RFC 189 Http Service Updates

Draft

52 Pages

Abstract

The current Http Service specification is based on Servlet API 2.1. As such it misses newer functionality such as Servlet Filters or event listeners. In addition use of the service does not support the recent whiteboard pattern approach. This RFC lists requirement to update the Http Service specification as well as possible create new specification for extended Web Applications in the context of OSGi.

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0.3   Feedback

This document can be downloaded from the OSGi Alliance design repository at https://github.com/osgi/design The public can provide feedback about this document by opening a bug at https://www.osgi.org/bugzilla/.

0.4   Table of Contents

0.5   Terminology and Document Conventions

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

```
Source code is shown in this typeface.
```

0.6   Revision History

The last named individual in this history is currently responsible for this document.

Revision	Date	Comments
Initial	11/02/12	Initial Version Felix Meschberger, Adobe Systems Incorporated, fmeschbe@adobe.com
Update	01/27/12	Update on Feedback from Orlando F2F and BJ Hargrave on the CPEG mailing list. Felix Meschberger, Adobe Systems Incorporated, fmeschbe@adobe.com
Update	01/28/12	Update on feedback from Austin F2F • Removal of new registration/unregistration methods • Clarification of Servlet API 3 registration methods • Definition of the osgi.whiteboard namespace • Minor clarifications and fixes Felix Meschberger, Adobe Systems Incorporated, fmeschbe@adobe.com
Update	04/16/13	Update with feedback from Cologne F2F • Annotations and asynchronous processing Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com
Update	05/22/13	Added section about listener registration Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com
Update	07/15/13	Updated with feedback from Palo Alto F2F • Updated listener handling • Clarified service lifecycle handling • Renamed "pattern" property to "path" Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com
Update	07/29/13	Updated with feedback from CPEG call • Changed handling of multiple whiteboard implementation Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com

Revision	Date	Comments
Update	08/15/13	Updated with feedback from BJ (partially already mentioned at the Palo Alto F2F) : • Clean up requirements list • Several clarifications / rewordings, samples • Moved DTOs to org.osgi.dto.service.http • Added security permissions Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com
Update	08/23/13	Update with feedback from CPEG call and add missing pieces: • use different registration properties for servlets and servlet filters • add notes about service life cycle and clarify properties for each service • Use consistent naming, changed the flow of chapters for easier reading Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com
Update	10/01/13	Update with feedback from CPEG call: • Reformat by moving common properties into separate chapter • Use prototype scope Carsten Ziegeler, Adobe Systems Incorporated, cziegele@adobe.com

1   Introduction

The OSGi Specifications currently only contain limited specification support for creating Web Applications in an OSGi context:

• Http Service Specification based on Servlet API 2.1. Apart from being based an old Servlet API version and being silent about how more recent versions are supported the main problem with this specification is that a provider of servlets and resources has to grab the Http Service first before being able to register servlets and resources. There is no whiteboard pattern support.

- Web Applications Specification basically just defines how existing web applications may be enhanced with OSGi Manifest headers and deployed into the OSGi Framework as-is. This is fine for moving existing web applications with minimal changes into the OSGi framework.

Some thoughts are already listed on the OSGi Community Wiki at http://wiki.osgi.org/wiki/WebExperience.

2   Application Domain

Developers need to use the full extend of current Servlet API specifications (as of this writing Servlet API 3.0 is the most recent version). As such there is a need to register servlet filters and event listeners.

3   Problem Description

3.1   Support for dated Serlvet API 2.1

Current support for web applications using the Http Service in traditional OSGi based applications is limited to servlets and resources. From the current Servlet API 3.0 specification the following functionality is missing:

- Servlet Filters

- Servlet Event Listeners

- Asynchronous Requests

At this moment some of this missing functionality is covered in a proprietary way. Examples are the Apache Felix Http Whiteboard support or the OPS4J Pax Web collection of bundles.

3.2   Dependency on the HttpService service

Currently the HttpService service (or one of them if multiple services exist in a framework) must be accessed to be able to register servlets and/or resources. In addition to register a servlet or resource an instance of the `HttpContext` interface is required.

This makes it very cumbersome to easily register servlets and resources. Particularly it is hard to come up with an `HttpContext` instance which for example uses an authentication mechanism available in the framework to implement the `handleSecurity` method.

To reduce (or simplify) this dependency it would be helpful to just register servlets as services and have them registered with a matching Http Service in a whiteboard pattern style. Likewise registration of static resources would be supported in an extender pattern style.

At this moment some of this missing functionality is covered in a proprietary way. Examples are the Apache Felix Http Whiteboard support or the OPS4J Pax Web collection of bundles.

3.3   Configuration

The Http Service specification currently declares a number of framework properties to configure the Http Service. This raises a number of issues:

- Unable to dynamically reconfigure the Http Service in an easy way

- Incomplete configuration. For example the local interface to bind to is not an official configuration property

- When the Http Service is implemented as bridge to a Servlet Container in which the OSGi framework is deployed (e.g. as part of a Web Application) these properties have no effect.

In addition the actual configuration of an Http Service instance cannot be easily be queried/introspected.

4   Requirements

4.1   Update to Http Service API

HS-1   The solution MUST update the Http Service specification to refer to the latest Servlet API specification and define to what extend the Http Service provides support.

HS-2   The solution MUST extend the Http Service service API to support Servlet registration with patterns as defined by the Servlet API specification (Section 12.2, Specification of Mappings, in the Servlet API 3.0 specification). This requirement aligns servlet registration to functionality provided by the Servlet API web application descriptor (`web.xml`).

HS-3   The solution MUST extend the Http Service service API to support registration of Servlet API filters with patterns as defined by the Servlet API specification (Section 12.2, Specification of Mappings, in the Servlet API 3.0 specification) or referring to servlets by their names. This requirement aligns mapping filters to requests to functionality provided by the Servlet API web application descriptor (`web.xml`).

HS-4   The solution MUST add support for error page configuration.

HS-5   The solution MUST define how registered servlets and servlet filters are named.

HS-6   The solution MUST clarify ServletContext implementation in the Http Service for both standalone and bridged Http Service implementations.

HS-7   The solution MUST clarify the ServletContext scope of Servlet API listeners registered through the Http Service.

HS-8   The solution MUST define service registration properties for the Http Service to reflect configuration of the service.

HS-9   The solution MUST define whiteboard registration of servlet services with the Http Service.

HS-10 The solution MUST define whiteboard registration of filter services with the Http Service.

HS-11 The solution MUST define whiteboard registration of servlet listener services with the Http Service.

HS-12 The solution MUST define registration of OSGi HttpContext services used for Servlet and Filter registration.

HS-13 The solution MUST define how servlets, filters, and servlet listener services are matched with Http Service services for registration.

HS-14 The solution MUST define whiteboard registration of static resources with the Http Service.

HS-15 The solution MUST define whiteboard registration of error pages with the Http Service.

HS-16 The solution MUST define a capability for the whiteboard pattern registration in one of the standard namespaces (or a new namespace to be defined in the Chapter 135, Common Namespaces Specification). Bundles registering servlet, filter, and/or servlet listener services can then require this capability.

5   Technical Solution

The Http Service Update consists of two parts:

- Updates and clarifications to the the Http Service API and specification itself.

- Whiteboard Registration support for servlets, servlet filters, listeners, resources and HttpContexts.

5.1   Update Http Service API

The goal of the Http Service update is to make the registration of more elements of the Web Application Descriptor available to OSGi applications:

- Servlets may be registered with more than one pattern (instead of a single alias)

- Servlet filters (introduced in Servlet API 2.3)

- Error pages (introduced in Servlet API 2.2)

- Event Listener (introduced in Servlet API 2.3)

Of the remaining elements defined in the Web Application descriptiors, MIME type mapping and login configuration is already available through the `HttpContext` interface.

Resources (EJB) are not supported by the Http Service because these are outside of the scope of the Http Service and are supported by other mechanisms in the OSGi framework such as the service registry or through JNDI.

Registration of those elements is possible following the whiteboard pattern. Registration of servlets and resources through the Http Service is deprecated.

5.1.1 Servlet API Reference Version

Implementations of the Http Service Specification 1.3 is based on the Servlet API Specification Version 3.0. Implementatios of the Http Service Specification 1.3 may support a previous version of the Servlet API Specification only. The actual version supported is exposed through the `ServletContext.getMajorVersion()` and `.getMinorVersion()` methods.

5.1.2 Annotations

Annotations defined in the Servlet API Specifications must be ignored by an implementation of the Http Service Specification. This is to avoid class path scanning and going the OSGi way. In addition this avoids unwanted situations where servlets are registered just by the fact that a specific class is contained in a bundle – this could lead to the servlet registered twice, with the wrong context or registered at all.

Implementations of the Http Service Specification may support annotations through an additional proprietary opt-in mechanism like a manifest header or require capability.

5.1.3 Web Application Events

Starting with Servlet API 2.3 event listener interfaces have been defined to be notified of various events during the web application and request processing live cycle. The Http Service supports all listeners as defined in section 11.2, Event Listeners, of the Servlet API 3.0 specification [3].

5.1.4 Relationship to Servlet Container

Implementations of the Http Service specification will generally be backed by actual implementations of the Servlet Servlet API specification such as Tomcat or Jetty. There also exist implementations which bridge into a servlet container into which the OSGi Framework has been deployed as a web application, for example the Apache Felix Http Service Bridge or the Equinox Http Service Bridge.

As such an Http Service implementation will live in a servlet context and all servlets, servlet filters, listeners and resources registered through the Http Service will be backed by the same `ServletContext`.

