ASP.NET Identity – Security Features

ASP.NET Identity – Security Features

ASP.NET Identity comes with several modern security features such as:

- Two Factor Authentication
- Account Confirmation
- Password Reset
- Account Lockout
- Security Stamp
- Security Token Service

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Two Factor Authentication

- Requires the user to provide two different "Secrets"
- A second security layer if the users password is compromised
- Often implemented using Email or SMS
- Hardware token generators like **SmartCard**, can be seen as a type of two factor authentication
- https://www.yubico.com

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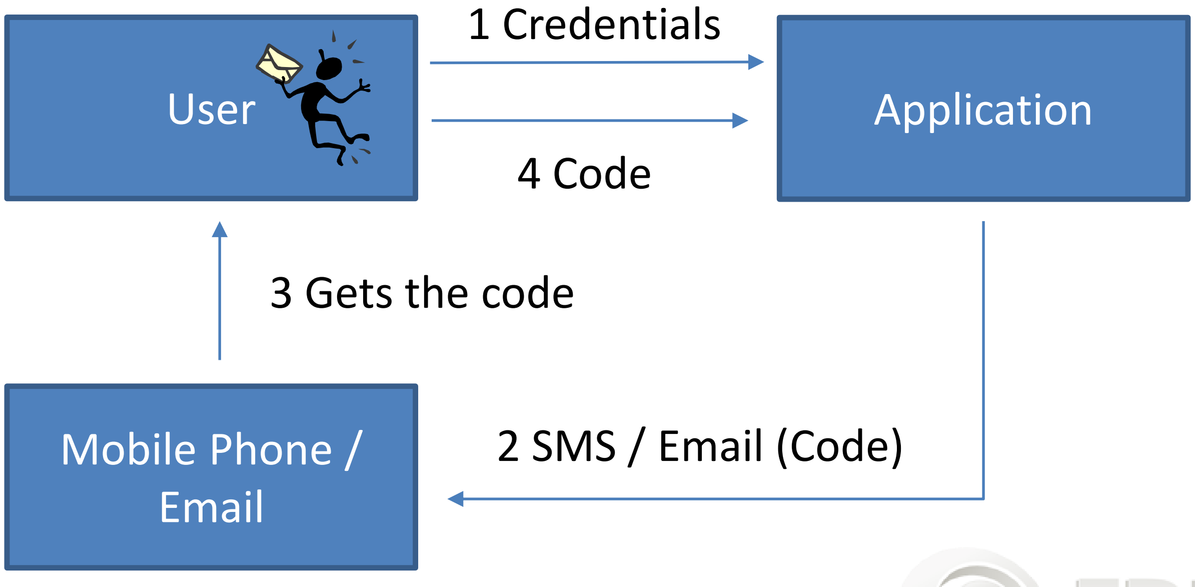
Two Factor Authentication

- The user logins to the service as usual
- The application sends a code in either a text message or email to the user
- The user receives the code from the mobile phone / email
- The user presents the code to the application



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Account Confirmation

A way to confirm that the user has access to a second “Secret”

- Sends a email / SMS with a verification link
- Verification link has a **one day** lifespan per default
- A way to confirm that the user has access to a second “Secret”
- Useful for two factor authentication & password recovery features
- Can use a third party service to send email / SMS

