iPass® Generic Interface Specification

BETWEEN SMART CLIENTS AND ACCESS GATEWAY, VERSION 1.6

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Scope

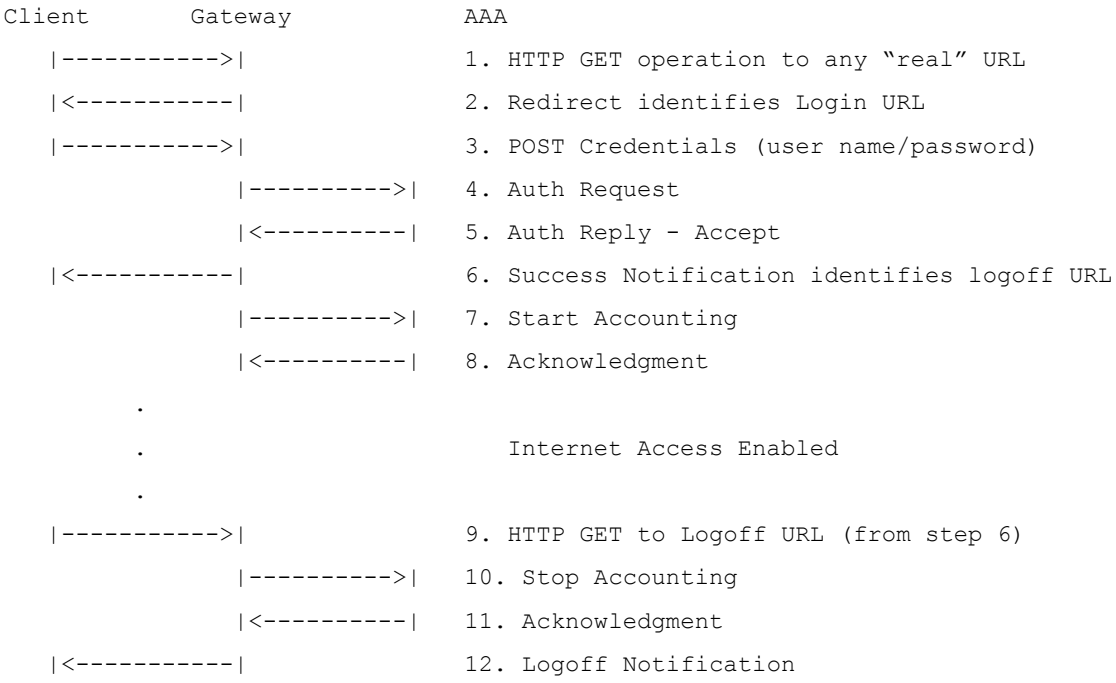
This document contains a Generic Interface Specification (GIS) between a smart client and an access gateway or other hybrid access control system. The GIS is compatible with the existing Web Browser authentication services that are presently deployed at hotspots.

Client Integration

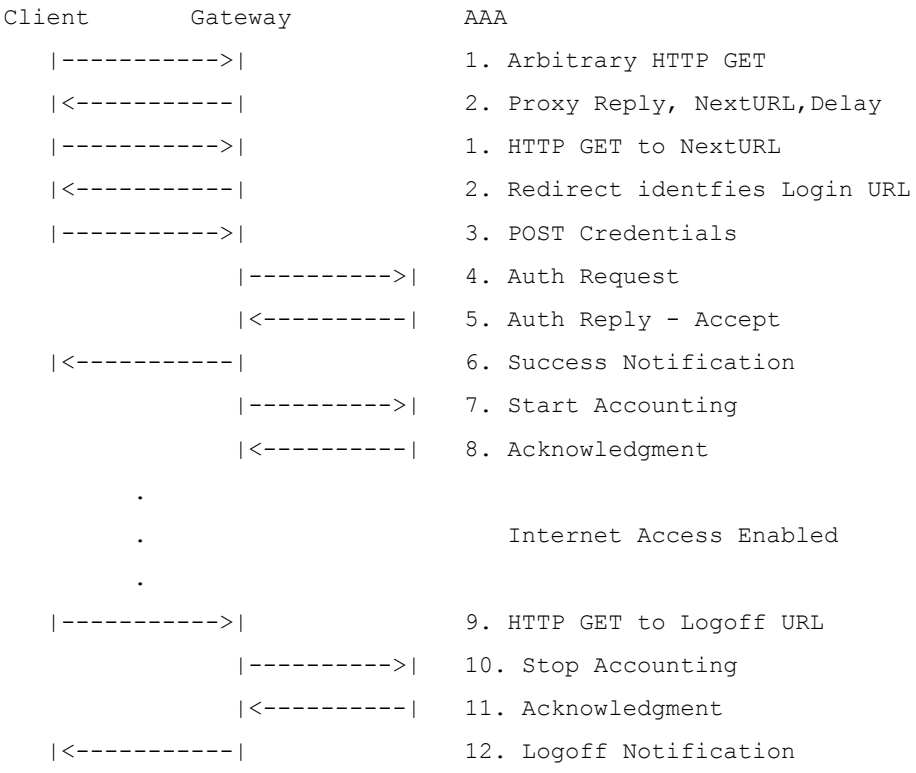
This interface is implemented through the use of client-initiated, HTTP message exchanges. TCP connections are established to ports 80 and 443 unless otherwise indicated. HTTP version 1.0 (http://www.ietf.org/rfc/rfc1945.txt) is specified due to its simplified header formats.

The following interaction diagrams represent the access protocol from the perspective of the smart client.