With respect to Web Applications two areas need clarification as to how they are segregated or shared amongst the servlets, servlet filters, listeners and resources:

- `ServletContext` objects used for servlet and servlet filter initialization

- Http Sessions acquired by servlets and servlet filters through the `HttpServletRequest`

5.1.4.1 HttpContext and ServletContext

The Http Service specification currently defines the correlation between an `HttpContext` used for Servlet (and now Filter) registration and the `ServletContext` used for the Servlet and Filter initialization as follows:

> `Servlet` objects require a `ServletContext` object. This object provides a number of functions to access the Http Service Java Servlet environment. It is created by the implementation of the Http Service for each unique `HttpContext` object with which a Servlet object is registered. Thus, Servlet objects registered with the same `HttpContext` object must also share the same `ServletContext` object.

The table lists all methods of the `ServletContext` interface and how these methods should be implemented:

Method	Implementation
`getContextPath` (Servlet API >= 2.5)	Backed by Servlet Container
`getContext(String)`	Backed by Servlet Container
`getMajorVersion()`	Backed by Servlet Container
`getMinorVersion()`	Backed by Servlet Container
`getMimeType(String)`	Backed by `HttpContext`
`getEffectiveMinorVersion()`	Same as `getMinorVersion()`
`getEffectiveMajorVersion()`	Same as `getMajorVersion()`
`getResourcePaths(String)`	Backed by `HttpContext`
`getResource(String)`	Backed by `HttpContext`
`getResourceAsStream()`	Backed by `HttpContext`
`getRequestDispatcher(String)`	See note 1.
`getNamedDispatcher(String)`	See note 1.
`getServlet(String)`	Backed by Servlet Container
`getServlets()`	Backed by Servlet Container
`getServletNames()`	Backed by Servlet Container
`log(String)`	Backed by Servlet Container
`log(Exception, String)`	Backed by Servlet Container
`log(String, Throwable)`	Backed by Servlet Container
`getRealPatch(String)`	Backed by `HttpContext`
`getServerInfo()`	Backed by Servlet Container
`getInitParameter(String)`	See note 2.
`getInitParameterNames()`	See note 2.
`getAttribute(String)`	Managed per `HttpContext`

getAttributeNames()	Managed per HttpContext
setAttribute(String, Object)	Managed per HttpContext
removeAttribute(String)	Managed per HttpContext
getServletContextName()	See note 3.
Programmatic Web Application configuration methods	See note 4.

Notes:

1. If the argument matches a servlet registered by the Http Service this method must be handled by the Http Service. Otherwise it must be backed by the Servlet Container.

2. In addition to the underlying ServletContext's initialization parameters, the Http Service exposes its own service registration properties as ServletContext initialization parameters.

3. By default this method is backed by the Servlet Container. Http Service implementations may opt to implement this method in an implementation specific way such as returning a name for the Http Service.

4. These methods for programmatic registration of servlets, servlet filters, and listeners in a Servlet API 3 servlet container always throw UnsupportedOperationException. These methods can only be called in ServletContextListener.contextInitialized methods for listeners managed by the servlet container itself.

5.1.4.2 Http Sessions

HTTP Sessions are managed by the servlet container separately for each web application with the session ID sent back and forth between client and server as a cookie or as a request parameter. Assuming the session ID cookie, this is attached to the servlet context path.

Implementations of the Http Service must ensure HTTP Sessions are not shared amongst Servlets registered with different servlet contexts. The implementation must make sure to create and destroy the sessions. HTTP Sessions are defined by chapter 7, Sessions, in the Servlet API 3.0 [3]. specification.

5.1.4.3 Lifecycle of Request Handling Objects

When the Http Service receives a request it establishes the processing pipeline based on the available services (filters, servlets, and listeners) at this point of time and executes this pipeline. Between establishing the pipeline and finishing the processing, services used in this pipeline might become unregistered. It is up to the implementation of such a service whether it throws a servlet exception if it gets executed in that case or not. (This is basically the same as with the current Http Service and a servlet gets unregistered while it is processing a request).

5.1.4.4 Asynchronous Requests

If the implementation supports Servlet API 3.0 (or higher), servlets might use the asynchronous request handling feature. However as the servlet might not be available when the processing continues a servlet exception will be thrown.

A servlet or filter supporting the asynchronous mode must declare this with a service property osgi.http.whiteboard.asyncSupported.

5.1.5 Http Service

5.1.5.1 Service Registration Properties

The Http Service must expose the following information through its servlet registration properties:

`osgi.http.service.endpoints`	A String+ property listing URLs of bound ports; e.g. http://192.168.1.10:8080/. The relevant information contained in the URLs is the scheme, bound interface and port and the (optional) context path in a Servlet API servlet container the Http Service is registered.

The port and address properties may not always be available to the Http Service implementation, particularly in a bridged implementation. In such cases these properties may be omitted from the service registration.

5.1.5.2 Configuration

The level of configurability of the Http Service may vary between implementations. Some implementations may allow to configure down to the interface and port level (for example the Jetty based Apache Felix implementtion) while others don't allow anything to be configured (for example a bridging implementation where configuration is done in the servlet container).

If an implementation supports configuration, such configuration should be supplied via the Configuration Admin Service.

The framework properties `org.osgi.service.http.port` and `org.osgi.service.http.port.secure` apply in the absence of configuration.

5.1.5.3 Diagnostics

See chapter 6, Data Transfer Objects, on the diagnostic API. This API only allows for inspection of registered Servlets, resources, Filters, and error page locations.

5.1.6 API Version

The Http Service API version is incremented to 1.3.

5.1.7 Servlet API Exports

The Http Service implementation bundle is not required to export the Servlet API Java Packages. If it does so, the bundle must obey semantic versioning and support the portable Java Contracts as defined in RFC 180 [4]. The following sections list suggested exports and capabilities.

If the Servlet API is provided by another bundle, it is recommended to export the packages and provide the capabilities as listed.

5.1.7.1 Providing Serlvet API 3.0

```
Export-Package: javax.servlet; javax.servlet.http; version=2.6, javax.servlet;
javax.servlet.http; version=3.0
Provide-Capability: osgi.contract; osgi.contract=JjavaS.servlet; version:Version=3;
     uses:="javax.servlet,      javax.servlet.http, javax.servlet.annotation,
javax.servlet.descriptor", osgi.contract;
 osgi.contract=JjavaS.servlet; version:Version=2.5; uses:="javax.servlet,
 javax.servlet.http", osgi.contract; osgi.contract=java.servlet;
 version:Version=2.4; uses:="javax.servlet, javax.servlet.http"
```

5.1.7.2 *Providing Serlvet API 2.5*

```
Export-Package: javax.servlet; javax.servlet.http; version=2.5
Provide-Capability: osgi.contract; osgi.contract=JavaServlet;
 version:Version=2.5; uses:="javax.servlet, javax.servlet.http",
 osgi.contract; osgi.contract=java.servlet;
 version:Version=2.4; uses:="javax.servlet, javax.servlet.http"
```

Providing Serlvet API 2.4
```
Export-Package: javax.servlet; javax.servlet.http; version=2.4
Provide-Capability: osgi.contract; osgi.contract=java.servlet;
 version:Version=2.4; uses:="javax.servlet, javax.servlet.http"
```

5.2   Whiteboard Registration Support

With whiteboard registration support for servlets, listeners, resources and servlet filters it is easy to register these web application elements without tracking the Http Service. The information required for the registration is provided with service registration properties.

The following table lists the common properties for whiteboard registration of servlets, listeners, resources and servlet filters. They are explained in more detailed in the next chapters.

Property	Type	Description
`osgi.http.whiteboard.context.name`	String	The value of this property refers to a Http Context service. If this property is missing or empty, the default context is used. If no context with the name exists or if the context is registered by another bundle and does not have the `osgi.http.whiteboard.context.shared` property set to `true`, the servlet cannot be registered.
`osgi.http.whiteboard.service.target`	String	Services registered with this property are registered with an Http Service whose service registration properties match this LDAP filter expression.

5.2.1   Target HttpService

Servlet, servlet filter, listener, and resource services may register with a `osgi.http.whiteboard.service.target` property containing a filter expression. A Http Service about to consume a servlet, servlet filter, listener, or resource must match that filter against his own service registration properties. Only if the filter matches, the servlet, servlet filter, listener, or resource is used by the Http Service. For example a whiteboard service registered with the property

```
osgi.http.whiteboard.service.target = "(name=Admin)"
```

must only be used by an Http Service exposing the `name` property set to `admin`.

Without such a target property all available Http Services are matching. Even if a target property is used, still several Http Services might match. However, a servlet, listener, resource, or servlet filter service must only be used by a single Http Service. To prevent multiple uses a whiteboard support implementation must ensure to register such objects only with a single Http Service by themselves. If more than a single whiteboard support implementation is active at runtime, there is the potential that a servlet, listener, resource or servlet filter is used by more than a single Http Service. In this case such objects should use the target property described above making sure that not more than one Http Service matches the filter expression.

If more than one Http Service is matching and the servlet, servlet filter, resource and listener services are registered with prototype scope (see RFC 195 Service Scopes), this service will be used by all matching Http

Services. If more than one Http Service is matching and the servlet, servlet filter, resource and listener services are registered with bundle scope, the service will be used by all matching Http Services registered by different bundles but only with one Http Service from the same bundle.

If more than one Http Service match, e.g, in the absence of the `osgi.http.whiteboard.service.target` property, any one Http Service may use the service. It is undefined which Http Service this is.