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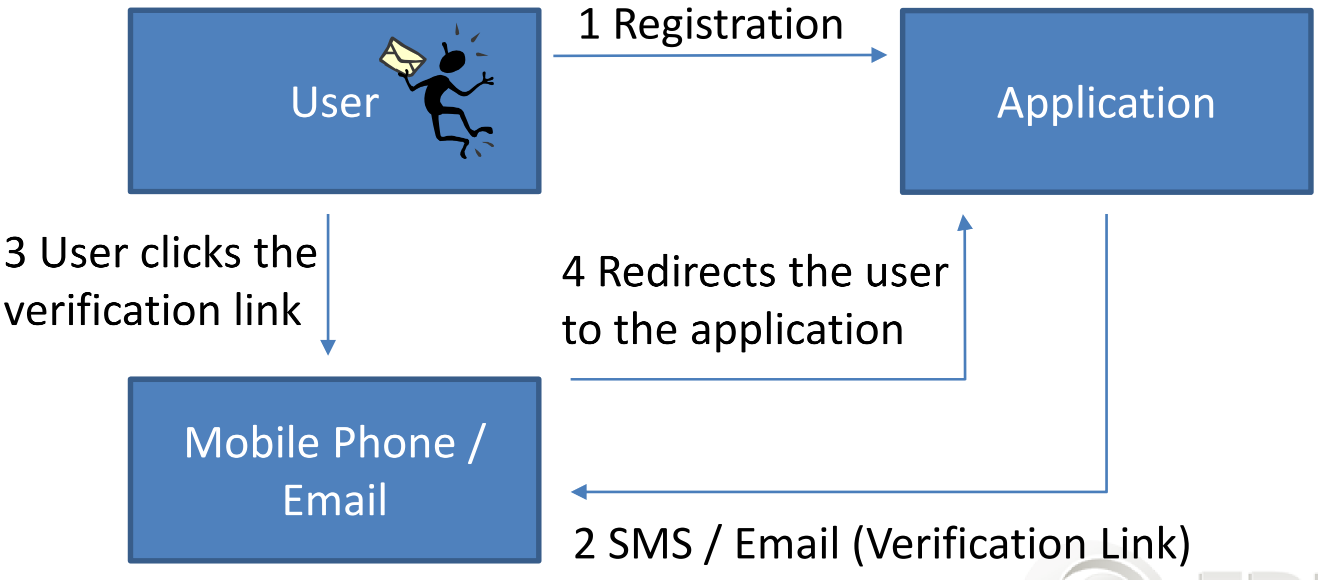
Account Confirmation

- The user registers to an application
- The application sends an SMS/ email to the email / phone number which the user entered in the registration
- The user checks his email / phone for the verification code
- The verification link redirects the user to the application


User
1 Registration
Application
3 User clicks the verification link
4 Redirects the user to the application
Mobile Phone / Email
2 SMS / Email (Verification Link)

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Password Reset

A secure way to reset a users password

- The user can request a password reset by providing the application with a username
- Sends a email / SMS with a reset link
- Reset link **has a one** day lifespan per default
- Requires account confirmation

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Generating the link

When we generate a confirmation or reset link we first generate a token which contains the User Id, Security stamp and purpose.

Token		
Type	**Description**	**Sample Value**
UserID	The users id (GUID)	507062dd-a4…..
Security Stamp	Generated security stamp (GUID)	b9a00ac2-78…..
Purpose	The purpose of the token	Confirmation

http://localhost:1470/Account/ResetPassword?userId=a8b1389c-df93-4dfc-b463-541507c1a4bc&code=yhUegXIM9SZBpPVbBtv22kg7NO7F96B8MJi9MryAadUY5XYjz8srVkS5UL8Lx%2BLPYTU6a6jhqOrzMUkkMyPbEHPY3Ul6%2B%2F0s0qQvtM%2FLLII3s29FgkcK0OnjX46Bmj9JlFCUx53rOH%2FXMacwnKDzoJ1rbrUyypZiJXloIE50Q6iPuMTUHbX9O%2B3JMZtCVXjhhsHLkTOn9IVoN6uVAOMWNQ%3D%3D

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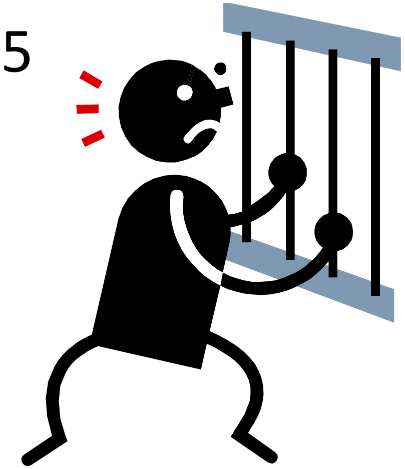
Account Lockout

- Prevents the user from logging in after a number of failed login attempts
- The lockout time is set to 5 minutes by default
- The default number of login attempts if set to 5
- Prevents brute force attacks
- Compensates for weak passwords



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Security Stamp

We have a field in the database which contains the **security stamp**

- A value which is changed when something security related is altered
- Invalidates existing cookies & tokens if the value is changed
- Represented as a GUID value in the database

Ex. The security stamp is changed when the user requests a password reset, invalidating all existing cookies since the security stamp has changed.