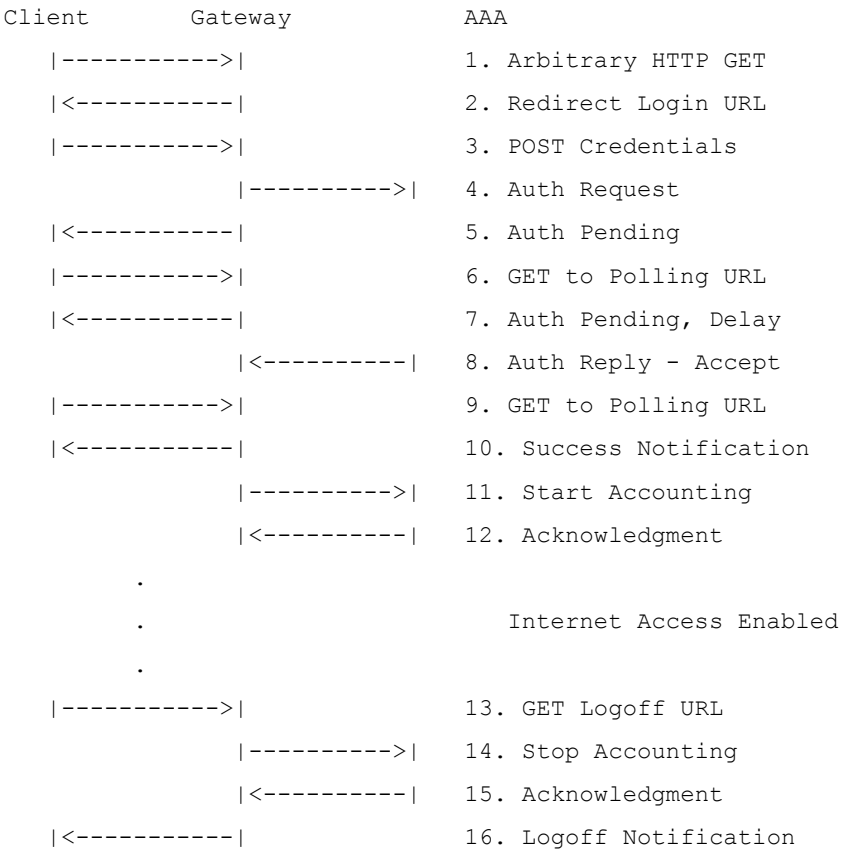
Login Request: Successful Case



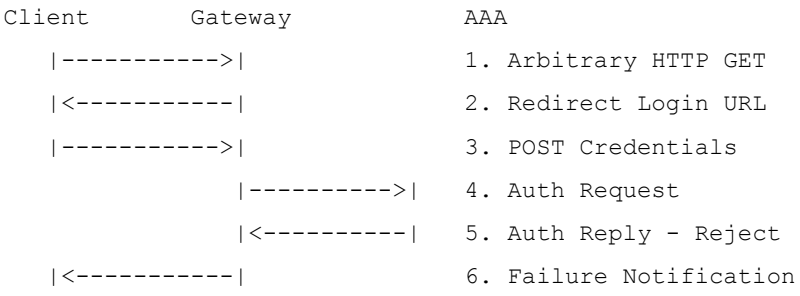
Login Request: Successful Case With Proxy Reply



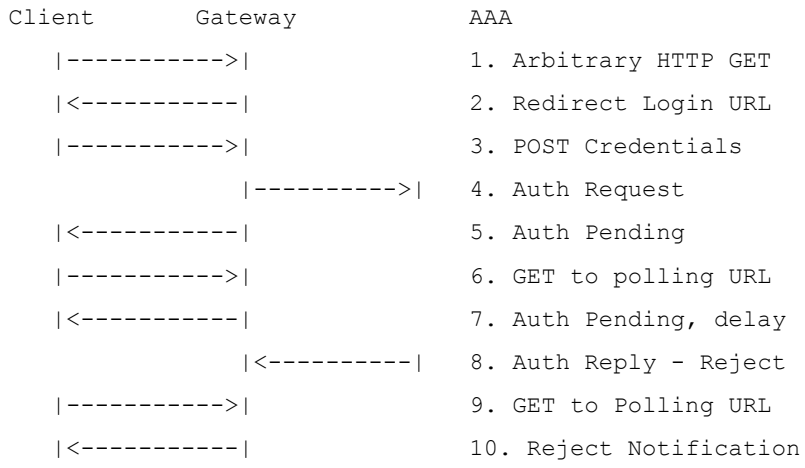
Login Request: Successful Case With Polling



Login Request: Reject



Login Request: Reject With Polling



Protocol Specifics

The smart client to access gateway (GIS) protocol is implemented using protocol messages consisting of well-formed XML documents. Presently, no assumption of standardized URLs is made. Rather, the protocol depends on using an HTTP-hijack/redirect. Most access gateways already provide a redirect mechanism for users attempting to access the network via a web browser. The protocol is designed to provide features that permit the GIS protocol messages to exist within gateway HTML pages which are also served to ordinary web browsers.

To avoid confusing web-browser clients, the gateway should “encapsulate” all GIS messages within an HTML comment tag within each HTML message to prevent interpretation by a web browser. To assure maximum “web browser invisibility” the “encapsulated” XML message should appear outside all inner HTML message segments (e.g., HEAD, BODY, etc) of the HTML message.

The access gateway must ensure HTML compatibility with a wide range of browsers. For this reason, both the HTTP Content-Length and Content-Type (“text/html; charset=UTF-8”) headers should be included in all HTML pages. It is further recommended that gateways include and enforce the Connection header with the “close” keyword. This will help protect the gateway from denial-of-service conditions resulting from connections incidentally left open due to a defective client or malicious user.