The service registration properties of the Http Service using the servlet, servlet filter, listener, or resource service are exposed as ServletContext initialization parameters.

5.2.2 Http Context for servlets, servlet filters, resources, and listeners

By default the whiteboard support is associating servlets, servlet filters, listeners, and resources with the default HttpContext of the targetted Http Service. Additional HttpContexts can be made available through the whiteboard support. In this case the HttpContext service must specify the `osgi.http.whiteboard.context.name` service property. This name can be used as a reference by a servlet, servlet filter, listener, or resource. If the HttpContext should be used by services from a different bundle than the bundle which registered the HttpContext, the HttpContext must set the `osgi.http.whiteboard.context.shared` property to the boolean value `true`.

If there is more than one HttpContext registering itself with the same context name, the Http Service is using the HttpContext with the highest service ranking. This might lead to re-binding whiteboard services.

If not specified further a servlet, servlet filter, listener, or resource using the whiteboard registration is associated with the default HttpContext. The service can be registered with a specific `HttpContext` by using the `osgi.http.whiteboard.context.name` service property. If the referenced HttpContext does not exist, or is registered by a different bundle and the `osgi.http.whiteboard.context.shared` property is not set to the boolean value `true`, the HttpContext cannot be used and the referencing service is not used by a Http Service.

If a servlet or servlet filter is used by an Http Service, the service calls the init() method of the servlet or servlet filter which gets a configuration object (ServletConfig or FilterConfig) that returns a ServletContext object. The HttpService is creating a ServletContext object for each HttpContext it is using. Therefore servlets and servlet filters used by the same HttpService and referencing the same HttpContext share the ServletContext object.

Property	Type	Description
`osgi.http.whiteboard.context.name`	String+	For `HttpContext` services this property is required and identifies the service when referred to by a servlet or servlet filter service. Http Context services without this property are ignored. For an HttpContext the type of this property is String+, as the context can be associated with more than one name.
`osgi.http.whiteboard.context.shared`	Boolean	Whether a Http Context service may be used by servlet, listener, resource, or servlet filter services registered by other bundles. By default Http Context services can only be used by servlet, listener, resource, or servlet filter services registered by the same bundle.

5.2.3 Servlet Registration

Servlets are registered with a list of patterns in the `osgi.http.whiteboard.servlet.pattern` service registration property. These patterns are defined by the Servlet API 3.0 specification [3]. in section 12.2, Specification of Mappings:

- A string beginning with a '/' character and ending with a '/*' suffix is used for path mapping.

- A string beginning with a '*.' prefix is used as an extension mapping.

- The empty string ("") is a special URL pattern that exactly maps to the application's context root, i.e., requests of the form http://host:port/<context- root>/. In this case the path info is '/' and the servlet path and context path is empty string ("").

- A string containing only the '/' character indicates the "default" servlet of the application. In this case the servlet path is the request URI minus the context path and the path info is null.

- All other strings are used for exact matches only.

A servlet may register itself with the property `osgi.http.whiteboard.servlet.name` which can be used by servlet filters to address this servlet. If the servlet does not set this property, the servlet name defaults to the fully qualified class name of the service object. Therefore in that case it can't be directly referenced by a servlet filter. If there is more than one servlet with the same name and also associated with the same HttpContext, then the servlet with the highest service ranking is used and the other servlet is ignored. The same happens if there is more than a single servlet using the exact value for a pattern within the same HttpContext.

If a servlet is used by an HttpService, the init() method of the servlet will be called. Once the servlet is no longer be used by the HttpService the destroy() method will be called.

As servlet services might come and go as well as HttpContexts might come and go, the whiteboard service registration can be very dynamic. Therefore servlet services might transition between used by a HttpService to not used and back to be used. The servlet service should either be implemented in a reentrant way and be prepared that after a call of destroy() a new initialization through init() might follow. The recommended alternative is to use the prototype scope to implement and register servlets instead — or the servlet should be registered with the prototype scope.

Property	Type	Description
`osgi.http.whiteboard.servlet.name`	String	The name of a servlet. This name is used as the value of the `ServletConfig.getServletName()` method and defaults to the fully qualified name of the service object's class.
`osgi.http.whiteboard.servlet.pattern`	String+	Registration pattern for the servlet.
`osgi.http.whiteboard.servlet.asyncSupport`	Boolean	Declares whether the servlet supports asynchronous operation mode.
`osgi.http.whiteboard.servlet.errorPage`	String+	Register the servlet as an error page for error code and/or exception; the value may be fully qualified exception type or three digit HTTP status code. Any value not being a three digit number is assumed to be a fully qualified class name.

5.2.4 Servlet Filter Registration

Servlet filters have been introduced into the Servlet API specification in Version 2.3 and thus far have been missing from the Http Service specification. This update adds support to register servlets filters through the whiteboard pattern. A servlet filter can be registered with path patterns like a servlet or a servlet filter may be mapped to a specific servlet by referencing the servlet's name.

A servlet filter can set the `osgi.http.whiteboard.filter.pattern` property to path patterns as defined by the Servlet API 3.0 specification [3]. in section 12.2, Specification of Mappings. A servlet filter can also reference servlets by name using the `osgi.http.whiteboard.filter.servlet` property.

A servlet filter may register itself with the property `osgi.http.whiteboard.filter.name`. If the servlet filter does not set this property, the servlet filter name defaults to the fully qualified class name of the service object. If there is more than one servlet filter with the same name and also associated with the same HttpContext, then the servlet filter with the highest service ranking is used and the other servlet filter is ignored.

If a servlet filter is used by an HttpService, the init() method of the servlet filter will be called. Once the servlet filter is no longer be used by the HttpService the destroy() method will be called.

As servlet filter services might come and go as well as HttpContexts might come and go, the whiteboard service registration can be very dynamic. Therefore servlet filter services might transition between used by a HttpService to not used and back to be used. The servlet filter service should either be implemented in a reentrant way and be prepared that after a call of destroy() a new initialization through init() might follow. The recommended alternative is to use the prototype scope when registering and implementing a — or the servlet filter should be registered with the prototype scope.

Property	Type	Description
`osgi.http.whiteboard.filter.name`	String	The name of a servlet filter. This name is used as the value of the `FilterConfig.getFilterName()` method and defaults to the fully qualified name of the service object's class.
`osgi.http.whiteboard.filter.pattern`	String+	Registration property for a servlet filter to apply this filter to the url paths.
`osgi.http.whiteboard.filter.servlet`	String+	Registration property for a servlet filter to apply this filter to the referenced servlet.
`osgi.http.whiteboard.filter.asyncSupport`	Boolean	Declares whether the servlet filter supports asynchronous operation mode.

5.2.5 Resources

To register resources through the whiteboard an instance of the `org.osgi.service.http.Resource` servlet is registered as a regular servlet with the additional `osgi.http.whiteboard.resource.prefix` servlet registration property. The `osgi.http.whiteboard.resource.pattern` property must be a single value prefix pattern. The `pattern` property is used as the alias and the `prefix` property as the name for the `registerResources` call.

Property	Type	Description
`osgi.http.whiteboard.resource.pattern`	String	Registration pattern for the resource. This property is required.
`osgi.http.whiteboard.resource.prefix`	String	Registers a mapping from the prefix pattern defined in the single valued `osgi.http.whiteboard.resource.pattern` to resources found at the given prefix.

Example using DS:

```
@Component(property={"osgi.http.whiteboard.context.name=resource-context"})
public class ResourceHttpContext implements HttpContext {
```

```
    ...
}

@Component(service = javax.servlet.Servlet.class, scope="PROTOTYPE",
    property={
        "osgi.http.whiteboard.resource.pattern=/files/*",
        "osgi.http.whiteboard.resource.prefix=/tmp",
        "osgi.http.whiteboard.context.name=resource-context"})
public class MyResource extends Resource {
    ...
}
```

5.2.6 Event Listeners

Event listeners register themselves under the interface(s) they are implementing, supported are:

- ServletContextListener

- ServletContextAttributeListener

- ServletRequestListener

- ServletRequestAttributeListener

- HttpSessionListener

- HttpSessionAttributeListener

- AsyncListener

Events are sent to all listeners registered in the OSGi service registry based on their registration properties. Each listener is associated with a http context as described in section 5.2.2..

The http service implementation gets the listeners from the service registry as soon as the associated http context is established and releases them when the context is not available any more or the listener is unregistered.

5.2.6.1 ServletContextListener and ServletContextAttributeListener

The ServletContextListener receives events after the Http Service has started and the corresponding context is available and when either the context gets unavailable or the Http Service is about to stop. A newly registered listener will be called with the contextInitialized method either if the context is available or when the context becomes available. As soon as the context or the Http Service gets unavailable, the contextDestroyed method is called. The Http Service keeps the listener as long as the context is available. ServletContextAttributeListeners are kept for the same period of time.

Methods in the ServletContext object handed to the `contextInitialized` method of a registered ServletContextListener to programmatically register servlets, servlet filters, and listeners are not supported and will always throw `UnsupportedOperationException`. The particular reason for not supporting these methods

is the mismatch between the lifecycle of the servlet container and the lifecycle of the bundle trying to register Servlets, Filters, or Listeners.

If implementations of the Http Service decide to support dynamic registration through the servlet context, they should require a proprietary opt-in mechanism like a manifest header or require capability.

5.2.7 Error Pages

A servlet can be marked to be called in case of errors, either if an exception is thrown during request processing or if a servlet uses the sendError method with a status code of 4xx or 5xx.