Security Token &
Security Token Services

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What is a Security Token?

A Security token is a token which is used to authenticate users

The security token contains the following parts:

Type	Description
ID	Unique identifier
Security key	Cryptographic key
ValidFrom	Time at which the token is valid from
ValidTo	Time at which the token is valid to

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What is a STS (Security Token Service)?

- A STS is a service which provides users with security tokens
- This token is then used to authenticate the user on the web-application

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A good example of where a STS is used is when you try to login to your online bank.

The bank requests a code (a security token) from you, which you get by entering your credentials to your authentication device (STS) which will return a code (a security token).

You would then proceed to use this code to login.

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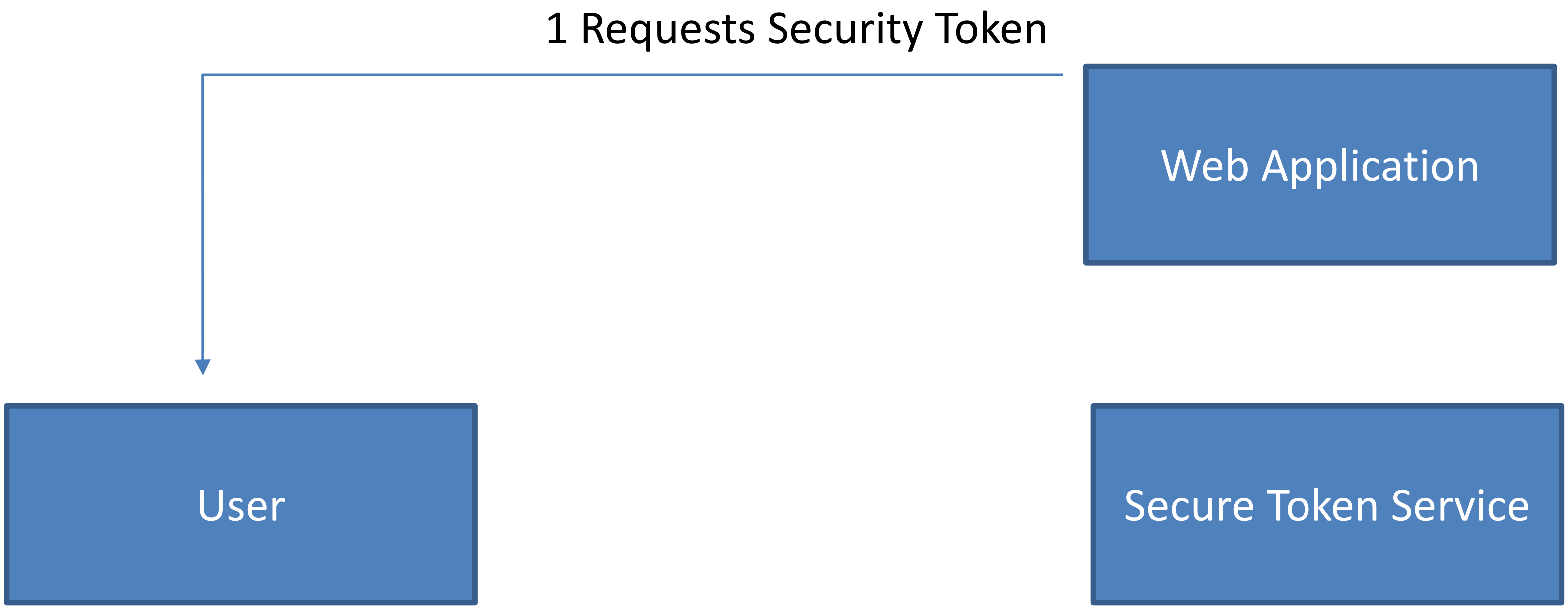
STS Flow illustration

When the user tries to login to the web application, the application requests a security token.