Access gateways are widely used to control access to wireless services using IEEE 802.11. Due to the weaknesses in present implementations of the 802.11 air-security protocol (WEP), the GIS protocol requires that SSL be used to protect the subscriber’s authentication credentials. In order to further protect the subscriber from rogue access points, the gateway must utilize a security certificate from a reputable Certificate Authority that can be readily verified by the smart client. Authentication of the access point is outside the scope of this document.

The protocol messages include a proxy notification message as some existing access gateways require it. All messages from the access gateway to the smart client will contain both response codes and message types.

The message types shall be one of the following values:

Message Type	Message Meaning
100	Initial redirect message
110	Proxy notification
120	Authentication notification
130	Logoff notification
140	Response to Authentication Poll
150	Response to Abort Login

The response code shall be one of the following values:

Response Code	Response Meaning
0	No error
50	Login succeeded (Access ACCEPT)
100	Login failed (Access REJECT)
102	Authentication server error/timeout
105	Network Administrator Error: No authentication server enabled
150	Logoff succeeded
151	Login aborted
200	Proxy detection/repeat operation
201	Authentication pending
255	Access gateway internal error

In the following sections, GIS messages and their sub-elements are referred to by their XML root tag name enclosed in angled brackets as it would appear in the opening XML tag:

```
<GIS message name> or <GIS message element name>
```

Message content which is inserted by the gateway is indicated by enclosing its description in braces:

```
{Gateway-generated content}
```

Note: Braces are not a part of the message syntax.

Smart Client HTTP GET to ORIGIN SERVER

The smart client shall perform an HTTP GET to a valid web site to initiate the access sequence.

In situations where the client device is already authorized, the access gateway shall pass the HTTP GET through to the connected public network and return no special response.

If the subscriber should explicitly navigate to the login page within the gateway's walled garden while already authorized for access via the smart client, the access gateway shall respond with a web page indicating that the user is already logged in or other appropriate notification in response to an authorization attempt.

When the client device is not currently authorized for access, the access gateway shall return one of the following in reply to the initial HTTP GET operation:

- An HTTP redirect (301/302/303/307/308) status with an accompanying HTTP Location header and no GIS

content (See section 0).

- an HTTP OK (200) status with an accompanying HTML <META HTTP-EQUIV="Refresh" Content="…"> tag and no GIS content (See section 0).
- An HTTP redirect (301/302/303/307/308) status and HTML page including an XML GIS <Proxy> message (see section 0).
- an HTTP redirect (301/302/303/307/308) status and HTML page including an XML GIS <Redirect> message (see section 0)
- an HTTP OK (200) status and HTML page including an XML GIS <Proxy> message (see section 0)
- an HTTP OK (200) status and HTML page including an XML GIS <Redirect> message (see section 0)

This will be covered in more detail below.

HTTP Redirect with no GIS Content

When an HTTP REDIRECT (301/302/303/307/308) status is returned, the response MAY NOT contain an HTML body. IF present, the body of the page MAY contain an XML document containing either the <Redirect> message or the <Proxy> message defined in the following sections.

When the HTML message is NOT PRESENT –or- does not contain an XML document containing a GIS message, the GIS smart client shall perform another HTTP GET operation to the URL present in the HTTP Location header accompanying the HTTP 301/302/303/307/308 status. The page retrieved by the GIS client after implementing the HTTP redirect MUST contain an XML document containing the GIS <Redirect> elements as defined in the table below or a <Proxy> message as defined in the next two sections.

META "Refresh" with no GIS Content

When an HTTP OK (200) status is returned, the body of the page MAY contain an XML document containing either the <Redirect> message or the <Proxy> message defined in the following sections.

When the HTML message does not contain an XML document containing a GIS message, the GIS smart client shall perform another HTTP GET operation to the URL present in the "Content" attribute of the META tag accompanying the HTTP 200 status.

> Note: The "refresh" string in the META tag must be present as exactly one of the following two strings:
> • Refresh
> • refresh
> No other representations with alternative capitalization shall be used to assure compatibility with older HTML parsers.

The page retrieved by the GIS client MUST contain an XML document containing the GIS <Redirect> message or a <Proxy> message as defined in the next two sections.

Redirect

When the returned HTTP message contains an HTML message containing the <Redirect> message, any HTTP redirect or META "Refresh" function indicated by such HTTP message shall be ignored. Instead the GIS smart client shall process the <Redirect> message elements described in the following table.

The <Redirect> information shall be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

Redirect Message Elements

Information name	Field format/value	Required/ Optional
Access procedure	<AccessProcedure> 1.0 </AccessProcedure>	Required
Location Identifier	<AccessLocation> {Location ID} </AccessLocation>	Required
Location Name	<LocationName> {User readable location name} </LocationName>	Required
Login URL	<LoginURL> https://{site specific login URL} </LoginURL>	Required- Must be a secure URL
Abort Login URL	<AbortLoginURL> http[s]://{abort login URL} </AbortLoginURL>	Optional* (0 or 1) see note below
Message Type	<MessageType> 100 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required

Note: The AbortLoginURL element is only required if the gateway is implementing the **Authentication Results Polling** option (see section 0). The AbortLoginURL may specify either a secure (https:) or unsecure (http:) site**. If the gateway does not support this functionality, this tag should NOT be present in the <Redirect> message.**

The *Access Procedure* must be exactly the string: 1.0 (numeral one, period, numeral zero) for gateways whose features comply with just this version of the GIS specification. Future versions of the specification will assure upward client compatibility for clients which ignore message elements which are not a part of this specification version. **For this reason, a schema-validating XML parser SHOULD NOT be used by GIS clients**. All GIS message versions shall be well-formed.

