# Authentication model

The core model (IAuthenticationInfo, IUserInfo, IUserSchemeInfo) is defined in CK.Auth.Abstractions along with standard implementations (StdAuthenticationInfo, StdUserInfo and StdUserSchemeInfo). It has been designed to be extensible (thanks to IAuthenticationTypeSystem) thus this is not recommended: this authentication model should remain minimal and standard.

The AuthService that appears below is not part of the core model: this is a typical Client implementation that exposes the model.

* Info: exposes the authentication information. This should be implemented as an immutable object.
* Token: contains the (encrypted) AuthenticationInfo that enables calls to the server API.
* Refreshable: is a read-only boolean that states whether the AuthenticationInfo can be renewed.
* ClientClaim: is an optional server generated object (nil or null when not defined) that contains application specific information. This should also be implemented as an immutable object.

AuthService

AuthenticationInfo

Info

Token (string)

Refreshable (bool)

ClientClaim (object)

AvailableSchemes (string[])

User

UnsafeUser

ActualUser

UnsafeActualUser

Expires (date)

CriticalExpires (date)

IsImpersonated (bool)

Level (enum)

UserId (int)

UserName (string)

Schemes

Name (string)

LastUsed (date)

Name (string)

LastUsed (date)

None

Unsafe

Normal

Critical

UserInfo

Any AuthService implementation MUST:

* Issue a call to refresh as soon as possible (during its initialization) to obtain the current authentication data and retrieves the AvailableSchemes from the server.
* Guaranty that User, UnsafeUser, ActualUser and UnsafeActualUser are never nil or null: instead the empty Anonymous object must be exposed (UserName is the empty string, UserId is 0 and Schemes are empty).
* Handles the CriticalExpires and Expires in background so that AuthenticationInfo is refreshed or downgraded accordingly.
* Expose at least one “OnChanged event”.
* Expose methods to initiate login (BasicLogin or external ones).

# WebFrontAuth configuration (AspNet Core 2.0)

## Required Services

The **WebFrontAuthService** must be registered like any other authentication service.

By default, the standard StdAuthenticationTypeSystem will be the implementation of the required **IAuthenticationTypeSystem**.

An implementation of **IWebFrontAuthLoginService** must be registered. The configuration below is a basic configuration with the SqlWebFrontAuthLoginService defined in CK.DB.AspNet.Auth package.

public void ConfigureServices( IServiceCollection services )

{

services.AddAuthentication()

.AddWebFrontAuth();

services.AddDefaultStObjMap( "WebApp.Tests.Generated" );

services.AddSingleton<IWebFrontAuthLoginService, SqlWebFrontAuthLoginService>();

}

## Optional Services

The only optional services defined so far are related to impersonation and direct login control:

/// <summary>

/// Optional service that controls user impersonation either by user identifier or user name.

/// Impersonation is not an actual login, it must have no visible impact on the

/// impersonated user data.

/// </summary>

public interface IWebFrontAuthImpersonationService

{

/// <summary>

/// Attempts to impersonate the current user into another one.

/// Should return the user information on success and null if impersonation is not allowed.

/// </summary>

/// <param name="ctx">The HttpContext.</param>

/// <param name="monitor">The monitor to use.</param>

/// <param name="info">The current user information.</param>

/// <param name="userId">The target user identifier.</param>

/// <returns>The target impersonated user or null if impersonation is not possible.</returns>

Task<IUserInfo> ImpersonateAsync(

HttpContext ctx,

IActivityMonitor monitor,

IAuthenticationInfo info,

int userId );

/// <summary>

/// Attempts to impersonate the current user into another one.

/// Should return the user information on success and null if impersonation is not allowed.

/// </summary>

/// <param name="ctx">The HttpContext.</param>

/// <param name="monitor">The monitor to use.</param>

/// <param name="info">The current user information.</param>

/// <param name="userName">The target user name.</param>

/// <returns>The target impersonated user or null if impersonation is not possible.</returns>

Task<IUserInfo> ImpersonateAsync(

HttpContext ctx,

IActivityMonitor monitor,

IAuthenticationInfo info,

string userName );

}

/// <summary>

/// Optional service that can allow calls to the dangerous '/c/unsafeDirectLogin'.