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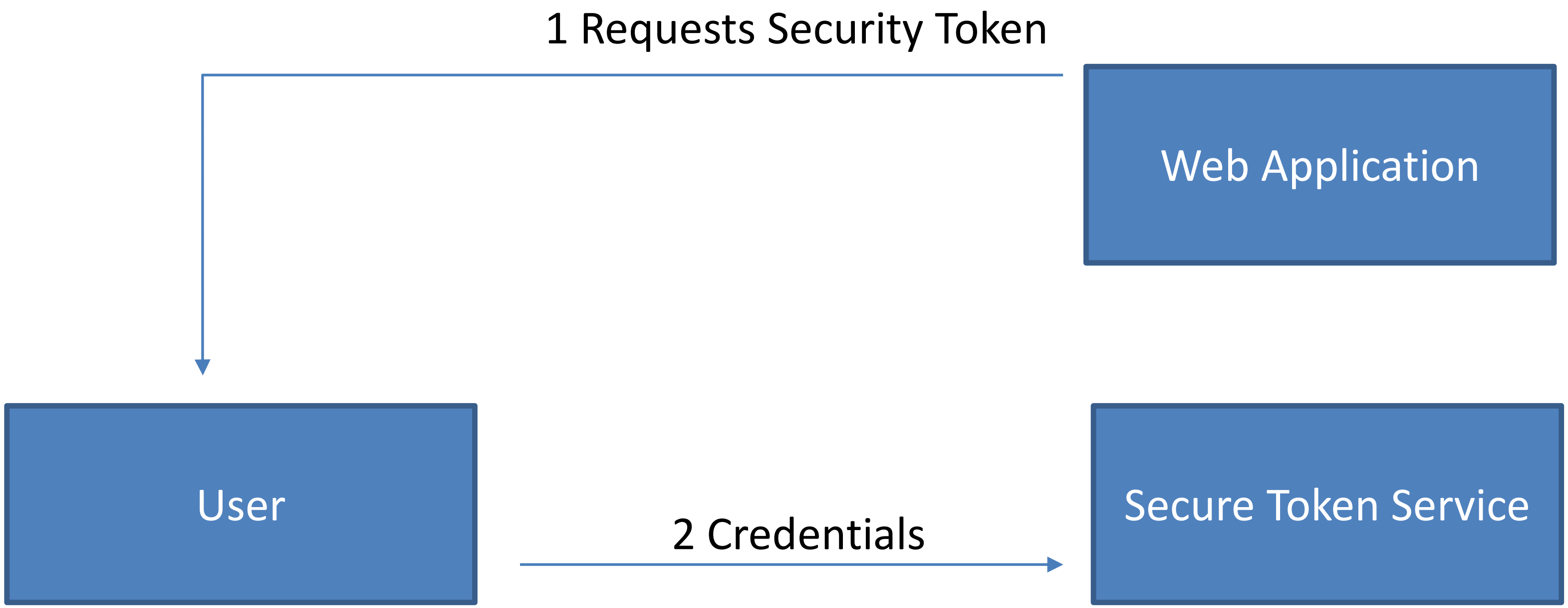
STS Flow illustration