The *Location ID* specified uniquely identifies the device or subnet through which the access will occur. If this ID is a characteristic of the physical device, replacement of the device may modify the ID received from the access location.

The *location name* can be presented by the smart client to the user to identify the access location.

When all required parameters are not present, an internal malfunction of the access gateway shall be assumed, and the smart client will behave as though it received a response code 255: access gateway internal error.

The *AbortLoginURL* is used by the smart client to inform the access gateway that some error has occurred during the login process. When this is received by the access gateway, every attempt should be made to abort the session cleanly without generating an accounting record. This message element is required only when the gateway implements the authentication results polling procedures defined in a later section.

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Message
0	No error
105	Network Administrator Error: No authentication server enabled
255	Access gateway internal error

Proxy

When the returned HTTP message contains an HTML message containing the <Proxy> message, any HTTP redirect or META Refresh function indicated by such message shall be ignored. Instead the GIS smart client shall process the <Proxy> message elements described in the following table.

The GIS <Proxy> message MAY contain an optional <Delay> element. The proxy message SHALL only be returned in response to the initial HTTP GET at login. The information SHOULD be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

Proxy message Elements

Information name	Field format/value	Required/ Optional
Message Type	<MessageType> 110 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required
Next URL	<NextURL> http[s]://{<site specific URL>} </NextURL>	Optional
Delay in seconds	<Delay> {Number of seconds data} </Delay>	Optional

When all *required* parameters are not present, the smart client will assume an internal malfunction of the access gateway, and the smart client shall behave as though an access gateway internal error response code was received.

If the <Proxy> message includes a <Delay> element, the smart client SHALL suspend execution for the number of seconds before it resends the HTTP GET to the gateway.

> **Note:** The <Proxy> message may be returned by the gateway multiple times (but only once in response to each HTTP GET operation). Some reasonable limit to the number of recurrences SHOULD be implemented by the GIS smart client to avoid an undesirable user experience in the event of gateway malfunction. A 6-cycle limit is recommended.

Gateways SHOULD specify a <Delay> interval large enough to reflect actual processing delay to prevent large numbers of GET recurrences and potential authentication failure due to GIS client limits described in the preceding paragraph. Gateways SHOULD specify a non-zero <Delay> value whenever there will be an actual processing delay on the gateway to avoid being overwhelmed by rapidly repeating HTTP GET operations by smart clients.

If the optional <NextURL> element is present, the GIS smart client SHALL perform another GET operation to the specified URL. This effectively implements a URL "redirect" specific to the GIS smart client. This use of the <Proxy> message is available to redirect GIS clients to a different gateway pageset without changing the normal, browser-oriented gateway page sequence.

The URL must be different in each <Proxy> message. If no <NextURL> element is present in a given proxy message, the last-used URL value WILL be used by the smart client.

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Message
200	Proxy detection/repeat operation
255	Access gateway internal error

Authentication

The authentication phase of the protocol shall be started by an authentication request POST operation by the smart client. This will be followed by an Authentication Reply from the gateway. This phase may include an *optional* "authentication results polling" behavior by the gateway as defined in this section.

Authentication Request

The smart client shall perform a secure HTTP POST operation to the login URL returned in the redirect message. Since the post will be using HTTPS, it should be assumed that port 443 would be used unless otherwise specified as part of the LoginURL.

The POST parameters shall be as follows:

- **UserName:** the full user id (NAI) including appropriate clearinghouse routing prefixes
- **Password:** the user's password
- **Button:** form button identifier
- **OriginatingServer:** the URL of the server to which the activation GET operation was directed

Field name	Field naming/format specification	Required/ Optional
User name input field	name="UserName" max size="253"	Required
Password input	name="Password" max size="128"	Required
Button Identifier	name="button" content="Login"	Required
Form Name	Name="FNAME" content="0" (numeral zero)	Required
Origin Server	Name="OriginatingServer" content={original server GET URL}	Required

Authentication Reply

The access gateway shall return an <AuthenticationReply> message in response to the Authentication Request operation performed by the smart client.

When the gateway response contains the <AuthenticationReply> message it shall further contain the elements described in the table below. The information SHOULD be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

AuthenticationReply Message Elements

Information name	Field format/value	Required/ Optional
Message Type	<MessageType> 120 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required
Reply Message	<ReplyMessage> {Reply Message Text} </ReplyMessage>	Optional *(0 or more)
Login results URL	<LoginResultsURL> http[s]://{site specific login URL} </LoginResultsURL>	Optional**
Logoff URL	<LogoffURL> http[s]://{site specific logoff URL} </LogoffURL>	Optional***
Redirection URL	<RedirectionURL> http[s]://{redirection URL} </RedirectionURL>	Optional

* The <ReplyMessage> element MUST be returned when a RADIUS authentication system is used by the gateway and a returned RADIUS Access-Accept or Access-Reject message contains RADIUS attribute 18, *Reply-Message*. When multiple RADIUS *Reply-Message* attribute instances are present in the RADIUS message, each instance should be returned in a separate <Reply Message> element. The order of the individual <Reply Message> instances MUST reflect the order of the RADIUS *Reply-Message* attribute instances in the RADIUS message.

The <LoginResultsURL> element must be present in the authentication reply if the response code is “Authentication Pending” (code 201). This element should NOT be present under any other circumstances. It may contain session specific information if required by the access gateway. The Login Results URL may specify either a secure (https:) or unsecure (http:) site. **No component of either the user name or password shall be passed as URL parameters EXCEPT when such communication is directed to a secure URL. Client programs shall filter URL parameters to prevent insecure communication of user credentials by misconfigured gateways.

