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex process\_objects that are the result of logically combining and filtering the process\_items that are identified by one or more process\_objects.  Please see the OVAL Language Specification for additional information. |
| command | oval-def:  EntityObjectStringType | 0..1 | false | Specifies which command/program name to check. |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of process\_items from the set of process\_items collected by a process\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def:process\_state

The process\_state construct is used by a process\_test to specify information about processes on UNIX platforms. To get this information an administrator can use the **ps** command[[69]](#footnote-69) or obtain information from /proc/<pid>/psinfo, where <pid> is the process identifier of an individual process[[70]](#footnote-70). An alternate name and command to access (with minimum effort) is provided for convenience as it relates to **ps**'s output.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| command | oval-def:EntityStateStringType | 0..1 | false | Alternate name: COMMAND. The command property specifies the command/program name to check. Accessible via **ps**. |
| exec\_time | oval-def:EntityStateStringType | 0..1 | false | Alternate name: TIME. This is the cumulative CPU time, formatted in [DD-]HH:MM:SS where DD is the number of days when execution time is 24 hours or more. This can be adjusted implicitly via the **nice** command or nice() system call. Accessible via **ps**. |
| pid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: PID. This is the process ID of the process. Accessible via **ps**. |
| ppid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: PPID. This is the process ID of the process's parent process. Accessible via **ps –f**. |
| priority | oval-def:EntityStateIntType | 0..1 | false | Alternate name: RTPRIO. This is the scheduling priority with which the process runs. This can be adjusted with the **nice** command or nice() system call. Accessed via **ps –o rtprio,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |
| ruid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: RUID. This is the real user id which represents the user who has created the process. Accessed via **ps –o ruid,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| scheduling\_class | oval-def:EntityStateStringType | 0..1 | false | Alternate name: CLS. A platform specific characteristic maintained by the scheduler: RT (real-time), TS (timeshare), FF (fifo), SYS (system), etc. Accessed via **ps –o cls,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| start\_time | oval-def:EntityStateStringType | 0..1 | false | Alternate name: STARTED or START (abbreviated). This is the time of day the process started, formatted in HH:MM:SS (or HH:MM) if the same day the process started or formatted as MMM\_DD (Ex.: Feb\_5) if process started the previous day or further in the past.  The best way to get this information is to use **ps –o start,\*** for the HH:MM:SS format. |
| tty | oval-def:EntityStateStringType | 0..1 | false | Alternate name: TTY. This is the TTY on which the process was started, if applicable. Accessible via **ps**. |
| user\_id | oval-def:EntityStateIntType | 0..1 | false | Alternate names: UID (sometimes—works under **ps –l** but NOT **ps -f**). This is the effective user id (a number, not a string) which represents the actual privileges of the process. Best accestable via **ps –l**. |

## unix-sc:process\_item

The process\_item construct defines the information associated with processes on file systems supported by the UNIX platform. To get this information an administrator can use the **ps** command[[71]](#footnote-71) or obtain information from /proc/<pid>/psinfo, where <pid> is the process identifier of an individual process[[72]](#footnote-72). An alternate name and command to access (with minimum effort) is provided for convenience as it relates to **ps**'s output.

.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| command | oval-sc:EntityItemStringType | 0..1 | false | Alternate name: COMMAND. The command element specifies the command/program name to check. Accessible via **ps**. |
| exec\_time | oval-sc:EntityItemStringType | 0..1 | false | Alternate name: TIME. This is the cumulative CPU time, formatted in [DD-]HH:MM:SS where DD is the number of days when execution time is 24 hours or more. This can be adjusted implicitly via the nice command. Accessible via **ps**. |
| pid | oval-sc:EntityItemIntType | 0..1 | false | Alternate name: PID. This is the process ID of the process. Accessible via **ps**. |
| ppid | oval-sc:EntityItemIntType | 0..1 | false | Alternate name: PPID. This is the process ID of the process's parent process. Accessible via **ps –f**. |
| priority | oval-sc: EntityItemIntType | 0..1 | false | Alternate name: RTPRIO. This is the scheduling priority with which the process runs. This can be adjusted with the nice command or nice() system call. Accessed via **ps –o rtprio,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |
| ruid | oval-sc: EntityItemIntType | 0..1 | false | Alternate name: RUID. This is the real user id which represents the user who has created the process. Accessed via **ps –o ruid,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| scheduling\_class | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: CLS. A platform specific characteristic maintained by the scheduler: RT (real-time), TS (timeshare), FF (fifo), SYS (system), etc. Accessed via **ps –o cls,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |
| start\_time | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: STARTED or START (abbreviated). This is the time of day the process started, formatted in HH:MM:SS (or HH:MM) if the same day the process started or formatted as MMM\_DD (Ex.: Feb\_5) if process started the previous day or further in the past.  The best way to get this information is to use **ps –o start,\*** for the HH:MM:SS format. |
| tty | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: TTY. This is the TTY on which the process was started, if applicable. Accessible via ps. |
| user\_id | oval-sc: EntityItemIntType | 0..1 | false | Alternate names: UID (sometimes—works under **ps –l** but NOT **ps -f**). This is the effective user id (a number, not a string) which represents the actual privileges of the process. Best accestable via **ps –l**. |

## unix-def:process58\_test

The process58\_test is used to make assertions about processes on a UNIX system, especially information given as output via the ps command[[73]](#footnote-73). Notice that the **ps** command may have different UNIX implementations depending on the flags and outputs set by the vendor[[74]](#footnote-74). The process58\_test MUST reference one process58\_object and zero or more process58\_states.



### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:process58\_object

The process58\_object construct defines the set of processes, via BOTH the command\_line and pid properties, whose associated information should be collected and represented as process58\_items[[75]](#footnote-75).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex process58\_objects that are the result of logically combining and filtering the process58\_items that are identified by one or more process58\_objects.  Please see the OVAL Language Specification for additional information. |
| command\_line | oval-def:  EntityObjectStringType | 0..1 | false | Specifies which command/program name to check. |
| pid | oval-def:  EntityObjectIntType | 0..1 | false | Alternate name: PID. This is the process ID of the process. Accessible via ps. |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of process58\_items from the set of process58\_items collected by a process58\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def: process58\_state