The service property `osgi.http.whiteboard.servlet.errorPage` can be configured on a servlet, the values can be a http status code or the fully qualified name of an exception. If such a status code is set via sendError or such an exception is thrown, this servlet is invoked to render an error page. A servlet serving error page requests does not need to set the `osgi.http.whiteboard.servlet.pattern` service property. If it does so, the servlet can be called by using the path, but might wish to do so to serve regular requests as well.

Example:

```
@Component(service = javax.servlet.Servlet.class, scope="PROTOTYPE",
    property={
      "osgi.http.whiteboard.servlet.errorPage=java.io.IOException",
      "osgi.http.whiteboard.servlet.errorPage=500"})
public class MyErrorServlet extends HttpServlet {
    ...
}
```

The above servlet is invoked if the status code 500 is sent via sendError or if an IOException occurs

5.3   Provided Capability

The bundle implementing whiteboard support for servlets, servlet filters, listeners, resources, and Http Contexts has to provide the following `osgi.whiteboard` capability:

```
        Provide-Capability: osgi.whiteboard;
            osgi.whiteboard="osgi.http";
            uses:="javax.servlet,javax";
            version:Version="1.3"
Such  a  bundle  must  provide  support  for  all  whiteboard  service  types  as  outlined  in  this
specification.
```

5.3.1.1 osgi.whiteboard Namespace

The whiteboard pattern leverages the OSGi service registry as a registry for objects. In the context of the Http Service servlets can be registered directly with the Http Service and the Http Service manages the usage of these registrations. Applying the whiteboard pattern the services are registered with the OSGi service registry instead.

A Whiteboard Consumer is a service that uses the life cycle events from other services to use their functionality when the service is active. It can use metadata (service registration properties) to control its functionality. Whiteboard Providers, registering such services, therefore have a dependency on the Whiteboard Consumer that can be modeled with the osgi.whiteboard namespace. The definition for this namespace can be found in the following table and the `WhiteboardNamespace` class.

Name	Kind	M/O	Type	Syntax	Description
osgi.whiteboard	CA	M	String	symbolic-name	A symbolic name for the whiteboard consumer.

					These names are defined in their respective specifications and should in general use the specification top level package name. For example, `org.acme.foo`. The OSGi Alliance reserves names that start with `osgi`.
version	CA	M	Version	version	A version. This version must correspond to the specification of the whiteboard consumer.

Specifications for whiteboard consumers (Http Service, Event Admin, etc.) should specify the values for these attributes. Whiteboard consumers that provide such a capability should list the packages that they use in their specification in the uses directive of that capability to ensure class space consistency. Whiteboard consumers can consume a whiteboard provider even if that bundle does not require the whiteboard consumer unless the specification explicitly forbids this. For example an OSGi Http Service could declare its capability with the following manifest header:

```
Provide-Capability: osgi.whiteboard;
    osgi.whiteboard="osgi.http";
    uses:="javax.servlet,javax.servlet.http";
    version:Version="1.3"
```

A bundle that depends on a Http Service could require such a whiteboard consumer with the following manifest header:

```
Require-Capability: osgi.whiteboard;
  filter:="(&(osgi.whiteboard=osgi.http)(version>=1.3)(!(version>=2.0)))"
```

6   Data Transfer Objects

This chapter defines an API to retrieve administrative information from the Http Service. The DTOs are accessed through the Http Service interface:

```
ServletDTO[] getServlets();
Map<String, String> getResources();
FilterDTO[] getFilters();
Map<String, String> getErrorLocations();
```

See the JavaDoc for details.

7 Javadoc

OSGi Javadoc

23.08.13 10:35

Package org.osgi.dto.service.http

`@org.osgi.annotation.versioning.Version(value="1.3")`

OSGi Data Transfer Object Http Service Package Version 1.3.

See:
> **Description**

Class Summary		*Page*
FilterDTO	Represents a `Filter` registered with the <u>HttpService</u>.	*24*
ListenerDTO	Represents a `Listener` used by an <u>HttpService</u>.	*26*
ServletContext DTO	Represents a `ServletContext` created for registered servlets and filters backed by the <u>HttpContext</u> objects used during registration.	*27*
ServletDTO	Represents a `Servlet` registered with the <u>HttpService</u>.	*29*

Package org.osgi.dto.service.http Description

OSGi Data Transfer Object Http Service Package Version 1.3.

Bundles wishing to use this package must list the package in the Import-Package header of the bundle's manifest. This package has two types of users: the consumers that use the API in this package and the providers that implement the API in this package.

Example import for consumers using the API in this package:

```
Import-Package: org.osgi.service.http.dto; version="[1.3,2.0)"
```

Example import for providers implementing the API in this package:

```
Import-Package: org.osgi.service.http.dto; version="[1.3,1.4)"
```

Class FilterDTO

org.osgi.dto.service.http

```
java.lang.Object
  └─ org.osgi.dto.DTO
      └─ org.osgi.dto.service.http.FilterDTO
```

```
public class FilterDTO
extends org.osgi.dto.DTO
```

Represents a `Filter` registered with the <u>HttpService</u>.

Version:
$ld: c9e5922919c8ff6038850dc5ed2711a0423e1b3e $
NotThreadSafe

Field Summary		Page
boolean	**asyncSupported** The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT</u> service registration property of the registered `javax.servlet.Filter` service.	25
String	**name** The name of the filter as returned by the `FilterConfig.getFilterName()` method.	25
String[]	**patterns** The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_PATTERN</u> service registration property of the registered `javax.servlet.Filter` service.	24
ServletContextDTO	**servletContext** The <u>ServletContextDTO</u> representing the `javax.servlet.ServletContext` to which this filter is registered.	25
String[]	**servletNames** The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_SERVLET</u> service registration property of the registered `javax.servlet.Filter` service.	25

Constructor Summary	Page
FilterDTO()	25

Methods inherited from class org.osgi.dto.DTO
toString

Field Detail

patterns

```
public String[] patterns
```

The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_PATTERN</u> service registration property of the registered `javax.servlet.Filter` service.

See Also:
        <u>HttpConstants.HTTP_WHITEBOARD_FILTER_PATTERN</u>

---

servletNames

`public String[]` **`servletNames`**

> The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_SERVLET</u> service registration property of the registered `javax.servlet.Filter` service.
>
> **See Also:**
> > <u>HttpConstants.HTTP_WHITEBOARD_FILTER_PATTERN</u>

asyncSupported

`public boolean` **`asyncSupported`**

> The value of the <u>HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT</u> service registration property of the registered `javax.servlet.Filter` service.
>
> **See Also:**
> > <u>HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT</u>

name

`public String` **`name`**

> The name of the filter as returned by the `FilterConfig.getFilterName()` method.
>
> **See Also:**
> > <u>HttpConstants.HTTP_WHITEBOARD_FILTER_NAME</u>

servletContext

`public` <u>ServletContextDTO</u> **`servletContext`**

> The <u>ServletContextDTO</u> representing the `javax.servlet.ServletContext` to which this filter is registered.

Constructor Detail

FilterDTO

`public` **`FilterDTO`**`()`

Class ListenerDTO

org.osgi.dto.service.http

```
java.lang.Object
  └─org.osgi.dto.DTO
      └─org.osgi.dto.service.http.ListenerDTO
```

```
public class ListenerDTO
extends org.osgi.dto.DTO
```

Represents a `Listener` used by an HttpService.

Version:
$Id: c9e5922919c8ff6038850dc5ed2711a0423e1b3e $
NotThreadSafe

Field Summary		Pag e
ServletCon textDTO	**servletContext** The ServletContextDTO representing the `javax.servlet.ServletContext` to which this listener is registered.	26
String	**type** The listener type - this is the full qualified interface name of the corresponding listener interface.	26

Constructor Summary	Pag e
ListenerDTO()	26

Methods inherited from class org.osgi.dto.DTO
toString

Field Detail

type

```
public String type
```

> The listener type - this is the full qualified interface name of the corresponding listener interface.

---

servletContext

```
public ServletContextDTO servletContext
```

> The ServletContextDTO representing the `javax.servlet.ServletContext` to which this listener is registered.

Constructor Detail

ListenerDTO

```
public ListenerDTO()
```

Class ServletContextDTO

org.osgi.dto.service.http

```
java.lang.Object
  └─org.osgi.dto.DTO
      └─org.osgi.dto.service.http.ServletContextDTO
```

```
public class ServletContextDTO
extends org.osgi.dto.DTO
```

Represents a `ServletContext` created for registered servlets and filters backed by the <u>HttpContext</u> objects used during registration.

Version:
$Id: 1a4d0af68f98f053eb5ec5bd14ec3e58d4043027 $
NotThreadSafe

Field Summary		Pag e
Map<String ,Object>	**attributes** Servlet context attributes The value type must be a numerical type, Boolean, String, DTO or an array of any of the former.	28
String	**contextPath** The servlet context path returned from the `ServletContext.getContextPath()` method.	27
Map<String ,String>	**initParams** Servlet context initialization parameters	28
String	**name** The name of the servlet context returned from the `ServletContext.getServletContextName()`.	27

Constructor Summary	Pag e
ServletContextDTO()	28

Methods inherited from class org.osgi.dto.DTO
toString

Field Detail

name

```
public String name
```

>   The name of the servlet context returned from the `ServletContext.getServletContextName()`.

contextPath

```
public String contextPath
```

>   The servlet context path returned from the `ServletContext.getContextPath()` method.

initParams

`public Map<String,String>` **`initParams`**

> Servlet context initialization parameters

---

attributes

`public Map<String,Object>` **`attributes`**

> Servlet context attributes The value type must be a numerical type, Boolean, String, DTO or an array of any of the former. Therefore this method will only return the attributes of the servlet context conforming to this constraint.