***The <LogoffURL> element must be present in the authentication reply if the response code is “Login succeeded”. It may contain session specific information if required by the access gateway. The Logoff URL may specify either a secure (https:) or unsecure (http:) site. **No component of either the user name or password shall be passed as URL parameters EXCEPT when such communication is directed to a secure URL. Client programs shall filter URL parameters to prevent insecure communication of user credentials by misconfigured gateways.**

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Meaning
50	Login succeeded (Access ACCEPT)
100	Login failed (Access REJECT)
102	Authentication server error/timeout
201	Authentication pending
255	Access gateway internal error

As described above, the <ReplyMessage> element(s) return text to the smart client that is taken from the RADIUS Reply-Message attribute, when RADIUS authentication is used. This allows the AAA server to provide a human readable reason for rejecting an authentication request or other administrative guidance (e.g., "Your password will expire tomorrow"). Multiple Reply-Messages may be included in the RADIUS message and they must be returned to the smart client in the same order as they appear in the RADIUS message.

The access gateway may choose to block the smart client's execution during execution of the authentication request and then return the result to the user if the time-to-authenticate is expected to be low. This is the typical execution behavior of most access gateways.

Alternately, if there are many concurrent authentication requests and/or the time-to-authenticate is very high or the access gateway has limited memory resources, the access gateway may choose, instead, to immediately return an <AuthenticationPending> message causing the smart client to poll for the result of its authentication request. This allows the access gateway to immediately reuse memory and operating system resources that would otherwise be held idle while waiting for completion of the authentication operation.

If the reply to the authentication POST operation includes the *Authentication Pending* response code (201), the smart client shall begin polling the access gateway for the authentication results. This requires the inclusion of the optional <LoginResultsURL> element in the <AuthenticationReply> message from the gateway. The login results URL may specify either a secure (https:) or unsecure (http:) site.

The <RedirectionURL> can be used by the smart client as the start page for a launched browser session following authentication completion.

Authentication Results Polling

If the <AuthenticationReply> message contains the *Authentication Pending* response code, the smart client SHALL begin the authentication results polling procedure. The polling procedure shall consist of a series of one or more HTTP GET operations by the smart client to a secure URL, each followed by an HTTP 200 or HTTP 301/302/303/307/308 status message from the access gateway.

> **Note**: There is no requirement that a gateway implement this polling functionality. All GIS-compliant smart clients, however, must implement support for the authentication results polling procedure.

Authentication Poll

The smart client shall send a HTTP GET to the <LoginResultsURL> that was returned in the <AuthenticationReply> message. When the polling GET operation accesses a secure (HTTPS) URL, it is assumed that port 443 will be used unless otherwise specified as part of the URL. Whenever possible, the <LoginResultsURL> SHOULD specify a secure URL since the <AuthenticationPollReply> returned by the gateway may contain <ReplyMessage> text that is confidential to the user. The use of an insecure URL also exposes the content of the <LogoffURL> creating an opportunity for

nuisance denial-of-service attacks on the user's session in some gateway architectures. The <LoginResultsURL> may, of course, include URL parameters. **However, such parameters MUST NOT include any element of the user credentials (username or password) UNLESS the URL is secure. Client software developers should verify compliance with this requirement to prevent accidental or intentional exposure of the user's credentials.**

Response to Authentication Poll

The access gateway shall return one of the following in reply to the authentication results poll.

- an HTTP redirect (301/302/303/307/308) status with an accompanying HTTP Location header
- an HTTP OK (200) status with an accompanying HTML <META HTTP-EQUIV="Refresh" Content="…"> tag.

The reply shall contain an XML document containing the <AuthenticationPollReply> elements as described in the table below. The information SHOULD be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

AuthenticationPollReply Message Elements

Information name	Field format/value	Required/ Optional
Message Type	<MessageType> 140 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required
Reply Message	<ReplyMessage> {Reply Message Text} </ReplyMessage>	Optional*
Delay in seconds	<Delay> {Number of seconds data} </Delay>	Optional
Logoff URL	<LogoffURL> http[s]://{site specific logoff URL} </LogoffURL>	Optional**
Redirection URL	<RedirectionURL> http[s]://{redirection URL} </RedirectionURL>	Optional

* The <ReplyMessage> element MUST be returned when a RADIUS authentication system is used by the gateway and a returned RADIUS Access-Accept or Access-Reject message contains RADIUS attribute 18, *Reply-Message*. When multiple RADIUS *Reply-Message* attribute instances are present in the RADIUS message, each instance should be returned in a separate <Reply Message> element. The order of the individual <Reply Message> instances MUST reflect the order of the RADIUS *Reply-Message* attribute instances in the RADIUS message.

**The <LogoffURL> element must be present in the authentication poll reply if the response code is "Login succeeded". It may contain session specific information if required by the access gateway. The Logoff URL may specify either a secure (https:) or unsecure (http:) site.

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Meaning
50	Login succeeded (Access ACCEPT)
100	Login failed (Access REJECT)
102	Authentication server error/timeout
201	Authentication pending
255	Access gateway internal error

If the authentication is complete, the response to the authentication poll will contain the authentication result. If not (when response code 201 is returned), the smart client will delay for the number of seconds specified in the <Delay> element before resending the HTTP GET to the <LoginResultsURL> specified in the <AuthenticationReply> message from the gateway.

The optional <ReplyMessage> returns text to the smart client that is taken from the RADIUS Reply-Message attribute, if RADIUS authentication is used. This allows the AAA server to provide a human readable reason for rejecting an authentication request. Multiple Reply-Messages may be included in a RADIUS Access-Reply message and they must be returned to smart client in the same order as they appear in the RADIUS Access-Reply message.