The process58\_state construct is used by a process58\_test to specify information about processes on UNIX platforms. To get this information an administrator can use the **ps** command[[76]](#footnote-76) or obtain information from /proc/<pid>/psinfo, where <pid> is the process identifier of an individual process[[77]](#footnote-77). An alternate name and command to access (with minimum effort) is provided for convenience as it relates to **ps**'s output.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| command | oval-def:EntityStateStringType | 0..1 | false | Alternate name: COMMAND. The command element specifies the command/program name to check. Accessible via **ps**. |
| exec\_time | oval-def:EntityStateStringType | 0..1 | false | Alternate name: TIME. This is the cumulative CPU time, formatted in [DD-]HH:MM:SS where DD is the number of days when execution time is 24 hours or more. This can be adjusted implicitly via the nice command. Accessible via **ps**. |
| pid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: PID. This is the process ID of the process. Accessible via ps. |
| ppid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: PPID. This is the process ID of the process's parent process. Accessible via **ps –f**. |
| priority | oval-def:EntityStateIntType | 0..1 | false | Alternate name: RTPRIO? This is the scheduling priority with which the process runs. This can be adjusted with the **nice** command or nice() system call. Accessed via **ps –o rtprio,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| ruid | oval-def:EntityStateIntType | 0..1 | false | Alternate name: RUID. This is the real user id which represents the user who has created the process. Accessed via **ps –o ruid,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |
| scheduling\_class | oval-def:EntityStateStringType | 0..1 | false | Alternate name: CLS. A platform specific characteristic maintained by the scheduler: RT (real-time), TS (timeshare), FF (fifo), SYS (system), etc. Accessed via **ps –o cls,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| start\_time | oval-def:EntityStateStringType | 0..1 | false | Alternate name: STARTED or START (abbreviated). This is the time of day the process started, formatted as HH:MM:SS (or HH:MM) if the same day the process started or formatted as MMM\_DD (Ex.: Feb\_5) if process started the previous day or further in the past.  The best way to get this information is to use **ps –o start,\*** for the HH:MM:SS format. |
| tty | oval-def:EntityStateStringType | 0..1 | false | Alternate name: TTY. This is the TTY on which the process was started, if applicable. Accessible via ps. |
| user\_id | oval-def:EntityStateIntType | 0..1 | false | Alternate names: UID (sometimes—works under **ps –l** but NOT **ps -f**). This is the effective user id (a number, not a string) which represents the actual privileges of the process. Best accestable via **ps –l**. |
| exec\_shield | oval-def:EntityStateBoolType | 0..1 | false | A boolean that when true would indicate that ExecShield is enabled for the process. |
| loginuid | oval-def:EntityStateIntType | 0..1 | false | The loginuid shows which account a user gained access to the system with. The /proc/XXXX/loginuid shows this value. If the value is -1, cast as an unsigned int, the loginuid was unset[[78]](#footnote-78). |
| posix\_capability | unix-def:  EntityStateCapabilityType | 0..1 | false | An effective capability associated with the process. This can be accessed via proc/<pid>/status under the value, capeff. |
| selinux\_domain\_label | oval-def:EntityStateStringType | 0..1 | false | An selinux domain (or type) label associated with the process. This domain label corresponds to the type specified via the **secon** command or the getpidcon() system call[[79]](#footnote-79). |
| session\_id | oval-def:EntityStateIntType | 0..1 | false | Alternate name: SID  The session ID of the process. If the values of session\_id and pid match, then this process is also a session leader[[80]](#footnote-80).  Accessed via **ps –o sid,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |

## unix-sc:process58\_item

The process58\_item construct defines the information associated with processes on file systems supported by the UNIX platform. To get this information an administrator can use the **ps** command[[81]](#footnote-81) or obtain information from /proc/<pid>/psinfo, where <pid> is process identifier of an individual process[[82]](#footnote-82). An alternate name and command to access (with minimum effort) is provided for convenience as it relates to **ps**'s output.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| command | oval-sc:EntityItemStringType | 0..1 | false | Alternate name: COMMAND. The command element specifies the command/program name to check. Accessible via **ps**. |
| exec\_time | oval-sc:EntityItemStringType | 0..1 | false | Alternate name: TIME. This is the cumulative CPU time, formatted in [DD-]HH:MM:SS where DD is the number of days when execution time is 24 hours or more. This can be adjusted implicitly via the nice command. Accessible via **ps**. |
| pid | oval-sc:EntityItemIntType | 0..1 | false | Alternate name: PID. This is the process ID of the process. Accessible via ps. |
| ppid | oval-sc:EntityItemIntType | 0..1 | false | Alternate name: PPID. This is the process ID of the process's parent process. Accessible via **ps –f**. |
| priority | oval-sc: EntityItemIntType | 0..1 | false | Alternate name: RTPRIO? This is the scheduling priority with which the process runs. This can be adjusted with the **nice** command or nice() system call. Accessed via **ps –o rtprio,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| ruid | oval-sc: EntityItemIntType | 0..1 | false | Alternate name: RUID. This is the real user id which represents the user who has created the process. Accessed via **ps –o ruid,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |
| scheduling\_class | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: CLS. A platform specific characteristic maintained by the scheduler: RT (real-time), TS (timeshare), FF (fifo), SYS (system), etc. Accessed via **ps –o cls,\*** where \* is any combination of pids, commands, or fields that could be specified for clarification. |
| start\_time | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: STARTED or START (abbreviated). This is the time of day the process started, formatted as HH:MM:SS (or HH:MM) if the same day the process started or formatted as MMM\_DD (Ex.: Feb\_5) if process started the previous day or further in the past.  The best way to get this information is to use **ps –o start,\*** for the HH:MM:SS format. |
| tty | oval-sc: EntityItemStringType | 0..1 | false | Alternate name: TTY. This is the TTY on which the process was started, if applicable. Accessible via ps. |
| user\_id | oval-sc: EntityItemIntType | 0..1 | false | Alternate names: UID (sometimes—works under ps –l but NOT ps -f). This is the effective user id (a number, not a string) which represents the actual privileges of the process. Best accestable via ps –l. |
| exec\_shield | oval-def:EntityStateBoolType | 0..1 | false | A boolean that when true would indicate that ExecShield is enabled for the process. |
| loginuid | oval-def:EntityStateIntType | 0..1 | false | The loginuid shows which account a user gained access to the system with. The /proc/XXXX/loginuid shows this value. If the value is -1, cast as an unsigned int, the loginuid was unset[[83]](#footnote-83). |
| posix\_capability | unix-def:  EntityStateCapabilityType | 0..1 | false | An effective capability associated with the process. This can be accessed via proc/<pid>/status under the value, capeff. |
| selinux\_domain\_label | oval-def:EntityStateStringType | 0..1 | false | An selinux domain (or type) label associated with the process. This domain label corresponds to the type specified via the secon command or the getpidcon() system call[[84]](#footnote-84). |
| session\_id | oval-def:EntityStateIntType | 0..1 | false | Alternate name: SID  The session ID of the process. If the values of session\_id and pid match, then this process is also a session leader[[85]](#footnote-85).  Accessed via **ps –o sid,\*** where **\*** is any combination of pids, commands, or fields that could be specified for clarification. |