The user provides the STS with his credentials



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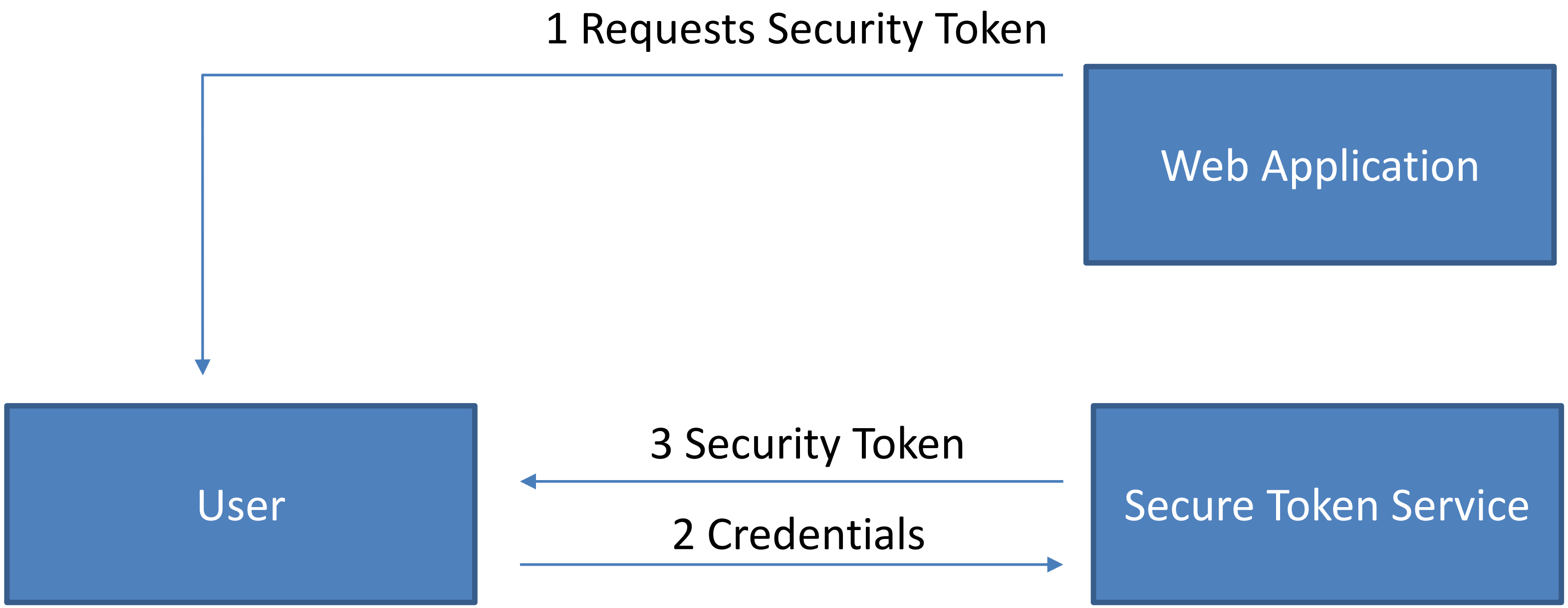
STS Flow illustration

If the credentials are valid, the STS will return a Security token



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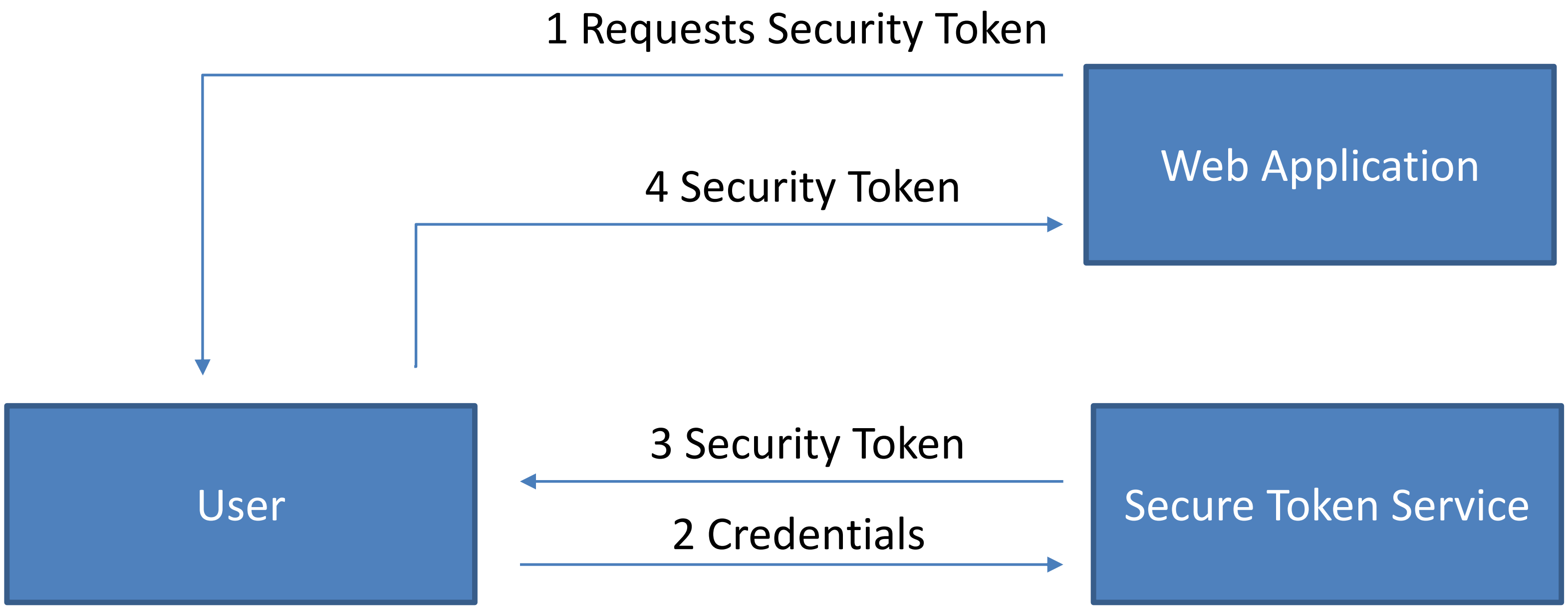
STS Flow illustration