The <RedirectionURL> can be used by the smart client as the start page for a launched browser session following authentication completion.

Abort Login

When the gateway implements authentication results polling and a protocol error occurs during the polling process, the smart client SHALL perform a GET operation to the <AbortLoginURL> specified in the initial <Redirect> message from the gateway. The access gateway should respond with an HTTP 200 or HTTP 302.

Abort Login Request

To abort a login, the smart client shall send a HTTP GET operation to the <AbortLoginURL> returned in the initial <Redirect> message.

Abort Login Reply

The access gateway shall return one of the following responses in reply to the Abort Login Request operation performed by the smart client:

- HTTP 200 and HTML page including the <AbortLoginReply> message
- HTTP 200 with <META HTTP-EQUIV=”Refresh” …> tag and HTML page including the <AbortLoginReply> message
- HTTP 302 redirect and HTML page including the <AbortLoginReply> message

The reply shall contain an XML document containing the <AbortLoginReply> elements described in the table below. The smart client shall NOT act on the redirection information when an HTTP 302 status is returned or the Content attribute when a META Refresh tag is present. The Abort Login Reply information SHOULD be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

When the Abort Login request is received by the gateway AFTER the corresponding authentication operation has completed, the gateway shall respond in one of the following ways:

- If the Login operation failed, the gateway shall return an < AbortLoginReply > message specifying the Login Aborted response code (151).
- If the Login operation succeeded, the gateway shall return an < AbortLoginReply > message specifying the Login succeeded response code (50) and includes the <LogoffURL> element.

AbortLoginReply Message Elements

Information name	Field format/value	Required/ Optional
Message Type	<MessageType> 150 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required
Logoff URL	<LogoffURL> http[s]://{site specific logoff URL} </LogoffURL>	Optional*

* The <LogoffURL> must be present in the < AbortLoginReply > message if the response code is "Login Succeeded" (50). It may contain session-specific information if required by the access gateway. If the login operation has already succeeded, the user's access session has not been terminated. The smart client may terminate the session by sending a logoff request to the <LogoffURL>. The Logoff URL may specify either a secure (https:) or unsecure (http:) site.

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Meaning
50	Login succeeded (Access ACCEPT)
151	Login aborted
255	Access gateway internal error

Logoff

The logoff phase of the protocol is triggered by a GET operation to the <LogoffURL> by the smart client. This operation is followed by a HTTP 200 or HTTP 302 response by the access gateway.

Logoff Request

To initiate a logoff, the smart client SHALL perform a HTTP GET operation to the <LogoffURL> returned in either the <AuthenticationReply> or <AuthenticationPollReply> message.

Logoff Reply

The access gateway shall return one the following in response to the logoff request operation by the smart client:

- HTTP 200 status and HTML page with <LogoffReply> message
- HTTP 302 status and HTML page with <LogoffReply> message

The reply shall contain an XML document with the <LogoffReply> message elements described in the table below. The client shall not act on the redirection information when an HTTP 302 status is returned. The Logoff Reply information SHOULD be contained within a valid HTML message, delimited appropriately with the <HTML> and </HTML> tags. The HTML message may contain other valid HTML message elements (e.g., HEAD, BODY, etc.).

LogoffReply Message Elements

Information name	Field format/value	Required/ Optional
Message Type	<MessageType> 130 </MessageType>	Required
Response Code	<ResponseCode> {Response Code} </ResponseCode>	Required

`{response code}` shall be one of the values listed in the following table:

Response Code	Response Meaning
150	Logoff succeeded*
255	Access gateway internal error

*Gateways shall return the “Logoff succeeded” response code when the logoff request refers to a session which has been previously terminated due to a prior logoff request or gateway session timeout. When the gateway is unable to determine the prior state of a session, the gateway shall return the “Logoff succeeded” response code.

Appendix A: ACCESS GATEWAY INTERFACE SPECIFICATION LICENSE AGREEMENT

ACCESS GATEWAY INTERFACE SPECIFICATION LICENSE AGREEMENT

This License Agreement (the "Agreement") is a legal agreement between you, either an individual or a single legal entity ("You"), and iPass Inc. ("iPass") that governs Your acquisition and use of the version of the iPass specification identified above and any accompanying documentation (the "Specification"). You must accept the terms of this Agreement before viewing, downloading, copying, or otherwise using (collectively, "Acquiring") the Specification.

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Appendix B: Example HTTP and XML Message exchange between Smart Client and A SIMPLE ACCESS Gateway

The messages documented in this section are associated with their [*originator*], either the smart **client** or the access **gateway**.

Authentication Procedure Initiation [client]

```
GET / HTTP/1.0
```

Activation – Authentication Redirect [gateway]

HTTP 302 Found

{Other HTTP headers}

```
<HTML> <!--
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
  xmlns:xsi=”http://www.w3.org/2001/XMLSchema-instance”

xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
  <Redirect>
      <AccessProcedure>1.0</AccessProcedure>
      <AccessLocation>12</AccessLocation>
      <LocationName>
ACMEWISP,Gate_14_Terminal_C_of_Newark_Airport
</LocationName>
 <LoginURL>https://www.acmewisp.com/login/?sid=4a4&try=1</LoginURL>
      <MessageType>100</MessageType>
      <ResponseCode>0</ResponseCode>
  </Redirect>
</WISPAccessGatewayParam>
--> </HTML>
```

Authentication Request [client] via SSL

```
POST /login/?sid=4a4&try=1 HTTP/1.0
```