## unix-def:EntityStateCapabilityType

The EntityStateCapabilityType defines the values that describe POSIX capability[[86]](#footnote-86) types associated with a process service on UNIX systems. This list is based off the values defined in linux/include/linux/capability.h[[87]](#footnote-87).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| CAP\_CHOWN | Defined as 0 in capability.h. In a system with the [\_POSIX\_CHOWN\_RESTRICTED] option defined, this overrides the restriction of changing file ownership and group ownership. |
| CAP\_DAC\_OVERRIDE | Defined as 1 in capability.h. Override all DAC access, including ACL execute access if POSIX\_ACL] is defined. Excluding DAC access covered by CAP\_LINUXIMMUTABLE. |
| CAP\_DAC\_READ\_SEARCH | Defined as 2 in capability.h. Overrides all DAC restrictions regarding read and search on files and directories, including ACL restrictions if POSIX\_ACL] is defined. Excluding DAC access covered by CAP\_LINUXIMMUTABLE. |
| CAP\_FOWNER | Defined as 3 in capability.h. Overrides all restrictions about allowed operations on files, where file owner ID must be equal to the user ID, except where CAP\_FSETID is applicable. It doesn’t override MAC and DAC restrictions. |
| CAP\_FSETID | Defined as 4 in capability.h. Overrides the following restrictions that the effective user ID shall match the file owner ID when setting the S\_ISUID and S\_ISGID bits on that file; that the effective group ID (or one of the supplementary group IDs) shall match the file owner ID when setting the S\_ISGID bit on that file; that the S\_ISUID and S\_ISGID bits are cleared on successful return from chown(2) (not implemented). |
| CAP\_KILL | Defined as 5 in capability.h. Overrides the restriction that the real or effective user ID of a process sending a signal must match the real or effective user ID of the process receiving the signal. |
| CAP\_SETGID | Defined as 6 in capability.h. Allows setgid(2) manipulation, setgroups(2), and forged gids on socket credentials passing. |
| CAP\_SETUID | Defined as 7 in capability.h. Allows set\*uid(2) manipulation (including fsuid) and forged pids on socket credentials passing. |
| CAP\_SETPCAP | Defined as 8 in capability.h. Linux-specific capabilities: Transfer any capability in your permitted set to any pid, remove any capability in your permitted set from any pid. |
| CAP\_LINUX\_IMMUTABLE | Defined as 9 in capability.h. Allow modification of S\_IMMUTABLE and S\_APPEND file attributes. |
| CAP\_NET\_BIND\_SERVICE | Defined as 10 in capability.h. Allows binding to TCP/UDP sockets below 1024 and binding to ATM VCIs below 32 |
| CAP\_NET\_BROADCAST | Defined as 11 in capability.h. Allow broadcasting and listening to multicast. |
| CAP\_NET\_ADMIN | Defined as 12 in capability.h. Allows certain administrative rights, including interface configuration, administration of IP firewall, masquerading and accouting, and setting dubug option on sockets. The full list can be found in linux/include/linux/capability.h[[88]](#footnote-88). |
| CAP\_NET\_RAW | Defined as 13 in capability.h. Allows the use of RAW and PACKET sockets. |
| CAP\_IPC\_LOCK | Defined as 14 in capability.h. Allows the locking of shared memory segments and mlock and mlockall (which doesn’t really have anything to do with IPC). |
| CAP\_IPC\_OWNER | Defined as 15 in capability.h. Overrides IPC ownership checks. |
| CAP\_SYS\_MODULE | Defined as 16 in capability.h. Insert and remove kernel modules – modify kernel without limit, and modify cap\_bset. |
| CAP\_SYS\_RAWIO | Defined as 17 in capability.h. Allow ioperm/iopl access and the sending of USB messages to any device via /proc/bus/usb. |
| CAP\_SYS\_CHROOT | Defined as 18 in capability.h. Allows use of chroot(). |
| CAP\_SYS\_PTRACE | Defined as 19 in capability.h. Allow ptrace() of any process. |
| CAP\_SYS\_PACCT | Defined as 20 in capability.h. Allow configuration of process accounting. |
| CAP\_SYS\_ADMIN | Defined as 21 in capability.h. Allows for many rights, including configuration of the secure attention key, administration of the random device, examination and configuration of disk quotas, among others. The full list can be found in linux/include/linux/capability.h[[89]](#footnote-89). |
| CAP\_SYS\_BOOT | Defined as 22 in capability.h. Allow use of reboot(). |
| CAP\_SYS\_NICE | Defined as 23 in capability.h. Allows raising priority and setting priority on other (different UID) processes, the use of FIFO and round-robin (realtime) scheduling on own processes and setting the scheduling algorithm used by another process, and setting cpu affinity on other processes. |
| CAP\_SYS\_RESOURCE | Defined as 24 in capability.h. Overrides certain limitations, such as resource limits, quota limits, reserved space on ext2 filesystems, among other tasks which are listed in linux/include/linux/capability.h[[90]](#footnote-90). |
| CAP\_SYS\_TIME | Defined as 25 in capability.h. Allow manipulation of system clock, irix\_stime on mips and setting the real-time clock. |
| CAP\_SYS\_TTY\_CONFIG | Defined as 26 in capability.h. Allow configuration of tty devices and vhangup() of tty. |
| CAP\_MKNOD | Defined as 27 in capability.h. Allow the privileged aspects of mknod(). |
| CAP\_LEASE | Defined as 28 in capability.h. Allow taking of leases on files. |
| CAP\_AUDIT\_WRITE | Defined as 29 in capability.h. |
| CAP\_AUDIT\_CONTROL | Defined as 30 in capability.h. |
| CAP\_SETFCAP | Defined as 31 in capability.h. NOT supported on all UNIX OSes as many versions of capability.h stop at 30. |
| CAP\_MAC\_OVERRIDE | Defined as 32 in capability.h. Override MAC access. The base kernel enforces no MAC policy. An LSM may enforce a MAC policy, and if it does and it chooses to implement capability based overrides of that policy, this is the capability it should use to do so. NOT supported on all UNIX OSes as many versions of capability.h stop at 30. |
| CAP\_MAC\_ADMIN | Defined as 33 in capability.h. Allow MAC configuration or state changes. The base kernel requires no MAC configuration. An LSM may enforce a MAC policy, and if it does and it chooses to implement capabilitybased checks on modifications to that policy or the data required to maintain it, this is the capability it should use to do so. |
| *<empty string>* | This value indicates that no value has been specified and is permitted here to allow for an empty entity which is associated with error and not collected conditions. |