/// Enabling calls to to this endpoint must be explicit: by default "403 - Forbidden"

/// is always returned.

/// </summary>

public interface IWebFrontAuthUnsafeDirectLoginAllowService

{

/// <summary>

/// Predicate function that may allow calls to '/c/unsafeDirectLogin' for a

/// scheme and a payload.

/// </summary>

/// <param name="ctx">The current context.</param>

/// <param name="monitor">The monitor to use.</param>

/// <param name="scheme">The authentication scheme.</param>

/// <param name="payload">The login payload for the scheme.</param>

/// <returns>True if the call must be allowed, false otherwise.</returns>

Task<bool> AllowAsync( HttpContext ctx, IActivityMonitor monitor, string scheme, object payload );

}

## Using the WebFrontAuthService

### Middleware

The WebFrontService exposes its external API described hereafter thanks to an internal IAuthenticationRequestHandler. There is no other middleware to add to the request pipeline than the unique Microsoft.AspNetCore.Authentication.AuthenticationMiddleware:

public void Configure( IApplicationBuilder app )

{

// ...

app.UseAuthentication();

// ...

}

### Handling external authentications

The binding from external authentication services to the WebFrontAuth relies on the TicketReceived event: it is up to the developer to adapt the Claims from the ticket to the authentication provider dependent payload. The extension method WebFrontAuthRemoteAuthenticateAsync is a small helper that helps binding the received claims to the provider payload expected type.

Code sample below shows a binding from Google thanks to a dedicated event class that does the job by locating the service and a binding from a OIDC server with a much cleaner inlined function:

class OAuthEventHandler : OAuthEvents

{

public override Task TicketReceived( TicketReceivedContext c )

{

// Horrible service location here...

var authService = c.HttpContext.RequestServices.GetRequiredService<WebFrontAuthService>();

return authService.HandleRemoteAuthentication<IUserGoogleInfo>( c, payload =>

{

payload.GoogleAccountId = c.Principal.FindFirst( "AccountId" ).Value;

} );

}

}

public void ConfigureServices( IServiceCollection services )

{

services.AddAuthentication()

.AddGoogle( "Google", options =>

{

options.SignInScheme = WebFrontAuthOptions.OnlyAuthenticationScheme;

options.ClientId = "1012618945754-fi8r…9du.apps.googleusercontent.com";

options.ClientSecret = "vR…kH";

options.Events = new OAuthEventHandler();

} )

.AddOpenIdConnect( "oidc", options =>

{

options.SignInScheme = WebFrontAuthOptions.OnlyAuthenticationScheme;

options.Authority = "http://localhost:5000";

options.RequireHttpsMetadata = false;

options.ClientId = "WebApp";

options.ClientSecret = "WebApp.Secret";

options.Events.OnTicketReceived = c =>

c.WebFrontAuthRemoteAuthenticateAsync<IUserOidcInfo>( payload =>

{

payload.SchemeSuffix = "";

// Instead of "http://schemas.xmlsoap.org/ws/2005/05/identity/claims/nameidentifier"

// Use standard System.Security.Claims.ClaimTypes.

payload.Sub = c.Principal.FindFirst( ClaimTypes.NameIdentifier ).Value;

} );

} )

.AddWebFrontAuth();

services.AddDefaultStObjMap( "WebApp.Tests.Generated" );

services.AddSingleton<IWebFrontAuthLoginService, SqlWebFrontAuthLoginService>();

}

Important: The code above is from the integration tests and is absolutely NOT secure.

### Options

The WebFrontAuthService is configured by a AuthenticationSchemeOptions class:

/// <summary>

/// Options for <see cref="WebFrontAuthService"/>.

/// </summary>

public class WebFrontAuthOptions : AuthenticationSchemeOptions

{

static readonly PathString \_entryPath = new PathString( "/.webfront" );

/// <summary>

/// The <see cref="WebFrontAuthService"/> is not designed to be added multiple

/// times to an application, hence its name is unique.