Constructor Detail

ServletContextDTO

`public` **`ServletContextDTO`**`()`

Class ServletDTO

org.osgi.dto.service.http

```
java.lang.Object
  └─org.osgi.dto.DTO
      └─org.osgi.dto.service.http.ServletDTO
```

```
public class ServletDTO
extends org.osgi.dto.DTO
```

Represents a `Servlet` registered with the HttpService.

Version:
$Id: 25c610ec71badfe96c9db47f4760322db6c61d3a $
NotThreadSafe

Field Summary		Page
boolean	**asyncSupported** The value of the HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT service registration property of the registered `javax.servlet.Filter` service.	30
String	**name** The name of the servlet as returned by the `ServletConfig.getServletName()` method.	30
String[]	**patterns** The URL alias used to register the servlet with the HttpService.registerServlet(String, javax.servlet.Servlet, java.util.Dictionary, org.osgi.service.http.HttpContext) method or the value of the HttpConstants.HTTP_WHITEBOARD_SERVLET_PATTERN service registration property of the registered `javax.servlet.Servlet` service.	29
ServletContextDTO	**servletContext** The ServletDTO representing the `ServletContext` to which this servlet is registered.	30
String	**servletInfo** The servlet information string returned from the servlet through the `Servlet.getServletInfo()` method.	30

Constructor Summary	Page
ServletDTO()	30

Methods inherited from class org.osgi.dto.DTO
toString

Field Detail

patterns

```
public String[] patterns
```

>   The URL alias used to register the servlet with the HttpService.registerServlet(String, javax.servlet.Servlet, java.util.Dictionary, org.osgi.service.http.HttpContext) method or the value of the HttpConstants.HTTP_WHITEBOARD_SERVLET_PATTERN service registration property of the registered `javax.servlet.Servlet` service.

>   **See Also:**
>   HttpService.registerServlet(String, javax.servlet.Servlet, java.util.Dictionary, org.osgi.service.http.HttpContext), HttpConstants.HTTP_WHITEBOARD_SERVLET_PATTERN

name

`public String` **`name`**

> The name of the servlet as returned by the `ServletConfig.getServletName()` method.

> **See Also:**
>> [HttpConstants.HTTP_WHITEBOARD_SERVLET_NAME](#)

servletInfo

`public String` **`servletInfo`**

> The servlet information string returned from the servlet through the `Servlet.getServletInfo()` method.

asyncSupported

`public boolean` **`asyncSupported`**

> The value of the [HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT](#) service registration property of the registered `javax.servlet.Filter` service.

> **See Also:**
>> [HttpConstants.HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT](#)

servletContext

`public` [ServletContextDTO](#) **`servletContext`**

> The [ServletDTO](#) representing the `ServletContext` to which this servlet is registered.

Constructor Detail

ServletDTO

`public` **`ServletDTO`**`()`

Package org.osgi.service.http

`@org.osgi.annotation.versioning.Version(value="1.3")`

Http Service Package Version 1.3.

See:
      Description

Interface Summary		Page
HttpContext	This interface defines methods that the Http Service may call to get information about a registration.	*36*
HttpService	The Http Service allows other bundles in the OSGi environment to dynamically register resources and servlets into the URI namespace of Http Service.	*39*

Class Summary		Page
HttpConstants	Defines standard names for Http Service constants.	*32*
Resource	The `Resource` servlet is a marker servlet which can be used to register resources through the Whiteboard to serve resources through the Http Context with which the Resource is registered.	*50*

Exception Summary		Page
NamespaceException	**Deprecated.** *as of 1.3*	*43*

Package org.osgi.service.http Description

Http Service Package Version 1.3.

Bundles wishing to use this package must list the package in the Import-Package header of the bundle's manifest. This package has two types of users: the consumers that use the API in this package and the providers that implement the API in this package.

Example import for consumers using the API in this package:

```
Import-Package: org.osgi.service.http; version="[1.3,2.0)"
```

Example import for providers implementing the API in this package:

```
Import-Package: org.osgi.service.http; version="[1.3,1.4)"
```

Class HttpConstants

org.osgi.service.http

```
java.lang.Object
  └─org.osgi.service.http.HttpConstants
```

```
final public class HttpConstants
extends Object
```

Defines standard names for Http Service constants.

Since:
    1.3
Version:
    $Id: 4b7be7d793964cb6471df2af7d2cf2da4985e20b $

Field Summary		*Pag e*
static String	**HTTP_SERVICE_ENDPOINTS** Lists URLs to which the Http Service is bound; e.g.	*35*
static String	**HTTP_WHITEBOARD_CONTEXT_NAME** For <u>HttpContext</u> services this property is required and identifies the service when referred to by a whiteboard service.	*33*
static String	**HTTP_WHITEBOARD_CONTEXT_SHARED** Whether a Http Context service may be used by whiteboard service registered by other bundles.	*33*
static String	**HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT** Register the servlet filter as a filter supporting asynchronous request processing The type of this servlet registration property is Boolean.	*35*
static String	**HTTP_WHITEBOARD_FILTER_NAME** The name of a servlet filter registered.	*34*
static String	**HTTP_WHITEBOARD_FILTER_PATTERN** Registration pattern for the servlet filter.	*34*
static String	**HTTP_WHITEBOARD_FILTER_SERVLET** Registration property for the servlet filter to reference a named servlet.	*34*
static String	**HTTP_WHITEBOARD_RESOURCE_PATTERN** Registration pattern for the resource.	*35*
static String	**HTTP_WHITEBOARD_RESOURCE_PREFIX** Registers a mapping from the prefix pattern defined in the single valued <u>HTTP_WHITEBOARD_RESOURCE_PATTERN</u> to resources found at the given prefix.	*35*
static String	**HTTP_WHITEBOARD_SERVLET_ASYNC_SUPPORT** Register the servlet as a servlet supporting asynchronous request processing The type of this servlet registration property is Boolean.	*34*
static String	**HTTP_WHITEBOARD_SERVLET_ERROR_PAGE** Register the servlet as an error page for error code and/or exception; the value may be fully qualified exception type or three digit HTTP status code.	*34*
static String	**HTTP_WHITEBOARD_SERVLET_NAME** The name of a registered servlet.	*33*
static String	**HTTP_WHITEBOARD_SERVLET_PATTERN** Registration pattern for the servlet.	*33*
static String	**HTTP_WHITEBOARD_TARGET** Servlet, listener, resource or servlet filter services registered with this property are registered with an Http Service whose service registration properties match this LDAP filter expression.	*35*

Field Detail

HTTP_WHITEBOARD_CONTEXT_NAME

public static final String **HTTP_WHITEBOARD_CONTEXT_NAME** = "osgi.http.whiteboard.context.name"

> For <u>HttpContext</u> services this property is required and identifies the service when referred to by a whiteboard service. Http Context services without this property are ignored. For servlet, listener, servlet filter, or resource services this refers to the Http Context service used to register the whiteboard service. If the name of the Http Context is missing or is registered by another bundle and does not have the <u>HTTP_WHITEBOARD_CONTEXT_SHARED</u> property set to true, the whiteboard service cannot be registered.
>
> The type of this registration property is String+ for <u>HttpContext</u> s and String for whiteboard services.
>
> **See Also:**
> > <u>HTTP_WHITEBOARD_CONTEXT_SHARED</u>

HTTP_WHITEBOARD_CONTEXT_SHARED

public static final Strin g **HTTP_WHITEBOARD_CONTEXT_SHARED** = "osgi.http.whiteboard.context.shared"

> Whether a Http Context service may be used by whiteboard service registered by other bundles. By default Http Context services can only be used by whiteboard services registered by the same bundle.
>
> The type of this context registration property is Boolean.
>
> **See Also:**
> > <u>HTTP_WHITEBOARD_CONTEXT_NAME</u>

HTTP_WHITEBOARD_SERVLET_NAME

public static final String **HTTP_WHITEBOARD_SERVLET_NAME** = "osgi.http.whiteboard.servlet.name"

> The name of a registered servlet. This name is used as the value of the ServletConfig.getServletName() and defaults to the fully qualified name of the service object's class. Filter services may refer to servlets by this name in their <u>HTTP_WHITEBOARD_FILTER_SERVLET</u> property to apply the filter to a concrete servlet.
>
> The type of this servlet registration property is String.
>
> **See Also:**
> > <u>HTTP_WHITEBOARD_FILTER_SERVLET</u>

HTTP_WHITEBOARD_SERVLET_PATTERN

public static final Strin g **HTTP_WHITEBOARD_SERVLET_PATTERN** = "osgi.http.whiteboard.servlet.pattern"

> Registration pattern for the servlet. See section 5.2.2, Servlet Registration for a description. Servlets not registered with this property are ignored.
>
> The type of this servlet registration property is String+.

HTTP_WHITEBOARD_SERVLET_ERROR_PAGE

public   static   final   Strin g   **HTTP_WHITEBOARD_SERVLET_ERROR_PAGE**   =
"osgi.http.whiteboard.servlet.errorPage"

> Register the servlet as an error page for error code and/or exception; the value may be fully qualified
> exception type or three digit HTTP status code. Any value not being a three digit number is assumed to be
> a fully qualified class name.

> The type of this servlet registration property is String+.