## unix-sc:EntityItemCapabilityType

The EntityItemCapabilityType defines the enumeration of values that describe POSIX capability[[91]](#footnote-91) types associated with a process service on UNIX systems. This list is based off the values defined in linux/include/linux/capability.h[[92]](#footnote-92).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| CAP\_CHOWN | Defined as 0 in capability.h. In a system with the [\_POSIX\_CHOWN\_RESTRICTED] option defined, this overrides the restriction of changing file ownership and group ownership. |
| CAP\_DAC\_OVERRIDE | Defined as 1 in capability.h. Override all DAC access, including ACL execute access if POSIX\_ACL] is defined. Excluding DAC access covered by CAP\_LINUXIMMUTABLE. |
| CAP\_DAC\_READ\_SEARCH | Defined as 2 in capability.h. Overrides all DAC restrictions regarding read and search on files and directories, including ACL restrictions if POSIX\_ACL] is defined. Excluding DAC access covered by CAP\_LINUXIMMUTABLE. |
| CAP\_FOWNER | Defined as 3 in capability.h. Overrides all restrictions about allowed operations on files, where file owner ID must be equal to the user ID, except where CAP\_FSETID is applicable. It doesn’t override MAC and DAC restrictions. |
| CAP\_FSETID | Defined as 4 in capability.h. Overrides the following restrictions that the effective user ID shall match the file owner ID when setting the S\_ISUID and S\_ISGID bits on that file; that the effective group ID (or one of the supplementary group IDs) shall match the file owner ID when setting the S\_ISGID bit on that file; that the S\_ISUID and S\_ISGID bits are cleared on successful return from chown(2) (not implemented). |
| CAP\_KILL | Defined as 5 in capability.h. Overrides the restriction that the real or effective user ID of a process sending a signal must match the real or effective user ID of the process receiving the signal. |
| CAP\_SETGID | Defined as 6 in capability.h. Allows setgid(2) manipulation, setgroups(2), and forged gids on socket credentials passing. |
| CAP\_SETUID | Defined as 7 in capability.h. Allows set\*uid(2) manipulation (including fsuid) and forged pids on socket credentials passing. |
| CAP\_SETPCAP | Defined as 8 in capability.h. Linux-specific capabilities: Transfer any capability in your permitted set to any pid, remove any capability in your permitted set from any pid. |
| CAP\_LINUX\_IMMUTABLE | Defined as 9 in capability.h. Allow modification of S\_IMMUTABLE and S\_APPEND file attributes. |
| CAP\_NET\_BIND\_SERVICE | Defined as 10 in capability.h. Allows binding to TCP/UDP sockets below 1024 and binding to ATM VCIs below 32 |
| CAP\_NET\_BROADCAST | Defined as 11 in capability.h. Allow broadcasting and listening to multicast. |
| CAP\_NET\_ADMIN | Defined as 12 in capability.h. Allows certain administrative rights, including interface configuration, administration of IP firewall, masquerading and accouting, and setting dubug option on sockets. The full list can be found in linux/include/linux/capability.h[[93]](#footnote-93). |
| CAP\_NET\_RAW | Defined as 13 in capability.h. Allows the use of RAW and PACKET sockets. |
| CAP\_IPC\_LOCK | Defined as 14 in capability.h. Allows the locking of shared memory segments and mlock and mlockall (which doesn’t really have anything to do with IPC). |
| CAP\_IPC\_OWNER | Defined as 15 in capability.h. Overrides IPC ownership checks. |
| CAP\_SYS\_MODULE | Defined as 16 in capability.h. Insert and remove kernel modules – modify kernel without limit, and modify cap\_bset. |
| CAP\_SYS\_RAWIO | Defined as 17 in capability.h. Allow ioperm/iopl access and the sending of USB messages to any device via /proc/bus/usb. |
| CAP\_SYS\_CHROOT | Defined as 18 in capability.h. Allows use of chroot(). |
| CAP\_SYS\_PTRACE | Defined as 19 in capability.h. Allow ptrace() of any process. |
| CAP\_SYS\_PACCT | Defined as 20 in capability.h. Allow configuration of process accounting. |
| CAP\_SYS\_ADMIN | Defined as 21 in capability.h. Allows for many rights, including configuration of the secure attention key, administration of the random device, examination and configuration of disk quotas, among others. The full list can be found in linux/include/linux/capability.h[[94]](#footnote-94). |
| CAP\_SYS\_BOOT | Defined as 22 in capability.h. Allow use of reboot(). |
| CAP\_SYS\_NICE | Defined as 23 in capability.h. Allows raising priority and setting priority on other (different UID) processes, the use of FIFO and round-robin (realtime) scheduling on own processes and setting the scheduling algorithm used by another process, and setting cpu affinity on other processes. |
| CAP\_SYS\_RESOURCE | Defined as 24 in capability.h. Overrides certain limitations, such as resource limits, quota limits, reserved space on ext2 filesystems, among other tasks which are listed in linux/include/linux/capability.h[[95]](#footnote-95). |
| CAP\_SYS\_TIME | Defined as 25 in capability.h. Allow manipulation of system clock, irix\_stime on mips and setting the real-time clock. |
| CAP\_SYS\_TTY\_CONFIG | Defined as 26 in capability.h. Allow configuration of tty devices and vhangup() of tty. |
| CAP\_MKNOD | Defined as 27 in capability.h. Allow the privileged aspects of mknod(). |
| CAP\_LEASE | Defined as 28 in capability.h. Allow taking of leases on files. |
| CAP\_AUDIT\_WRITE | Defined as 29 in capability.h. |
| CAP\_AUDIT\_CONTROL | Defined as 30 in capability.h. |
| CAP\_SETFCAP | Defined as 31 in capability.h. NOT supported on all UNIX OSes as many versions of capability.h stop at 30. |
| CAP\_MAC\_OVERRIDE | Defined as 32 in capability.h. Override MAC access. The base kernel enforces no MAC policy. An LSM may enforce a MAC policy, and if it does and it chooses to implement capability based overrides of that policy, this is the capability it should use to do so. NOT supported on all UNIX OSes as many versions of capability.h stop at 30. |
| CAP\_MAC\_ADMIN | Defined as 33 in capability.h. Allow MAC configuration or state changes. The base kernel requires no MAC configuration. An LSM may enforce a MAC policy, and if it does and it chooses to implement capabilitybased checks on modifications to that policy or the data required to maintain it, this is the capability it should use to do so. |
| *<empty string>* | This value indicates that no value has been specified and is permitted here to allow for an empty entity which is associated with error and not collected conditions. |

## unix-def:inetd\_test

The inetd\_test is used to make assertions about different Internet services associated with a UNIX system, especially information in **/etc/inet/inetd.conf** or **/etc/inetd.conf**[[96]](#footnote-96). The inetd\_test MUST reference one inetd\_object and zero or more inetd\_states.



### Known Supported Platforms

Some of the latest UNIX platforms are bundled with the xinetd command instead of the inetd command. In this case, the xinetd\_test SHOULD be used instead.

## unix-def:inetd\_object

The inetd\_object construct defines the set of Internet services whose associated information should be collected and represented as inetd\_items[[97]](#footnote-97).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex inetd\_objects that are the result of logically combining and filtering the inetd\_items that are identified by one or more inetd\_objects.  Please see the OVAL Language Specification for additional information. |
| protocol | oval-def:  EntityObjectStringType | 0..1 | false | A recognized protocol listed in the file **/etc/inet/protocols**, as well as others supported under IPv6. Some of these values in **/etc/inet/protocols** include **tcp** and **udp**[[98]](#footnote-98). Because **tcp6**, **tcp6only**, **udp6**, and **udp6only** are NOT official protocols, they will NOT be listed in the **/etc/inet/protocols** file[[99]](#footnote-99); however, they will still be recognized as **inetd** protocol types. The **inetd** program uses an **AF\_INET6** type socket endpoint, which supports BOTH IPv4 and IPv6 client requests. |
| service\_name | oval-def:  EntityObjectStringType | 0..1 | false | The name of a valid service listed in the services file. For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of inetd\_items from the set of inetd\_items collected by an inetd\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def:inetd\_state