The user provides the web application with the Security Token received from the STS



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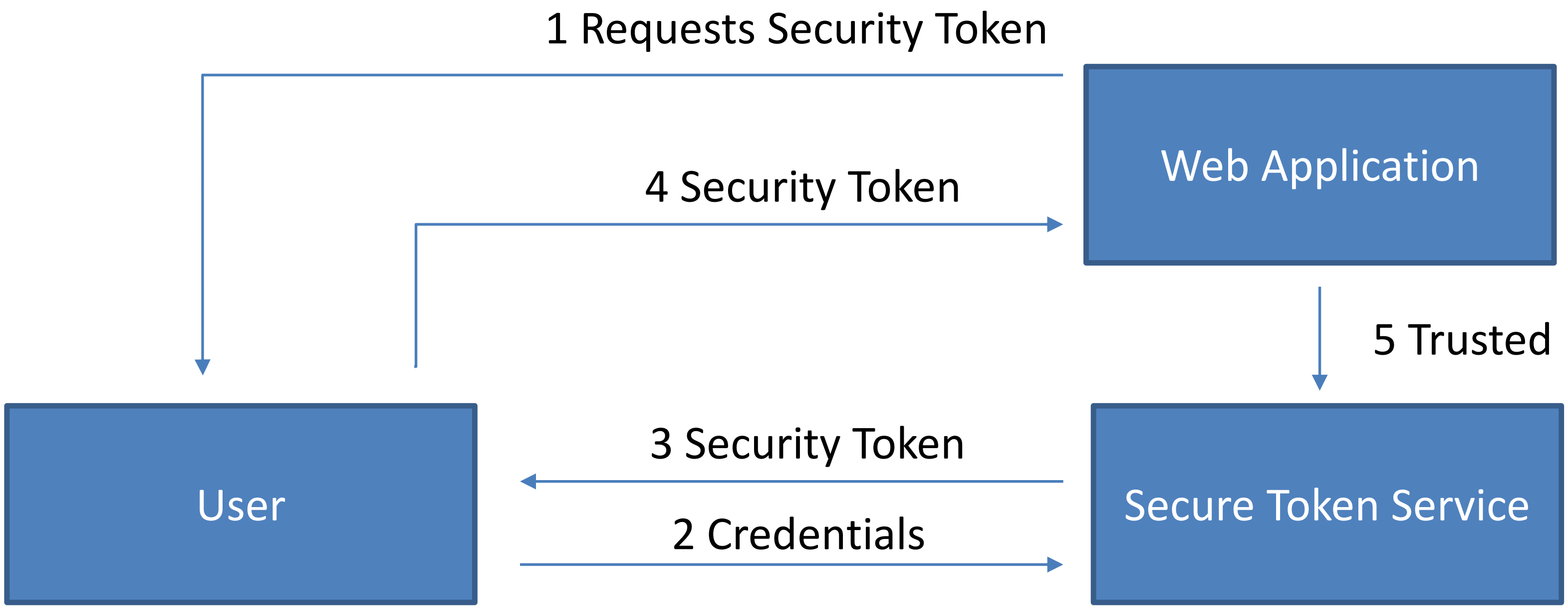
STS Flow illustration