/// </summary>

public const string OnlyAuthenticationScheme = "WebFrontAuth";

/// <summary>

/// Gets the entry point: "/.webfront".

/// </summary>

public PathString EntryPath => \_entryPath;

/// <summary>

/// Controls how much time the authentication will remain valid

/// from the point it is created.

/// Defaults to 20 minutes.

/// This time is extended if <see cref="SlidingExpirationTime"/> is set and

/// when "<see cref="EntryPath"/>/c/refresh" is called.

/// This configuration can be changed dynamically: modifying the configuration will take the

/// new value into account.

/// </summary>

public TimeSpan ExpireTimeSpan { get; set; } = TimeSpan.FromMinutes( 20 );

/// <summary>

/// Controls how much time the long term, unsafe, authentication information

/// will remain valid from the point it is created.

/// Defaults to one year.

/// This configuration can be changed dynamically.

/// </summary>

public TimeSpan? UnsafeExpireTimeSpan { get; set; } = TimeSpan.FromDays( 366 );

/// <summary>

/// Gets whether <see cref="UnsafeExpireTimeSpan"/> is not null, greater than

/// <see cref="ExpireTimeSpan"/>, and <see cref="CookieMode"/> is not

/// <see cref="AuthenticationCookieMode.None"/>.

/// When true a long-lived cookie is used to store the unsafe, but long term,

/// authentication information.

/// Its <see cref="CookieOptions.Path"/> depends on <see cref="CookieMode"/>.

/// </summary>

public bool UseLongTermCookie => UnsafeExpireTimeSpan.HasValue

&& UnsafeExpireTimeSpan > ExpireTimeSpan

&& CookieMode != AuthenticationCookieMode.None;

/// <summary>

/// Gets whether the authentication cookie (see <see cref="CookieMode"/>) requires or not https.

/// Note that the long term cookie uses <see cref="CookieOptions.Secure"/> sets to false since it

/// does not require any protection.

/// Defaults to <see cref="CookieSecurePolicy.SameAsRequest"/>.

/// This can not be changed dynamically.

/// </summary>

public CookieSecurePolicy CookieSecurePolicy { get; set; }

/// <summary>

/// Gets or sets if and how cookies are managed to store the authentication information.

/// <para>

/// Defaults to <see cref="AuthenticationCookieMode.WebFrontPath"/>.

/// </para>

/// <para>

/// Setting it to <see cref="AuthenticationCookieMode.RootPath"/> should NOT BE used for

/// professional development: this mode, that is the same as the standard Cookie ASP.Net

/// authentication, should be used only for standard and classical Web application.

/// </para>

/// <para>

/// Setting it to <see cref="AuthenticationCookieMode.None"/> disables all cookies: client apps

/// are no more "F5 resilient", this can be used for pure API implementations.

/// </para>

/// <para>

/// This can not be changed dynamically.

/// </para>

/// </summary>

public AuthenticationCookieMode CookieMode { get; set; }

/// <summary>

/// Gets or sets a list of available schemes returned for information from '/c/refresh' endpoint

/// when 'schemes' appears in the query string.

/// <para>

/// Defaults to null: schemes are the same as <see cref="IWebFrontAuthLoginService.Providers"/>

/// when this is null or empty.

/// </para>

/// <para>

/// When not null (or empty), this list takes precedence over the login service's providers:

/// all supported schemes must be declared here (and unwanted ones must not appear).

/// </para>

/// <para>

/// This list does not forbid user login to non listed schemes, this is intended only for

/// applications to communicate with the user.

/// </para>

/// <para>

/// This configuration can be changed dynamically: modifying the configuration will take the

/// new schemes into account.

/// </para>

/// </summary>

public List<string> AvailableSchemes { get; set; }

/// <summary>

/// Gets or sets the refresh validation time.

/// When set to other than <see cref="TimeSpan.Zero"/> the middleware will re-issue a new token

/// (and new authentication cookie if <see cref="CookieMode"/> allows it) with a new expiration

/// time any time it processes a "<see cref="EntryPath"/>/c/refresh" request.