The inetd\_state construct is used by an inetd\_test to specify indormation about Internet services on UNIX platforms. This information is located in **/etc/inet/inetd.conf** or **/etc/inetd.conf**[[100]](#footnote-100).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| protocol | oval-def:EntityStateStringType | 0..1 | false | A recognized protocol listed in the file **/etc/inet/protocols**, as well as others supported under IPv6. Some of these values in **/etc/inet/protocols** include **tcp** and **udp**[[101]](#footnote-101). Because **tcp6**, **tcp6only**, **udp6**, and **udp6only** are NOT official protocols, they will NOT be listed in the **/etc/inet/protocols** file[[102]](#footnote-102); however, they will still be recognized as **inetd** protocol types. The **inetd** program uses an **AF\_INET6** type socket endpoint, which supports BOTH IPv4 and IPv6 client requests. |
| service\_name | oval-def:EntityStateStringType | 0..1 | false | The name of a valid service listed in the services file. For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). |
| server\_program | oval-def:EntityStateStringType | 0..1 | false | Either the pathname of a server program to be invoked by inetd to perform the requested service, or the value internal if inetd itself provides the service[[103]](#footnote-103). |
| server\_arguments | oval-def:EntityStateStringType | 0..1 | false | The arguments passed to the server program starting with argv[0][[104]](#footnote-104). |
| endpoint\_type | unix-def:  EntityStateEndpointType | 0..1 | false | The type of socket established by the service for communications[[105]](#footnote-105). |
| exec\_as\_user | oval-def:EntityStateStringType | 0..1 | false | The user name, and optional group name, that the server will run as when it starts up[[106]](#footnote-106). |
| wait\_status | unix-def:  EntityStateWaitStatusType | 0..1 | false | This property takes on the values **wait** and **nowait**. It specifies whether the server that is invoked by **inetd** will take over the listening socket associated with the service, and whether once launched, inetd will wait for that server to exit, if ever, before it resumes listening for new service requests[[107]](#footnote-107). |

## unix-sc:inetd\_item

The inetd\_item construct defines the information associated with Internet services on file systems supported by the UNIX platform. This information is located in **/etc/inet/inetd.conf** or **/etc/inetd.conf**[[108]](#footnote-108).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| protocol | oval-sc:EntityItemStringType | 0..1 | false | A recognized protocol listed in the file **/etc/inet/protocols**, as well as others supported under IPv6. Some of these values in **/etc/inet/protocols** include **tcp** and **udp**[[109]](#footnote-109). Because **tcp6**, **tcp6only**, **udp6**, and **udp6only** are NOT official protocols, they will NOT be listed in the **/etc/inet/protocols** file[[110]](#footnote-110); however, they will still be recognized as **inetd** protocol types. The **inetd** program uses an **AF\_INET6** type socket endpoint, which supports BOTH IPv4 and IPv6 client requests. |
| service\_name | oval-sc:EntityItemStringType | 0..1 | false | The name of a valid service listed in the services file. For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). |
| server\_program | oval-sc:EntityItemStringType | 0..1 | false | Either the pathname of a server program to be invoked by inetd to perform the requested service, or the value internal if inetd itself provides the service[[111]](#footnote-111). |
| server\_arguments | oval-sc:EntityItemStringType | 0..1 | false | The arguments passed to the server program starting with argv[0][[112]](#footnote-112). |
| endpoint\_type | unix-sc:  EntityItemEndpointType | 0..1 | false | The type of socket established by the service for communications[[113]](#footnote-113). |
| exec\_as\_user | oval-sc:EntityItemStringType | 0..1 | false | The user name, and optional group name, that the server will run as when it starts up[[114]](#footnote-114). |
| wait\_status | unix-sc:  EntityItemWaitStatusType | 0..1 | false | This property takes on the values "wait" and "nowait." It specifies whether the server that is invoked by **inetd** will take over the listening socket associated with the service, and whether once launched, **inetd** will wait for that server to exit, if ever, before it resumes listening for new service requests[[115]](#footnote-115). |

## unix-def:EntityStateEndpointType

The EntityStateEndpointType defines the values that describe different socket types associated with an Internet service UNIX systems[[116]](#footnote-116).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| stream | The stream value is used to describe a stream socket. |
| dgram | The dgram value is used to describe a datagram socket. |
| raw | The raw value is used to describe a raw socket. |
| seqpacket | The seqpacket value is used to describe a sequenced packet socket. |
| tli | The tli value is used to describe all TLI endpoints. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

## unix-sc:EntityItemEndpointType

The EntityItemEndpointType defines the values that describe different socket types associated with an Internet service UNIX systems[[117]](#footnote-117).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| stream | The stream value is used to describe a stream socket. |
| dgram | The dgram value is used to describe a datagram socket. |
| raw | The raw value is used to describe a raw socket. |
| seqpacket | The seqpacket value is used to describe a sequenced packet socket. |
| tli | The tli value is used to describe all TLI endpoints. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

## unix-def:EntityStateWaitStatusType

The EntityStateWaitStatusType defines the values that describe different wait status types associated with an Internet service UNIX systems[[118]](#footnote-118). These two types are *'wait'*, and *'nowait'*. It specifies whether the server that is invoked by inetd will take over the listening socket associated with the service, and whether once launched, inetd will wait for that server to exit, if ever, before it resumes listening for new service requests.

A system administrator SHOULD set the wait-status for datagram servers to *'wait'* and additionally, configure UDP services as *'wait'* instead of *'nowait'*, as it can cause a race condition by which the **inetd** program selects on the sockets and the server program reads from the socket. As a result, many server programs will be forked and performance will be severely compromised[[119]](#footnote-119).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| wait | The server invoked by inetd will take over the listening socket associated with the service and once launched, inetd will wait for that server to exit, if ever, before it resumes listening for new service requests. |
| nowait | The server invoked by inetd will not take over the listening socket associated with the service and once launched, inetd will not wait for that server to exit, if ever, before it resumes listening for new service requests. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

## unix-sc:EntityItemWaitStatusType

The EntityItemWaitStatusType defines the values that describe different wait status types associated with an Internet service UNIX systems[[120]](#footnote-120). These two types are *'wait'*, and *'nowait'*. It specifies whether the server that is invoked by inetd will take over the listening socket associated with the service, and whether once launched, inetd will wait for that server to exit, if ever, before it resumes listening for new service requests.

A system administrator SHOULD set the wait-status for datagram servers to *'wait'* and additionally, configure UDP services as *'wait'* instead of *'nowait'*, as it can cause a race condition by which the inetd program selects on the sockets and the server program reads from the socket. As a result, many server programs will be forked and performance will be severely compromised[[121]](#footnote-121).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| wait | The server invoked by inetd will take over the listening socket associated with the service and once launched, inetd will wait for that server to exit, if ever, before it resumes listening for new service requests. |
| nowait | The server invoked by inetd will not take over the listening socket associated with the service and once launched, inetd will not wait for that server to exit, if ever, before it resumes listening for new service requests. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

## unix-def:xinetd\_test

The xinetd\_test is used to make assertions about different Internet services associated with more up-to-date UNIX systems than those covered in the inetd\_test, especially information in /etc/xinetd.conf[[122]](#footnote-122). The xinetd\_test MUST reference one xinetd\_object and zero or more xinetd\_states.