HTTP_WHITEBOARD_SERVLET_ASYNC_SUPPORT

public   static   final   Strin g   **HTTP_WHITEBOARD_SERVLET_ASYNC_SUPPORT**   =
"osgi.http.whiteboard.servlet.asyncSupport"

> Register the servlet as a servlet supporting asynchronous request processing

> The type of this servlet registration property is Boolean.

HTTP_WHITEBOARD_FILTER_NAME

public static final String **HTTP_WHITEBOARD_FILTER_NAME** = "osgi.http.whiteboard.filter.name"

> The   name   of   a   servlet   filter   registered.   This   name   is   used   as   the   value   of   the
> `FilterConfig.getFilterName()` method and defaults to the fully qualified name of the service object's
> class.

> The type of this filter registration property is String.

HTTP_WHITEBOARD_FILTER_PATTERN

public   static   final   Strin g   **HTTP_WHITEBOARD_FILTER_PATTERN**   =
"osgi.http.whiteboard.filter.pattern"

> Registration pattern for the servlet filter. See section 5.2.3, Servlet Filter Registration for a description.

> The type of this servlet filter registration property is String+.

HTTP_WHITEBOARD_FILTER_SERVLET

public   static   final   Strin g   **HTTP_WHITEBOARD_FILTER_SERVLET**   =
"osgi.http.whiteboard.filter.servlet"

> Registration property for the servlet filter to reference a named servlet. See section 5.2.3, Servlet Filter
> Registration for a description.

> The type of this servlet filter registration property is String+.

> **See Also:**
> > HTTP_WHITEBOARD_SERVLET_NAME

HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT

public static final Strin g **HTTP_WHITEBOARD_FILTER_ASYNC_SUPPORT** = "osgi.http.whiteboard.filter.asyncSupport"

Register the servlet filter as a filter supporting asynchronous request processing

The type of this servlet registration property is Boolean.

HTTP_WHITEBOARD_TARGET

public static final String **HTTP_WHITEBOARD_TARGET** = "osgi.http.whiteboard.service.target"

Servlet, listener, resource or servlet filter services registered with this property are registered with an Http Service whose service registration properties match this LDAP filter expression.

The type of this servlet registration property is String.

HTTP_WHITEBOARD_RESOURCE_PATTERN

public static final Strin g **HTTP_WHITEBOARD_RESOURCE_PATTERN** = "osgi.http.whiteboard.resource.pattern"

Registration pattern for the resource. See section 5.2.4, Resources for a description. Resources not registered with this property are ignored.

The type of this resource registration property is String.

See Also:
> HTTP_WHITEBOARD_RESOURCE_PREFIX

HTTP_WHITEBOARD_RESOURCE_PREFIX

public static final Strin g **HTTP_WHITEBOARD_RESOURCE_PREFIX** = "osgi.http.whiteboard.resource.prefix"

Registers a mapping from the prefix pattern defined in the single valued HTTP_WHITEBOARD_RESOURCE_PATTERN to resources found at the given prefix.

The type of this resource registration property is String.

See Also:
> HTTP_WHITEBOARD_RESOURCE_PATTERN

HTTP_SERVICE_ENDPOINTS

public static final String **HTTP_SERVICE_ENDPOINTS** = "osgi.http.service.endpoints"

Lists URLs to which the Http Service is bound; e.g. http://192.168.1.10:8080/. The relevant information contained in the URLs is the scheme, IP Address of the bound interface, bound port, and the (optional) context path in a Servlet API servlet container the Http Service is registered.

The type of this servlet registration property is String+.

Interface HttpContext

org.osgi.service.http

```
@org.osgi.annotation.versioning.ConsumerType
public interface HttpContext
```

This interface defines methods that the Http Service may call to get information about a registration.

Servlets and resources may be registered with an `HttpContext` object; if no `HttpContext` object is specified, a default `HttpContext` object is used. Servlets that are registered using the same `HttpContext` object will share the same `ServletContext` object.

This interface is implemented by users of the `HttpService`.

ThreadSafe

Field Summary		*Page*
String	**AUTHENTICATION_TYPE** `HttpServletRequest` attribute specifying the scheme used in authentication.	*36*
String	**AUTHORIZATION** `HttpServletRequest` attribute specifying the `Authorization` object obtained from the `org.osgi.service.useradmin.UserAdmin` service.	*37*
String	**REMOTE_USER** `HttpServletRequest` attribute specifying the name of the authenticated user.	*36*

Method Summary		*Page*
String	**getMimeType**(String name) Maps a name to a MIME type.	*38*
URL	**getResource**(String name) Maps a resource name to a URL.	*38*
boolean	**handleSecurity**(HttpServletRequest request, HttpServletResponse response) Handles security for the specified request.	*37*

Field Detail

REMOTE_USER

```
public static final String REMOTE_USER = "org.osgi.service.http.authentication.remote.user"
```

> `HttpServletRequest` attribute specifying the name of the authenticated user. The value of the attribute can be retrieved by `HttpServletRequest.getRemoteUser`. This attribute name is `org.osgi.service.http.authentication.remote.user`.
>
> **Since:**
>   1.1

AUTHENTICATION_TYPE

```
public static final String AUTHENTICATION_TYPE = "org.osgi.service.http.authentication.type"
```

> `HttpServletRequest` attribute specifying the scheme used in authentication. The value of the attribute can be retrieved by `HttpServletRequest.getAuthType`. This attribute name is `org.osgi.service.http.authentication.type`.

Since:
    1.1

AUTHORIZATION

```
public static final String AUTHORIZATION = "org.osgi.service.useradmin.authorization"
```

> `HttpServletRequest` attribute specifying the `Authorization` object obtained from the `org.osgi.service.useradmin.UserAdmin` service. The value of the attribute can be retrieved by `HttpServletRequest.getAttribute(HttpContext.AUTHORIZATION)`. This attribute name is `org.osgi.service.useradmin.authorization`.

> **Since:**
>   1.1

Method Detail

handleSecurity

```
boolean handleSecurity(HttpServletRequest request,
                       HttpServletResponse response)
              throws IOException
```

> Handles security for the specified request.

> The Http Service calls this method prior to servicing the specified request. This method controls whether the request is processed in the normal manner or an error is returned.

> If the request requires authentication and the Authorization header in the request is missing or not acceptable, then this method should set the WWW-Authenticate header in the response object, set the status in the response object to Unauthorized(401) and return `false`. See also RFC 2617: *HTTP Authentication: Basic and Digest Access Authentication* (available at http://www.ietf.org/rfc/rfc2617.txt).

> If the request requires a secure connection and the `getScheme` method in the request does not return 'https' or some other acceptable secure protocol, then this method should set the status in the response object to Forbidden(403) and return `false`.

> When this method returns `false`, the Http Service will send the response back to the client, thereby completing the request. When this method returns `true`, the Http Service will proceed with servicing the request.

> If the specified request has been authenticated, this method must set the AUTHENTICATION_TYPE request attribute to the type of authentication used, and the REMOTE_USER request attribute to the remote user (request attributes are set using the `setAttribute` method on the request). If this method does not perform any authentication, it must not set these attributes.

> If the authenticated user is also authorized to access certain resources, this method must set the AUTHORIZATION request attribute to the `Authorization` object obtained from the `org.osgi.service.useradmin.UserAdmin` service.

> The servlet responsible for servicing the specified request determines the authentication type and remote user by calling the `getAuthType` and `getRemoteUser` methods, respectively, on the request.

> **Parameters:**
>   `request` - the HTTP request
>   `response` - the HTTP response
> **Returns:**
>   `true` if the request should be serviced, `false` if the request should not be serviced and Http Service will send the response back to the client.
> **Throws:**
>   `IOException` - may be thrown by this method. If this occurs, the Http Service will terminate the request and close the socket.

getResource

```
URL getResource(String name)
```

Maps a resource name to a URL.

Called by the Http Service to map a resource name to a URL. For servlet registrations, Http Service will call this method to support the `ServletContext` methods `getResource` and `getResourceAsStream`. For resource registrations, Http Service will call this method to locate the named resource. The context can control from where resources come. For example, the resource can be mapped to a file in the bundle's persistent storage area via `bundleContext.getDataFile(name).toURL()` or to a resource in the context's bundle via `getClass().getResource(name)`

Parameters:
> `name` - the name of the requested resource
Returns:
> URL that Http Service can use to read the resource or `null` if the resource does not exist.

getMimeType

```
String getMimeType(String name)
```

Maps a name to a MIME type. Called by the Http Service to determine the MIME type for the name. For servlet registrations, the Http Service will call this method to support the `ServletContext` method `getMimeType`. For resource registrations, the Http Service will call this method to determine the MIME type for the Content-Type header in the response.

Parameters:
> `name` - determine the MIME type for this name.
Returns:
> MIME type (e.g. text/html) of the name or `null` to indicate that the Http Service should determine the MIME type itself.

Interface HttpService

org.osgi.service.http

```
@org.osgi.annotation.versioning.ProviderType
public interface HttpService
```

The Http Service allows other bundles in the OSGi environment to dynamically register resources and servlets into the URI namespace of Http Service. A bundle may later unregister its resources or servlets.