/// This applies to <see cref="IAuthenticationInfo.Expires"/> but not

/// to <see cref="IAuthenticationInfo.CriticalExpires"/>.

/// This configuration can be changed dynamically: modifying the configuration will take the

/// new value into account.

/// </summary>

public TimeSpan SlidingExpirationTime { get; set; }

/// <summary>

/// Gets or sets the http header name. Defaults to "Authorization".

/// This can not be changed dynamically.

/// </summary>

public string BearerHeaderName { get; set; } = "Authorization";

}

Among these configurations, ExpireTimeSpan, UnsafeExpireTimeSpan, SlidingExpirationTime and AvailableSchemes are « dynamic »: changing these configurations at runtime updates the service behavior accordingly.

# WebFrontAuth protocol

WebFrontAuth middleware handles all requests that start with /.webfront/.

## (POST) .webfront/c/basicLogin

This entry point supports basic authentication via user name and password.

Request body:

{

"userName": "Albert",

"password": "pwd"

}

Note: Body length must not exceed 1024 characters.

Response :

* If IWebFrontAuthLoginService.HasBasicLogin is false   
  🡺 404 Not Found.
* If the request body is not valid   
  🡺 400 Bad Request.
* If basic authentication succeeds   
  🡺 200 OK

{

"info": {

"user": {

"id": 2,

"name": "Albert",

"schemes": [

{

"name": "Basic",

"lastUsed": "2017-07-26T14:50:48.5767287Z"

}

]

},

"exp": "2017-07-26T15:10:58.7503983Z"

},

"token": "CfDJ8CS62…pLB10X",

"refreshable": false

}

* If basic authentication fails   
  🡺 401 Unauthorized with a body that contains the same fields as above (but set to null) and a login failure code and reason.

{

"info": null,

"token":null,

"refreshable":false,

**"loginFailureCode":4,**

**"loginFailureReason":"Invalid credentials."**

}

When refreshable is true, calls to c/refresh should be done before exp to refresh the expiration date.

## (GET, POST) .webfront/c/refresh[?schemes]

This should be the first call from a client that starts without any context: if cookies exist they are used to restore the authentication token. The other use of this entry point is to refresh an existing token before its expiration.

* If a valid authentication is found (non-expired Authorization token or Authorization cookie)   
  🡺 200 OK

Response body is the same as the return of a successful authentication with a possibly updated expiry date.

* If no valid authentication is found but the long-lived cookie exists  
  🡺 200 OK  
  There is no exp field: this is an **unsafe** user information.

{

"info": {

"user": {

"id": 2,

"name": "Albert",

"schemes": [

{

"name": "Basic",

"lastUsed": "2017-07-26T15:17:58.9615326Z"

}

]

}

},

"token": "CfDJ8CS6...H9vQeL7NZa1Aywib0NJ69X-",

"refreshable": false

}

* If no authentication at all has been found (or the Authorization token is invalid)  
  🡺 200 OK

{

"info": null,

"token": null,

"refreshable": false

}

The ?schemes query string parameters adds a schemes field to the response body that is an array of the available scheme names.

## (GET, POST) .webfront/c/logout[?full]

Logout the user by removing the authentication cookie and, if ?full query parameter is specified, the long-lived cookie is also removed.

## (GET, POST) .webfront/c/startLogin?scheme=SCHEME[&returnUrl=/PAGE]

Starts an external login process. SCHEME identifies the authentication scheme to use. By default, the process is done in a popup window but if returnUrl is specified, the process uses redirections (the web client application context is lost).

Client applications can easily transfer information through the process:

* In inline mode (returnUrl)
  + The parameters of the returnUrl are kept.
* In default mode (popup)
  + When using GET verb, any query string parameters that are not scheme nor returnUrl are considered as userData.
  + When using POST verb, any form data are considered as userData.