### Known Supported Platforms

* Red Hat Enterprise Linux 5
* Mac OSX 10.6
* Solaris 10

## unix-def:xinetd\_object

The xinetd\_object construct defines the set of Internet services whose associated information should be collected and represented as xinetd\_items[[123]](#footnote-123).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| set | oval-def:set | 0..1 | false | Enables the expression of complex xinetd\_objects that are the result of logically combining and filtering the xinetd\_items that are identified by one or more xinetd\_objects.  Please see the OVAL Language Specification[2] for additional information. |
| protocol | oval-def:  EntityObjectStringType | 0..1 | false | A recognized protocol, such as one listed in the file **/etc/protocols**, used by the service. If this property is not defined in the **xinetd.conf** file, the default protocol employed by the service will be used[[124]](#footnote-124). |
| service\_name | oval-def:  EntityObjectStringType | 0..1 | false | The name of a valid service listed in the services file[[125]](#footnote-125). For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). By default, the service id is the service name. |
| filter | oval-def:filter | 0..\* | false | Allows for the explicit inclusion or exclusion of xinetd\_items from the set of xinetd\_items collected by an xinetd\_object.  Please see the OVAL Language Specification [2] for additional information. |

## unix-def:xinetd\_state

The xinetd\_state construct is used by an xinetd\_test to specify indormation about Internet services on UNIX platforms. This information is located in **/etc/xinetd.conf**[[126]](#footnote-126).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| protocol | oval-def:EntityStateStringType | 0..1 | false | A recognized protocol, such as one listed in the file **/etc/protocols**, used by the service. If this property is not defined in the **xinetd.conf** file, the default protocol employed by the service will be used[[127]](#footnote-127). |
| service\_name | oval-def:EntityStateStringType | 0..1 | false | The name of a valid service listed in the services file. For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). |
| flags | oval-def:EntityStateStringType | 0..1 | false | The flags property specifies miscellaneous settings associated with the service. It can take on values such as INTERCEPT, NORETRY, IDONLY, NAMEINARGS, NODELAY, KEEPALIVE, NOLIBWRAP, SENSOR, IPv4, IPv6, LABELLED, and REUSE (deprecated)[[128]](#footnote-128). |
| no\_access | oval-def:EntityStateStringType | 0..1 | false | Determines the remote hosts to which the particular service is unavailable. Its value can be specified in the same way as the value of the **only\_from** property. These two properties determine the access control enforced by **xinetd**. If none of the two is specified for a service, the service is available to anyone. |
| only\_from | oval-def:  EntityStateIPAddressStringType | 0..1 | false | Determines the remote hosts to which the particular service is available. Its value is a list of IP addresses which can be specified in any combination of a numerical address, a factorized address, a network name, a host name, and/or an ip address/netmask range[[129]](#footnote-129). |
| port | oval-def:EntityStateIntType | 0..1 | false | Determines the service port. If this property is specified for a service listed in **/etc/services**, it SHOULD be equal to the port number listed in that file. |
| server | oval-def:EntityStateStringType | 0..1 | false | Determines the program to execute for this service. |
| server\_arguments | oval-def:EntityStateStringType | 0..1 | false | Determines the arguments passed to the server. Unlike **inetd**, the server name SHOULD NOT be included[[130]](#footnote-130). |
| socket\_type | oval-def:EntityStateStringType | 0..1 | false | Specifies the type of socket that is used by the service[[131]](#footnote-131). |
| type | unix-def:  EntityStateXinetdTypeStatusType | 0..1 | false | Specifies the type of the service. Any combination of the values RPC, INTERNAL, TCPMUX/TCPMUXPLUS, or UNLISTED can be used[[132]](#footnote-132). |
| user | oval-def:EntityStateStringType | 0..1 | false | Determines the uid for the server process. The user property can either be numeric or a name (recommended). If a name is given the user name must exist in **/etc/passwd**. This attribute is ineffective if the effective user ID of **xinetd** is NOT super-user[[133]](#footnote-133). |
| wait | oval-def:EntityStateBoolType | 0..1 | false | This property determines if the process is single or multi-threaded and whether or not **xinetd** accepts the connection or the server program accepts the connection[[134]](#footnote-134). |
| disabled | oval-def:EntityStateBoolType | 0..1 | false | A property of which when set to *true*, the service is disabled and not starting, and when set to *false*, the service is enabled[[135]](#footnote-135). |

## unix-sc:xinetd\_item

The xinetd\_item construct defines the information associated with Internet services on file systems supported by the UNIX platform. This information is located in **/etc/xinetd.conf**[[136]](#footnote-136).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property | Type | Multiplicity | Nillable | Description |
| protocol | oval-sc:EntityItemStringType | 0..1 | false | A recognized protocol, such as one listed in the file **/etc/protocols**, used by the service. If this property is not defined in the **xinetd.conf** file, the default protocol employed by the service will be used[[137]](#footnote-137). |
| service\_name | oval- sc:EntityItemStringType | 0..1 | false | The name of a valid service listed in the services file. For RPC services, the value of the service-name field consists of the RPC service name or program number, followed by a '/' (slash) and either a version number or a range of version numbers (for example, **rstatd/2-4**). |
| flags | oval- sc:EntityItemStringType | 0..\* | false | The flags property specifies miscellaneous settings associated with the service. It can take on values such as INTERCEPT, NORETRY, IDONLY, NAMEINARGS, NODELAY, KEEPALIVE, NOLIBWRAP, SENSOR, IPv4, IPv6, LABELLED, and REUSE (deprecated)[[138]](#footnote-138). |
| no\_access | oval- sc:EntityItemStringType | 0..\* | false | Determines the remote hosts to which the particular service is unavailable. Its value can be specified in the same way as the value of the **only\_from** property. These two properties determine the access control enforced by **xinetd**. If none of the two is specified for a service, the service is available to anyone. |
| only\_from | oval- sc:  EntityItemIPAddressStringType | 0..\* | false | Determines the remote hosts to which the particular service is available. Its value is a list of IP addresses which can be specified in any combination of a numerical address, a factorized address, a network name, a host name, and/or an ip address/netmask range[[139]](#footnote-139). |
| port | oval- sc:EntityItemIntType | 0..1 | false | Determines the service port. If this property is specified for a service listed in **/etc/services**, it SHOULD be equal to the port number listed in that file. |
| server | oval- sc:EntityItemStringType | 0..1 | false | Determines the program to execute for this service. |
| server\_arguments | oval- sc:EntityItemStringType | 0..1 | false | Determines the arguments passed to the server. Unlike **inetd**, the server name SHOULD NOT be included[[140]](#footnote-140). |
| socket\_type | oval- sc:EntityItemStringType | 0..1 | false | Specifies the type of socket that is used by the service[[141]](#footnote-141). |
| type | unix-sc:  EntityItemXinetdTypeStatusType | 0..1 | false | Specifies the type of the service[[142]](#footnote-142). |
| user | oval- sc:EntityItemStringType | 0..1 | false | Determines the uid for the server process. The user attribute can either be numeric or a name (recommended). If a name is given the user name must exist in **/etc/passwd**. This attribute is ineffective if the effective user ID of xinetd is NOT super-user[[143]](#footnote-143). |
| wait | oval- sc:EntityItemBoolType | 0..1 | false | This attribute determines if the process is single or multi-threaded and whether or not xinetd accepts the connection or the server program accepts the connection[[144]](#footnote-144). |
| disabled | oval- sc:EntityItemBoolType | 0..1 | false | A property of which when set to *true*, the service is disabled and not starting, and when set to *false*, the service is enabled[[145]](#footnote-145). |