The web application checks if the STS is a trusted issuer



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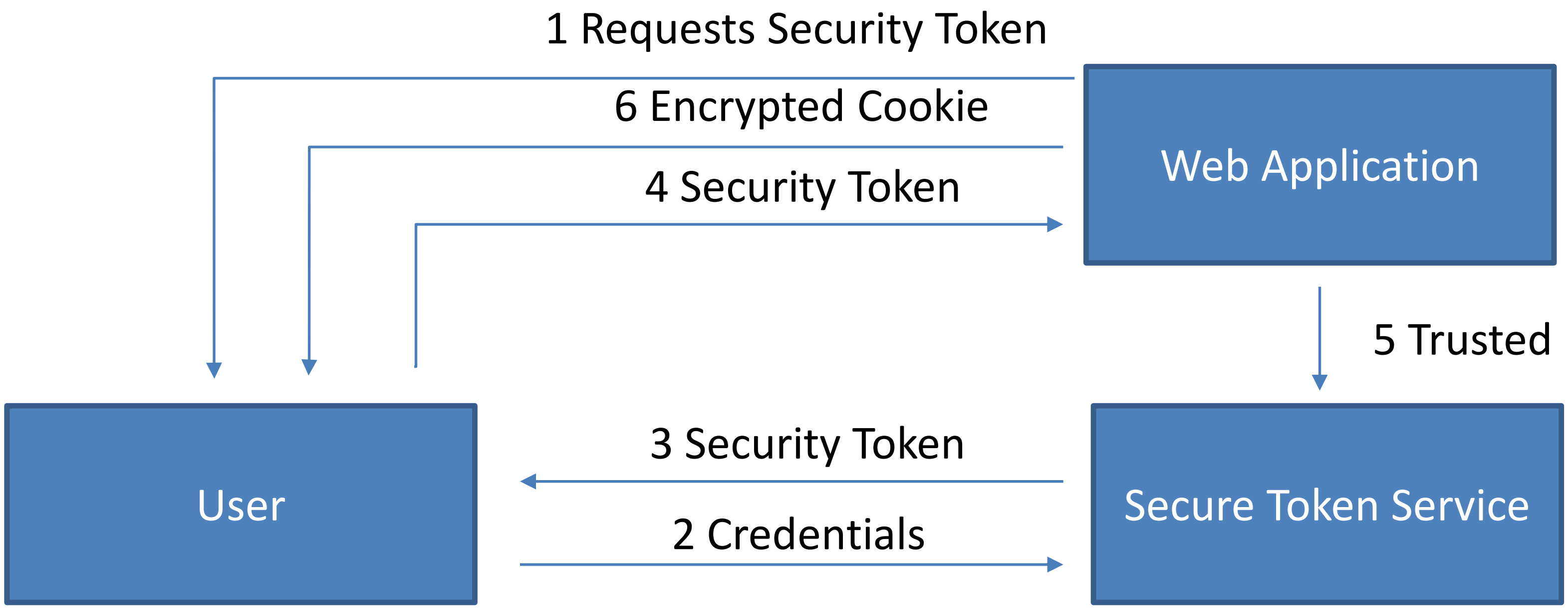
STS Flow illustration

If the STS is trusted the web application returns an encrypted cookie to the user for authorization purposes


1 Requests Security Token
6 Encrypted Cookie
4 Security Token
Web Application
5 Trusted
3 Security Token
2 Credentials
User
Secure Token Service