See Also:
> HttpContext

ThreadSafe

Method Summary		Page
HttpContext	**createDefaultHttpContext**() **Deprecated.** *as of 1.3 with no replacement*	41
Map<String,String>	**getErrorLocations**()	42
FilterDTO[]	**getFilters**()	42
ListenerDTO	**getListeners**()	50
Map<String,String>	**getResources**() Returns the registered resources as a map indexed by the resource alias with the resource prefixes being the values.	49
ServletContextDTO	**getServletContexts**()	42
ServletDTO[]	**getServlets**()	41
void	**registerResources**(String alias, String name, HttpContext context) **Deprecated.** *as of 1.3, use the whiteboard pattern registration of resources: Register a Resource instance as a service of type javax.servlet.Servlet adding at least the HttpConstants.HTTP_WHITEBOARD_RESOURCE_PATTERN and HttpConstants.HTTP_WHITEBOARD_RESOURCE_PREFIX service registration properties.*	40
void	**registerServlet**(String alias, Servlet servlet, Dictionary<String,String> initparams, HttpContext context) **Deprecated.** *as of 1.3, use the whiteboard pattern registration of servlets: Register the servlet as a service of type javax.servlet.Servlet adding at least the HttpConstants.HTTP_WHITEBOARD_SERVLET_PATTERN service registration property.*	39
void	**unregister**(String alias) **Deprecated.** *as of 1.3 this method can only unregister servlets and resource registered through the deprecated registerServlet(String, Servlet, Dictionary, HttpContext) and registerResources(String, String, HttpContext) methods.*	41

Method Detail

registerServlet

```
@Deprecated
void registerServlet(String alias,
                     Servlet servlet,
                     Dictionary<String,String> initparams,
                     HttpContext context)
             throws ServletException,
                    NamespaceException
```

> **Deprecated.** *as of 1.3, use the whiteboard pattern registration of servlets: Register the servlet as a service of type javax.servlet.Servlet adding at least the HttpConstants.HTTP_WHITEBOARD_SERVLET_PATTERN service registration property.*

Registers a servlet into the URI namespace.

The alias is the name in the URI namespace of the Http Service at which the registration will be mapped.

An alias must begin with slash ('/') and must not end with slash ('/'), with the exception that an alias of the form "/" is used to denote the root alias. See the specification text for details on how HTTP requests are mapped to servlet and resource registrations.

The Http Service will call the servlet's `init` method before returning.

```
httpService.registerServlet("/myservlet", servlet, initparams, context);
```

Servlets registered with the same `HttpContext` object will share the same `ServletContext`. The Http Service will call the `context` argument to support the `ServletContext` methods `getResource`,`getResourceAsStream` and `getMimeType`, and to handle security for requests. If the `context` argument is `null`, a default `HttpContext` object is used (see <u>createDefaultHttpContext()</u>).

Parameters:
    `alias` - name in the URI namespace at which the servlet is registered
    `servlet` - the servlet object to register
    `initparams` - initialization arguments for the servlet or `null` if there are none. This argument is used by the servlet's `ServletConfig` object.
    `context` - the `HttpContext` object for the registered servlet, or `null` if a default `HttpContext` is to be created and used.
Throws:
    `ServletException` - if the servlet's `init` method throws an exception, or the given servlet object has already been registered at a different alias.
    <u>NamespaceException</u> - if the registration fails because the alias is already in use.
    `IllegalArgumentException` - if any of the arguments are invalid

---

registerResources

```
void registerResources(String alias,
                       String name,
                       HttpContext context)
             throws NamespaceException
```

Deprecated. *as of 1.3, use the whiteboard pattern registration of resources: Register a <u>Resource</u> instance as a service of type* `javax.servlet.Servlet` *adding at least the* <u>*HttpConstants.HTTP_WHITEBOARD_RESOURCE_PATTERN*</u> *and* <u>*HttpConstants.HTTP_WHITEBOARD_RESOURCE_PREFIX*</u> *service registration properties.*

Registers resources into the URI namespace.

The alias is the name in the URI namespace of the Http Service at which the registration will be mapped. An alias must begin with slash ('/') and must not end with slash ('/'), with the exception that an alias of the form "/" is used to denote the root alias. The name parameter must also not end with slash ('/') with the exception that a name of the form "/" is used to denote the root of the bundle. See the specification text for details on how HTTP requests are mapped to servlet and resource registrations.

For example, suppose the resource name /tmp is registered to the alias /files. A request for /files/foo.txt will map to the resource name /tmp/foo.txt.

```
httpservice.registerResources("/files", "/tmp", context);
```

The Http Service will call the `HttpContext` argument to map resource names to URLs and MIME types and to handle security for requests. If the `HttpContext` argument is `null`, a default `HttpContext` is used (see <u>createDefaultHttpContext()</u>).

Parameters:
    `alias` - name in the URI namespace at which the resources are registered
    `name` - the base name of the resources that will be registered
    `context` - the `HttpContext` object for the registered resources, or `null` if a default `HttpContext` is to be created and used.

> **Throws:**
>> [NamespaceException](#) - if the registration fails because the alias is already in use.
>> IllegalArgumentException - if any of the parameters are invalid

unregister

```
@Deprecated
void unregister(String alias)
```

> **Deprecated.** *as of 1.3 this method can only unregister servlets and resource registered through the deprecated [registerServlet(String, Servlet, Dictionary, HttpContext)](#) and [registerResources(String, String, HttpContext)](#) methods.*
>
> Unregisters a previous registration done by registerServlet or registerResources methods.
>
> After this call, the registered alias in the URI name-space will no longer be available. If the registration was for a servlet, the Http Service must call the destroy method of the servlet before returning.
>
> If the bundle which performed the registration is stopped or otherwise "unget"s the Http Service without calling [unregister(String)](#) then Http Service must automatically unregister the registration. However, if the registration was for a servlet, the destroy method of the servlet will not be called in this case since the bundle may be stopped. [unregister(String)](#) must be explicitly called to cause the destroy method of the servlet to be called. This can be done in the BundleActivator.stop method of the bundle registering the servlet.
>
> **Parameters:**
>> alias - name in the URI name-space of the registration to unregister
>
> **Throws:**
>> IllegalArgumentException - if there is no registration for the alias or the calling bundle was not the bundle which registered the alias.

createDefaultHttpContext

```
HttpContext createDefaultHttpContext()
```

> **Deprecated.** *as of 1.3 with no replacement*
>
> Creates a default HttpContext for registering servlets or resources with the HttpService, a new HttpContext object is created each time this method is called.
>
> The behavior of the methods on the default HttpContext is defined as follows:
>
> 1. getMimeType - Does not define any customized MIME types for the Content-Type header in the response, and always returns null.
> 2. handleSecurity - Performs implementation-defined authentication on the request.
> 3. getResource - Assumes the named resource is in the context bundle; this method calls the context bundle's Bundle.getResource method, and returns the appropriate URL to access the resource. On a Java runtime environment that supports permissions, the Http Service needs to be granted org.osgi.framework.AdminPermission[*,RESOURCE].
>
> **Returns:**
>> a default HttpContext object.
>
> **Since:**
>> 1.1

getServlets

```
ServletDTO[] getServlets()
```

Returns:
the registered servlets or `null` if no servlets are registered.
Since:
1.3
See Also:
registerServlet(String, Servlet, Dictionary, HttpContext)

getResources

Map<String,String> **getResources**()

Returns the registered resources as a map indexed by the resource alias with the resource prefixes being the values.

Returns:
the registered resources or `null` if no resources are registered.
Since:
1.3
See Also:
registerResources(String, String, HttpContext)

getFilters

FilterDTO[] **getFilters**()

Returns:
the registered filters or `null` if no filters are registered.
Since:
1.3

getErrorLocations

Map<String,String> **getErrorLocations**()

Returns:
defined error location mappings or `null` if no error location mappings have been registered.
Since:
1.3

getServletContexts

ServletContextDTO **getServletContexts**()

Returns:
the registered http contexts or `null` if no http context has been registered.
Since:
1.3

getListeners

ListenerDTO **getListeners**()

Returns:
the registered listeners or `null` if no listener has been registered.
Since:
1.3

Class NamespaceException

org.osgi.service.http

```
java.lang.Object
  └ java.lang.Throwable
      └ java.lang.Exception
          └ org.osgi.service.http.NamespaceException
```

All Implemented Interfaces:
>   Serializable

```
@Deprecated
public class NamespaceException
extends Exception
```

Deprecated.

A NamespaceException is thrown to indicate an error with the caller's request to register a servlet or resources into the URI namespace of the Http Service. This exception indicates that the requested alias already is in use.

Constructor Summary	*Pag e*
NamespaceException(String message) Construct a NamespaceException object with a detail message.	*43*
NamespaceException(String message, Throwable cause) Construct a NamespaceException object with a detail message and a nested exception.	*43*

Method Summary		*Pag e*
Throwable	**getCause**() Returns the cause of this exception or null if no cause was set.	*44*
Throwable	**getException**() Returns the nested exception.	*44*
Throwable	**initCause**(Throwable cause) Initializes the cause of this exception to the specified value.	*44*

Constructor Detail

NamespaceException

```
public NamespaceException(String message)
```

>   Construct a NamespaceException object with a detail message.

>   **Parameters:**
>   >   message - the detail message

NamespaceException

```
public NamespaceException(String message,
                          Throwable cause)
```

>   Construct a NamespaceException object with a detail message and a nested exception.

Parameters:

`message` - The detail message.
`cause` - The nested exception.

Method Detail

getException

`public Throwable` **`getException`**`()`

Returns the nested exception.

This method predates the general purpose exception chaining mechanism. The `getCause()` method is now the preferred means of obtaining this information.

Returns:

The result of calling `getCause()`.

getCause

`public Throwable` **`getCause`**`()`

Returns the cause of this exception or `null` if no cause was set.

Overrides:

`getCause` in class `Throwable`

Returns:

The cause of this exception or `null` if no cause was set.