## unix-def:EntityStateXinetdTypeStatusType

The EntityStateXinetdTypeStatusType defines the values that describe the different types of Internet service functionality on UNIX systems[[146]](#footnote-146).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| INTERNAL | The INTERNAL type is used to describe services like echo, chargen, and others whose functionality is supplied by xinetd itself. |
| RPC | The RPC type is used to describe services that use remote procedure call ala NFS. |
| UNLISTED | The UNLISTED type is used to describe services that aren't listed in /etc/protocols or /etc/rpc. |
| TCPMUX | The TCPMUX type is used to describe services that conform to RFC 1078. This type indiciates that the service is responsible for handling the protocol handshake. |
| TCPMUXPLUS | The TCPMUXPLUS type is used to describe services that conform to RFC 1078. This type indicates that xinetd is responsible for handling the protocol handshake. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

## unix-sc:EntityItemXinetdTypeStatusType

The EntityItemXinetdTypeStatusType defines the values that describe the different types of Internet service functionality on UNIX systems[[147]](#footnote-147).

|  |  |
| --- | --- |
| Enumeration Value | Description |
| INTERNAL | The INTERNAL type is used to describe services like echo, chargen, and others whose functionality is supplied by xinetd itself. |
| RPC | The RPC type is used to describe services that use remote procedure call ala NFS. |
| UNLISTED | The UNLISTED type is used to describe services that aren't listed in /etc/protocols or /etc/rpc. |
| TCPMUX | The TCPMUX type is used to describe services that conform to RFC 1078. This type indiciates that the service is responsible for handling the protocol handshake. |
| TCPMUXPLUS | The TCPMUXPLUS type is used to describe services that conform to RFC 1078. This type indicates that xinetd is responsible for handling the protocol handshake. |
| *<empty string>* | The empty string value is permitted here to allow for empty elements associated with variable references. |

# Appendix A – Normative References

[1] RFC 2119 – Key words for use in RFCs to Indicate Requirement Levels

<http://www.ietf.org/rfc/rfc2119.txt>

[2] The OVAL Language Specification

<http://oval.mitre.org/language/version5.10#specification>

# Appendix B - Change Log

**Version 5.11 Revision 4 – December 01, 2014**

* Updated version and date information for 5.11 Release Candidate 2.

**Version 5.11 Revision 3 – November 18, 2014**

* Updated version and date information for 5.11 Release Candidate 1.

**Version 5.11 Revision 2 – September 25, 2013**

* **No changes were made other than updating the document version information.**

**Version 5.11 Revision 1 – February 20, 2013**

* Added documentation clarifying the expected behavior for the has\_extended\_acl entity in the unix-sc:file\_item. This addresses <https://github.com/OVALProject/Language/issues/12>.
* Updated version and date information for 5.11 Draft 1.

**Version 5.10 Revision 1 – April 4, 2012**

* Published initial revision of the version 5.10.1 UNIX extension specification.