{Other HTTP headers}

```
button=Login&UserName=WISP1/joseph@company.com&Password=xxxxx&FNAME=0&OriginatingServer=http://xxx.yyy.zzz.eee/
```

Authentication Reply [gateway] (Login Successful)

HTTP 200 OK

{Other HTTP headers}

```
<HTML> <!--
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
 xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayPara
m.xsd">
 <AuthenticationReply>
       <MessageType>120</MessageType>
       <ResponseCode>50</ResponseCode>
       <ReplyMessage>”Message of the Day”</ReplyMessage>
    <LogoffURL>http://www.acmewisp.com/logoff?ses=A134f3</LogoffURL>
 </AuthenticationReply>
</WISPAccessGatewayParam>
--> </HTML>
```

Authentication Reply [gateway] (Login rejected)

HTTP 200 OK

{Other HTTP headers}

```
<HTML> <!--
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
 xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayPara
m.xsd">
 <AuthenticationReply>
       <MessageType>120</MessageType>
       <ResponseCode>100</ResponseCode>
       <ReplyMessage>Invalid Password</ReplyMessage>
 </AuthenticationReply>
</WISPAccessGatewayParam>
--> </HTML>
```

Client-initiated Connection Termination (logoff) of Authenticated User [client]

```
GET /logoff?ses=A134f3
```

Logoff Reply [gateway]

HTTP 200 OK

{Other HTTP headers}

```
<HTML> <!--
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
   xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
 xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayPara
 m.xsd">
 <LogoffReply>
       <MessageType>130</MessageType>
       <ResponseCode>150</ResponseCode>
 </LogoffReply>
</WISPAccessGatewayParam>
--> </HTML>
```

Appendix C: Example Detailed XML Message exchange between Smart Client and a Gateway Implementing Authentication Result Polling

The messages documented in this section are associated with their [*originator*], either the smart **client** or the access **gateway**.

Authentication Procedure Initiation [client]

```
GET / HTTP/1.0
```

Activation - Proxy Reply [gateway]

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=”http://www.w3.org/2001/XMLSchema-instance”
   xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayP
 aram.xsd">
 <Proxy>
       <MessageType>110</MessageType>
       <NextURL>http://www.acmewisp.com/proxypoll</NextURL>
       <ResponseCode>200</ResponseCode>
    <Delay>5</Delay>
 </Proxy>
</WISPAccessGatewayParam>
```

Activation - Redirect Reply [gateway]

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=”http://www.w3.org/2001/XMLSchema-instance”
   xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayP
 aram.xsd">
 <Redirect>
       <AccessProcedure>1.0</AccessProcedure>
       <AccessLocation>12</AccessLocation>
       <LocationName>
       ACMEWISP,Gate_14_Terminal_C_of_Newark_Airport
    </LocationName>
       <LoginURL>http://www.acmewisp.com/login</LoginURL>
       <AbortLoginURL>http://www.acmewisp.com/abortlogin</AbortLoginURL>
```

```
        <MessageType>100</MessageType>
        <ResponseCode>0</ResponseCode>
    </Redirect>
</WISPAccessGatewayParam>
```

Authentication Request [client] via SSL

```
POST /login HTTP/1.0

button=Login&UserName=WISP1/joseph@company.com&Password=xxxxx&FNAME=0&Originating
Server=http://xxx.yyy.zzz.eee/
```

(a)Authentication Reply [gateway] (Login Result Pending-begin result polling)

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayParam
.xsd">
    <AuthenticationReply>
        <MessageType>120</MessageType>
        <ResponseCode>201</ResponseCode>
        <ReplyMessage>”Message of the Day”</ReplyMessage>
        <LoginResultsURL>http://www.acmewisp.com/loginpoll</LoginResultsURL>
    </AuthenticationReply>
</WISPAccessGatewayParam>
```

Client-initiated Authentication Result Poll [client]

GET /loginpoll

(a) Authentication Reply [gateway] (Result Still Pending-repeat polling operation again in 5 seconds)

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
    xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayPara
m.xsd">
<AuthenticationPollReply>
        <MessageType>140</MessageType>
        <ResponseCode>201</ResponseCode>
        <ReplyMessage>Authentication Pending</ReplyMessage>
        <Delay>5</Delay>
```

```
</AuthenticationPollReply>
</WISPAccessGatewayParam>
```

(b)Authentication Reply [gateway] (Login rejected)

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
   xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayP
 aram.xsd">
 <AuthenticationPollReply>
       <MessageType>140</MessageType>
       <ResponseCode>100</ResponseCode>
       <ReplyMessage>Invalid Password</ReplyMessage>
 </AuthenticationPollReply>
</WISPAccessGatewayParam>
```

(c)Authentication Reply [gateway] (Login Successful)

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
   xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayP
 aram.xsd">
 <AuthenticationPollReply>
       <LogoffURL>http://www.acmewisp.com/logoff</LogoffURL>
       <MessageType>140</MessageType>
       <ResponseCode>50</ResponseCode>
       <ReplyMessage>”Message of the Day”</ReplyMessage>
 </AuthenticationPollReply>
</WISPAccessGatewayParam>
```

Client-initiated Connection Termination (logoff) of Authenticated User [client]

GET `/logoff`

Logoff Reply [gateway]

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam
   xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
 xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayPara
 m.xsd">
 <LogoffReply>
```

```
            <MessageType>130</MessageType>
            <ResponseCode>150</ResponseCode>
        </LogoffReply>
    </WISPAccessGatewayParam>
```

Appendix D: XML Schema

The following XML schema is strictly invalid. Its invalidity is due to a limitation of the W3C XMLSchema definition v1.0 which does not permit specification of 'maxOccurence="unbounded"' as an attribute of an xs:all type. While the schema is strictly invalid, it reflects the intention of its designers. This issue only applies to schema elements which contain a <ReplyMessage> element definition. Where present, the <ReplyMessage> element may be present zero or more times. The schema will become valid with the release of the v1.1 of the W3C XMLSchema definition.