Examples:

* Using the inline mode:

GET /.webfront/c/startLogin?scheme=oidc&returnUrl=/auth-done?p=67

The process ends with this last response:

<!DOCTYPE html>

<html><body><script>

(function(){window.url='http://localhost:4324/auth-done?p=67';})();

</script></body></html>

* Using the default mode:

GET /.webfront/c/startLogin?scheme=oidc&A=3&A=p&Other=param&X

The process ends with this last response:

<!DOCTYPE html>

<html>

<body>

<script>

(function(){

window.opener.postMessage( {"info":{"user":{"id":3,"name":"carol","schemes":[{"name":"Oidc","lastUsed":"2017-07-26T16:21:12.89Z"},{"name":"Basic","lastUsed":"2017-07-26T16:19:38.51Z"}]},"exp":"2017-07-26T16:41:12.9034089Z"},"token":"CfDJ8CS62t…Aoa93HA","refreshable":false,"initialScheme":"oidc","callingScheme":"oidc","userData":{"A":["3","p"],"Other":"param","X":""}}, 'http://localhost:4324/');

window.close();

})();

</script>

<!--7Mq…KJHyzsdHI/-->

</body>

</html>

## (POST) .webfront/c/unsafeDirectLogin

This entry point supports direct authentication with the payload specific to a provider.

Since this is a very dangerous entry point (hence its name), it is totally disabled by default. Enabling it must be explicitly allowed on the configuration object.

The Basic scheme is a scheme like any other. We use it below (but it can work with all authentication providers).

Allowing the call (only for Basic authentication):

var opt = new WebFrontAuthMiddlewareOptions()

{

UnsafeDirectLoginAllower = ( httpCtx, scheme ) => scheme == "Basic";

}

Request body:

{

"provider": "Basic",

"payload": {

"userName": "Wolfgang",

"password": "pass"

}

}

Note: Body length must not exceed 4096 characters.

Response:

* If there is a null UnsafeDirectLoginAllower or calling it returned false  
  🡺 403 Forbidden
* If the request body is invalid (either cannot be parsed or not the expected format)   
  🡺 400 Bad Request  
  When the format is not the expected one, the body contains a more detailed information (for instance):

{

"errorId":"System.ArgumentException",

"errorText":"Invalid payload. Missing 'Password' -> string entry.\r\nNom du paramètre : payload"

}

* If the login failed   
  🡺 401 Unauthorized

Response body is the same as the return of a failed authentication (see basic) with login failure code and reason.

* If the login succeeds  
  🡺 200 OK  
  Response body is the same as the return of a successful authentication (see basic).

## (POST) .webfront/c/impersonate

This supports impersonation controlled by IWebFrontAuthImpersonationService registered implementation. If no such service exists, impersonation is totally disabled.

Request body:

{ "userName": "Robert" }

Or

{ "userId": 3 }

Note: Body length must not exceed 512 characters.

Response:

* If no impersonation service is registered  
  🡺 404 Not Found
* If the request body is invalid  
  🡺 400 Bad Request
* If the user cannot be impersonated (not allowed or target user not found)  
  🡺 403 Forbidden
* If the impersonation succeeds

🡺 200 OK

{

"info": {

"user": {

"id": 3,

"name": "Robert",

"schemes": []

},

**"actualUser": {**

**"id": 2,**

**"name": "Albert",**

**"schemes": [**

**{**

**"name": "Basic",**

**"lastUsed": "2017-07-28T16:33:26.2758228Z"**

**}**

**]**

**},**

"exp": "2017-07-28T16:53:26.2758228Z"

},

"token": "CfDJ…s4POjOs",

"refreshable": false

}

Impersonation adds the actualUser field, the user is the impersonated one.

## (GET, POST) .webfront/token

This is the only entry point that is not subordinated to the /c/ path: by default cookies cannot be used since they are only available below /.webfront/c/.

This acts as any “normal” API and is an easy way to test the authentication. It always returns the Authentication information in JSON (it will be able to use the authentication cookies only if WebFrontAuthMiddlewareOptions.CookieMode is AuthenticationCookieMode.RootPath just like any other API on the server).

# WebFrontAuth client API

The goal of the client API is to implement the protocol in the safer possible manner. The key point is to offer a unified model across the different clients that minimizes the risk of developer errors.