# Appendix C – Terms and Acronyms

1. For more information see <https://oval.mitre.org/about/termsofuse.html> [↑](#footnote-ref-1)
2. For more information see <https://oval.mitre.org/> [↑](#footnote-ref-2)
3. For more information see <http://en.wikipedia.org/wiki/Namespace_(computer_science)> [↑](#footnote-ref-3)
4. For more information see <http://linux.die.net/man/1/ls> [↑](#footnote-ref-4)
5. For more information see <http://linux.die.net/man/1/stat> [↑](#footnote-ref-5)
6. For more information see <http://linux.die.net/man/2/stat> [↑](#footnote-ref-6)
7. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html> [↑](#footnote-ref-7)
8. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html#metacharacters> [↑](#footnote-ref-8)
9. For more information see <http://linux.die.net/man/1/stat> [↑](#footnote-ref-9)
10. For more information see <http://linux.die.net/man/1/ls> [↑](#footnote-ref-10)
11. For more information see <http://evolt.org/node/263> and <http://www.greenend.org.uk/rjk/tech/perms.html> [↑](#footnote-ref-11)
12. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html> [↑](#footnote-ref-12)
13. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html#metacharacters> [↑](#footnote-ref-13)
14. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-14)
15. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-15)
16. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-16)
17. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-17)
18. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-18)
19. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-19)
20. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-20)
21. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-21)
22. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-22)
23. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-23)
24. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-24)
25. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-25)
26. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-26)
27. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-27)
28. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-28)
29. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-29)
30. For more information see <http://www.vanemery.com/Linux/ACL/linux-acl.html> or <http://www.softpanorama.info/Commercial_linuxes/linux_acl.shtml> [↑](#footnote-ref-30)
31. For more information see <http://www.vanemery.com/Linux/ACL/linux-acl.html> [↑](#footnote-ref-31)
32. For more information see <http://linux.die.net/man/1/stat> [↑](#footnote-ref-32)
33. For more information see <http://linux.die.net/man/1/ls> [↑](#footnote-ref-33)
34. For more information see <http://evolt.org/node/263> [↑](#footnote-ref-34)
35. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html> [↑](#footnote-ref-35)
36. For more information see <http://www.dwheeler.com/essays/fixing-unix-linux-filenames.html#metacharacters> [↑](#footnote-ref-36)
37. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-37)
38. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-38)
39. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-39)
40. For more information see <http://www.thegeekstuff.com/2009/07/unix-stat-command-how-to-identify-file-attributes/> [↑](#footnote-ref-40)
41. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-41)
42. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-42)
43. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-43)
44. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-44)
45. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-45)
46. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-46)
47. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-47)
48. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-48)
49. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-49)
50. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-50)
51. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-51)
52. For more information about the different types in the ls –l command see <http://www.hackinglinuxexposed.com/articles/20030417.html> [↑](#footnote-ref-52)
53. For more information see <http://www.vanemery.com/Linux/ACL/linux-acl.html> or <http://www.softpanorama.info/Commercial_linuxes/linux_acl.shtml> [↑](#footnote-ref-53)
54. For more information see <http://www.vanemery.com/Linux/ACL/linux-acl.html> [↑](#footnote-ref-54)
55. For more information see <http://ss64.com/bash/uname.html> [↑](#footnote-ref-55)
56. For more information see <http://ss64.com/bash/uname.html> [↑](#footnote-ref-56)
57. For more information about the command line options of the **uname** command see <http://ss64.com/bash/uname.html> [↑](#footnote-ref-57)
58. For more information about the **uname** system call see <http://linux.die.net/man/2/uname> [↑](#footnote-ref-58)
59. For more information about the command line options of the uname command see <http://ss64.com/bash/uname.html> [↑](#footnote-ref-59)
60. For more information about the **uname** system call see <http://linux.die.net/man/2/uname> [↑](#footnote-ref-60)
61. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?init+8> [↑](#footnote-ref-61)
62. For more information see <http://linux.die.net/man/8/chkconfig> [↑](#footnote-ref-62)
63. For more information see <http://linux.die.net/man/8/chkconfig>. You must be logged in as root AND have root in its own shell to use the command (via **su root** followed by **su -**) or it will return "command not found." [↑](#footnote-ref-63)
64. For more information see <http://linux.die.net/man/8/chkconfig>. You must be logged in as root AND have root in its own shell to use the command (via **su root** followed by **su -**) or it will return "command not found." [↑](#footnote-ref-64)
65. For more information see <http://linux.die.net/man/8/chkconfig>. You must be logged in as root AND have root in its own shell to use the command (via **su root** followed by **su -**) or it will return "command not found." [↑](#footnote-ref-65)
66. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-66)
67. For more information see <http://kb.iu.edu/data/afnv.html> [↑](#footnote-ref-67)
68. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-68)
69. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-69)
70. For more information about obtaining the ps output from system calls see <http://www.mitchr.me/SS/exampleCode/AUPG/solaris_ps.c.html> for the source code. The line sprintf(fileToOpen, "/proc/%s/psinfo", dep->d\_name) is of particular interest. Please note that the psinfo part of the process information path may vary for different UNIX systems. For example, in CentOS, status is used instead of psinfo. [↑](#footnote-ref-70)
71. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-71)
72. For more information about obtaining the ps output from system calls see <http://www.mitchr.me/SS/exampleCode/AUPG/solaris_ps.c.html> for the source code. The line sprintf(fileToOpen, "/proc/%s/psinfo", dep->d\_name) is of particular interest. Please note that the psinfo part of the process information path may vary for different UNIX systems. For example, in CentOS, status is used instead of psinfo. [↑](#footnote-ref-72)
73. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-73)
74. For more information see <http://kb.iu.edu/data/afnv.html> [↑](#footnote-ref-74)
75. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-75)
76. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-76)
77. For more information about obtaining the ps output from system calls see <http://www.mitchr.me/SS/exampleCode/AUPG/solaris_ps.c.html> for the source code. The line sprintf(fileToOpen, "/proc/%s/psinfo", dep->d\_name) is of particular interest. Please note that the psinfo part of the process information path may vary for different UNIX systems. For example, in CentOS, status is used instead of psinfo. [↑](#footnote-ref-77)
78. For more information see <http://linux.die.net/man/3/audit_getloginuid> [↑](#footnote-ref-78)
79. For more information see <http://linux.die.net/man/3/getpidcon> for the system call, <http://linux.die.net/man/1/secon> for the command, and <http://www.centos.org/docs/5/html/Deployment_Guide-en-US/ch-selinux.html> for more information. Note that there is NO DIFFERENCE between a domain and a type—see <http://docs.fedoraproject.org/en-US/Fedora/13/html/SELinux_FAQ/> [↑](#footnote-ref-79)
80. For more information see <http://www.informit.com/articles/article.aspx?p=397655&seqNum=6> or <http://unix.stackexchange.com/questions/18166/what-are-session-leaders-in-ps> [↑](#footnote-ref-80)
81. For more information see <http://unixhelp.ed.ac.uk/CGI/man-cgi?ps> [↑](#footnote-ref-81)
82. For more information about obtaining the ps output from system calls see <http://www.mitchr.me/SS/exampleCode/AUPG/solaris_ps.c.html> for the source code. The line sprintf(fileToOpen, "/proc/%s/psinfo", dep->d\_name) is of particular interest. Please note that the psinfo part of the process information path may vary for different UNIX systems. For example, in CentOS, status is used instead of psinfo. [↑](#footnote-ref-82)
83. For more information see <http://linux.die.net/man/3/audit_getloginuid> [↑](#footnote-ref-83)
84. For more information see <http://linux.die.net/man/3/getpidcon> for the system call, <http://linux.die.net/man/1/secon> for the command, and <http://www.centos.org/docs/5/html/Deployment_Guide-en-US/ch-selinux.html> for more information. Note that there is NO DIFFERENCE between a domain and a type—see <http://docs.fedoraproject.org/en-US/Fedora/13/html/SELinux_FAQ/> [↑](#footnote-ref-84)
85. For more information see <http://www.informit.com/articles/article.aspx?p=397655&seqNum=6> or <http://unix.stackexchange.com/questions/18166/what-are-session-leaders-in-ps> [↑](#footnote-ref-85)
86. For more information see <http://www.kernel.org/pub/linux/libs/security/linux-privs/kernel-2.2/capfaq-0.2.txt> [↑](#footnote-ref-86)
87. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-87)
88. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-88)
89. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-89)
90. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-90)
91. For more information see <http://www.kernel.org/pub/linux/libs/security/linux-privs/kernel-2.2/capfaq-0.2.txt> [↑](#footnote-ref-91)
92. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-92)
93. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-93)
94. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-94)
95. For more information see <http://www.cs.fsu.edu/~baker/devices/lxr/http/source/linux/include/linux/capability.h> [↑](#footnote-ref-95)
96. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-96)
97. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-97)
98. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=1M&topic=inetd> [↑](#footnote-ref-98)
99. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-99)
100. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-100)
101. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=1M&topic=inetd> [↑](#footnote-ref-101)
102. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-102)
103. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-103)
104. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-104)
105. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-105)
106. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-106)
107. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-107)
108. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-108)
109. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=1M&topic=inetd> [↑](#footnote-ref-109)
110. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-110)
111. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-111)
112. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-112)
113. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-113)
114. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-114)
115. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-115)
116. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-116)
117. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-117)
118. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-118)
119. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-119)
120. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-120)
121. For more information see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-121)
122. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-122)
123. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-123)
124. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-124)
125. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-125)
126. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-126)
127. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-127)
128. For more information about the different flags see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-128)
129. For more information about the specific host formatting available see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-129)
130. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-130)
131. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-131)
132. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-132)
133. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-133)
134. For more information about the implications of a single or multi-threaded service, see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-134)
135. For more information about the implications of a single or multi-threaded service, see <http://cims.nyu.edu/cgi-systems/man.cgi?section=4&topic=inetd.conf> [↑](#footnote-ref-135)
136. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-136)
137. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-137)
138. For more information about the different flags see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-138)
139. For more information about the specific host formatting available see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-139)
140. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-140)
141. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-141)
142. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-142)
143. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-143)
144. For more information about the implications of a single or multi-threaded service, see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-144)
145. For more information about the implications of a single or multi-threaded service, see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-145)
146. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-146)
147. For more information see <http://linux.die.net/man/5/xinetd.conf> [↑](#footnote-ref-147)