Since:

1.2

initCause

`public Throwable` **`initCause`**`(Throwable cause)`

Initializes the cause of this exception to the specified value.

Overrides:

`initCause` in class `Throwable`

Parameters:

`cause` - The cause of this exception.

Returns:

This exception.

Throws:

`IllegalArgumentException` - If the specified cause is this exception.
`IllegalStateException` - If the cause of this exception has already been set.

Since:

1.2

Class Resource

org.osgi.service.http

```
java.lang.Object
  └─javax.servlet.GenericServlet
       └─org.osgi.service.http.Resource
```

All Implemented Interfaces:
Serializable, Servlet, ServletConfig

```
final public class Resource
extends GenericServlet
```

The `Resource` servlet is a marker servlet which can be used to register resources through the Whiteboard to serve resources through the Http Context with which the Resource is registered.

The `Resource` object is registered as a `javax.servlet.Servlet` service along with the `HttpConstants.HTTP_WHITEBOARD_RESOURCE_PATTERN`, `HttpConstants.HTTP_WHITEBOARD_RESOURCE_PREFIX`, and `HttpConstants.HTTP_WHITEBOARD_CONTEXT_NAME` properties. See the specification text for more details.

`Resource` extends from `GenericServlet` and implements the `service` method with an empty method. Therefore calling the `service` method on a resource has absolutely no effect.

The default constructor must be used to instantiate new objects, the constructor as well is empty and does not call any other method.

Since:
1.3
Version:
$Id: 0b578492d62dc4e4f1d5a96399d2de4c43ec9e74 $
ThreadSafe

Constructor Summary	Pag e
Resource()	45

Method Summary		Pag e
void	**service**(ServletRequest request, ServletResponse response)	45

Constructor Detail

Resource

```
public Resource()
```

Method Detail

service

```
public void service(ServletRequest request,
                    ServletResponse response)
```

Specified by:
service in interface Servlet
Overrides:
service in class GenericServlet

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OSGi Javadoc

28.01.13 21:03

Package Summary		*Page*
org.osgi.namespace.whiteboard	Whiteboard Namespace Package Version 1.0.	*23*

Package org.osgi.namespace.whiteboard

Whiteboard Namespace Package Version 1.0.

See:
  Description

Class Summary		*Page*
WhiteboardNamespace	Whiteboard Capability and Requirement Namespace.	*25*

Package org.osgi.namespace.whiteboard Description

Whiteboard Namespace Package Version 1.0.

Bundles should not need to import this package at runtime since all the types in this package just contain constants for capability and requirement namespaces specified by the OSGi Alliance.

Class WhiteboardNamespace

org.osgi.namespace.whiteboard

```
java.lang.Object
   └─org.osgi.resource.Namespace
        └─org.osgi.namespace.whiteboard.WhiteboardNamespace
```

```
final public class WhiteboardNamespace
extends org.osgi.resource.Namespace
```

Whiteboard Capability and Requirement Namespace.

This class defines the names for the attributes and directives for this namespace. All unspecified capability attributes are of type `String` and are used as arbitrary matching attributes for the capability. The values associated with the specified directive and attribute keys are of type `String`, unless otherwise indicated.

Version:
    $Id: b23440f15fa24e7c0b0e27896d234d2fc4ecbb3a $
Immutable

Field Summary		*Pag e*
static String	**CAPABILITY_BUNDLE_SYMBOLICNAME_ATTRIBUTE** The capability attribute contains the symbolic name of the bundle providing the whiteboard consumer.	*25*
static String	**CAPABILITY_BUNDLE_VERSION_ATTRIBUTE** The capability attribute contains the `Version` of the bundle implementing the whiteboard consumer if one is specified or `0.0.0` if not specified.	*25*
static String	**CAPABILITY_VERSION_ATTRIBUTE** The capability attribute contains the `Version` of the specification of the whiteboard consumer.	*25*
static String	**WHITEBOARD_NAMESPACE** Namespace name for whiteboard capabilities and requirements.	*24*

Fields inherited from class org.osgi.resource.Namespace
CAPABILITY_EFFECTIVE_DIRECTIVE, CAPABILITY_USES_DIRECTIVE, CARDINALITY_MULTIPLE, CARDINALITY_SINGLE, EFFECTIVE_ACTIVE, EFFECTIVE_RESOLVE, REQUIREMENT_CARDINALITY_DIRECTIVE, REQUIREMENT_EFFECTIVE_DIRECTIVE, REQUIREMENT_FILTER_DIRECTIVE, REQUIREMENT_RESOLUTION_DIRECTIVE, RESOLUTION_MANDATORY, RESOLUTION_OPTIONAL

Field Detail

WHITEBOARD_NAMESPACE

```
public static final String WHITEBOARD_NAMESPACE = "osgi.whiteboard"
```

> Namespace name for whiteboard capabilities and requirements.
>
> Also, the capability attribute used to specify the name of the whiteboard consumer.

CAPABILITY_VERSION_ATTRIBUTE

```
public static final String CAPABILITY_VERSION_ATTRIBUTE = "version"
```

The capability attribute contains the `Version` of the specification of the whiteboard consumer. The value of this attribute must be of type `Version`.

CAPABILITY_BUNDLE_VERSION_ATTRIBUTE

`public static final String` **`CAPABILITY_BUNDLE_VERSION_ATTRIBUTE`** `= "bundle-version"`

The capability attribute contains the `Version` of the bundle implementing the whiteboard consumer if one is specified or `0.0.0` if not specified. The value of this attribute must be of type `Version`.

CAPABILITY_BUNDLE_SYMBOLICNAME_ATTRIBUTE

`public static final String` **`CAPABILITY_BUNDLE_SYMBOLICNAME_ATTRIBUTE`** `= "bundle-symbolic-name"`

The capability attribute contains the symbolic name of the bundle providing the whiteboard consumer.

8   Considered Alternatives

8.1   Servlet API Reference Version

This specification is based on Servlet API 3.0. Implementations though are free to be based on any prior or later Servlet API specification. The specification must still be available to implementations in embedded environments which are still mostly based on Java ME corresponding to Java 1.4.

Therefore the specification cannot mandate either Servlet API 2.5 whose specification requires Java 5 or Servlet API 3.0 whose specification requires Java 6 even though none of the API really requires the respective platforms.

8.2   New methods to register Servlets and Filters

In addition to the proposed support for Whiteboard style registration of Servlets, Filters, Resources, HttpContexts, and error pages the Http Service API could have been extended to support programmatic support for such registration.

At the CPEG F2F in Austin it was decided that we should only offer one mechanism to register such objects. Since whiteboard pattern allows for simpler code than having to access a service to register with adding new API was dismissed.

8.3   Web Application Events
8.3.1   Limiting events

Instead of just sending web application events to all event listeners registered in the OSGi service registry it would be conceivable that listeners may register with a `osgi.http.service.target` service property which defines an LDAP filter to limit the Http Services sending events to the listener service.

I am not sure whether this would really be of use.

8.3.2   Event Admin Service

Servlet Events could be bridged into Event Admin Service events.

I am omitting such bridging right now because I am not sure of its use.

8.4   HTTP Sessions

The simplest implementation for HTTP Sessions would be to have a single HTTP Session backed by servlet container and thus shared amongst all Servlets and their servlet contexts. Yet, this would probably be unexpected for these applications which have separate servlet contexts and thus separate attribute value spaces but still share the same HTTP Session.

8.5   Resources

Alternatively to the proposed `Resource` servlet it might be conceivable to have the `osgi.http.whiteboard.path` and `osg.http.whiteboard.prefix` properties on an Http Context service to register resources to be served through the given Http Context. In this case the `path` property must be a prefix pattern. If we support multi-value properties, the `pattern` and `prefix` properties must provide the same number of values and they are put together by the same index; i.e. $path[0] \rightarrow prefix[0]$, $path[1] \rightarrow prefix[1]$, etc.

While this solution looks appealing, I am not sure, whether there is a conceptual fit between the Http Context service and the resource registration. On the other hand resources are served (resolved actually) through an Http Context, so to register resources an Http Context is always required.

9   Security Considerations

Bundles that need to register a servlet, listener, resource filter, or http context must be granted ServicePermission[Interface Name, REGISTER] where interface name is the whiteboard interface the service is registered for.

Bundles that need to iterate the servlets, listeners, resources, filters, or http contexts registered with the system must be granted ServicePermission[interface name, GET] to retrieve the services from the service registry.

In addition if a whiteboard service wants to be associated with a shared http context registered by another bundle, the bundle registering the whiteboard service must be granted ServicePermission[org.osgi.service.http.HttpContext, GET].

10 Document Support

10.1 References

[1]. Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, RFC2119, March 1997.

[2]. Software Requirements & Specifications. Michael Jackson. ISBN 0-201-87712-0

[3]. Rajiv Mordani, Java Servlet Specification Version 3.0, JSR-315, December 2009

[4]. Portable Java SE/EE Contracts, RFC 180, work in progress

10.2 Author's Address

Name	Felix Meschber
Company	Adobe Systems Incorporated
Address	Barfüsserplatz 6, 4055 Basel, Switzerland
Voice	+41 61 226 55 49
e-mail	fmeschbe@adobe.com

Name	Carsten Ziegeler
Company	Adobe Systems Incorporated
Address	Barfüsserplatz 6, 4055 Basel, Switzerland
Voice	+41 61 226 55 0
e-mail	cziegele@adobe.com

10.3 Acronyms and Abbreviations

10.4 End of Document