```
<?xml version="1.0" encoding="UTF-8"?>
   <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xs:element name="WISPAccessGatewayParam">
           <xs:complexType>
                  <xs:choice>
                  <xs:element name="Proxy" type="ProxyType"/>
                  <xs:element name="Redirect" type="RedirectType"/>
                  <xs:element name="AuthenticationReply" type="AuthenticationReplyType"/>
                  <xs:element name="AuthenticationPollReply"
type="AuthenticationPollReplyType"/>
                  <xs:element name="LogoffReply" type="LogoffReplyType"/>
                  <xs:element name="AbortLoginReply" type="AbortLoginReplyType"/>
           </xs:choice>
           </xs:complexType>
    </xs:element>
    <xs:simpleType name="AbortLoginURLType">
           <xs:restriction base="xs:anyURI"/>
    </xs:simpleType>
    <xs:simpleType name="NextURLType">
           <xs:restriction base="xs:anyURI"/>
    </xs:simpleType>
    <xs:simpleType name="AccessProcedureType">
           <xs:restriction base="xs:string"/>
    </xs:simpleType>
    <xs:simpleType name="AccessLocationType">
           <xs:restriction base="xs:string"/>
    </xs:simpleType>
    <xs:simpleType name="LocationNameType">
           <xs:restriction base="xs:string"/>
    </xs:simpleType>
```

```
<xs:simpleType name="LoginURLType">
	<xs:restriction base="xs:anyURI"/>
</xs:simpleType>
<xs:simpleType name="RedirectionURLType">
	<xs:restriction base="xs:anyURI"/>
</xs:simpleType>
<xs:simpleType name="MessageTypeType">
	<xs:restriction base="xs:integer"/>
</xs:simpleType>
<xs:simpleType name="ResponseCodeType">
	<xs:restriction base="xs:integer"/>
</xs:simpleType>
<xs:simpleType name="ReplyMessageType">
	<xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:simpleType name="LoginResultsURLType">
	<xs:restriction base="xs:anyURI"/>
</xs:simpleType>
<xs:simpleType name="LogoffURLType">
	<xs:restriction base="xs:anyURI"/>
</xs:simpleType>
<xs:simpleType name="DelayType">
	<xs:restriction base="xs:integer"/>
</xs:simpleType>
<xs:complexType name="ProxyType">
	<xs:all>
		<xs:element name="MessageType" type="MessageTypeType"/>
		<xs:element name="ResponseCode" type="ResponseCodeType"/>
		<xs:element name="NextURL" type="NextURLType" minOccurs="0" maxOccurs="1"/>
		<xs:element name="Delay" type="DelayType" minOccurs="0" maxOccurs="1"/>
	</xs:all>
</xs:complexType>
<xs:complexType name="RedirectType">
	<xs:all>
		<xs:element name="AccessProcedure" type="AccessProcedureType"/>
		<xs:element name="AccessLocation" type="AccessLocationType"/>
		<xs:element name="LocationName" type="LocationNameType"/>
		<xs:element name="LoginURL" type="LoginURLType"/>
```

```
                <xs:element name="AbortLoginURL" type="AbortLoginURLType" minOccurs="0"
maxOccurs="1"/>
                <xs:element name="MessageType" type="MessageTypeType"/>
                <xs:element name="ResponseCode" type="ResponseCodeType"/>
          </xs:all>
   </xs:complexType>
   <xs:complexType name="AuthenticationReplyType">
          <xs:all>
                <xs:element name="MessageType" type="MessageTypeType"/>
                <xs:element name="ResponseCode" type="ResponseCodeType"/>
                <xs:element name="ReplyMessage" type="ReplyMessageType" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="LoginResultsURL" type="LoginResultsURLType"
minOccurs="0" maxOccurs="1"/>
                <xs:element name="LogoffURL" type="LogoffURLType" minOccurs="0"
maxOccurs="1"/>
                <xs:element name="RedirectionURL" type="RedirectionURLType"
minOccurs="0" maxOccurs="1"/>
          </xs:all>
   </xs:complexType>
   <xs:complexType name="AuthenticationPollReplyType">
          <xs:all>
                <xs:element name="MessageType" type="MessageTypeType"/>
                <xs:element name="ResponseCode" type="ResponseCodeType"/>
                <xs:element name="ReplyMessage" type="ReplyMessageType" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="Delay" type="DelayType" minOccurs="0"
maxOccurs="1"/>
                <xs:element name="LogoffURL" type="LogoffURLType" minOccurs="0"
maxOccurs="1"/>
                <xs:element name="RedirectionURL" type="RedirectionURLType"
minOccurs="0" maxOccurs="1"/>
          </xs:all>
   </xs:complexType>
   <xs:complexType name="LogoffReplyType">
          <xs:sequence>
                <xs:element name="MessageType" type="MessageTypeType"/>
                <xs:element name="ResponseCode" type="ResponseCodeType"/>
          </xs:sequence>
   </xs:complexType>
   <xs:complexType name="AbortLoginReplyType">
          <xs:sequence>
```

```
                <xs:element name="MessageType" type="MessageTypeType"/>
                <xs:element name="ResponseCode" type="ResponseCodeType"/>
                <xs:element name="LogoffURL" type="LogoffURLType" minOccurs="0"
maxOccurs="1"/>
          </xs:sequence>
    </xs:complexType>
```