

NC LIVE

**Authentication & Access 2.0**

Planning Document

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## **Introduction**

For over a decade, NC LIVE has provided member libraries with services facilitating patron access to purchased resources. During this period, a uniform access model was based on a unique password for each member library. While this service was adequate for library authentication needs a decade ago, technological advances, and the addition of locally owned online content have left the processes related to resource access inconsistent, and at times, inefficient. In order to remain relevant and useful in the communities of interest, NC LIVE must continually assess the organization's ability to connect users with licensed resources, and explore better ways to increase access to, and usage of, all online library resources.

## **The Issues**

In late 2010, NC LIVE staff noted several trends:

- NC LIVE's current authentication model (a password distributed annually to libraries which must then be communicated to each user individually) provides a disruptive user experience, primarily during the 60 days immediately following a password change, resulting in failure rates up to 34% higher than normal.
- Member libraries that provide local authentication methods to resources see consistently high failure rates when their users attempt to access content through the NC LIVE site, due in part to the lack of interoperability between the local system and NC LIVE's systems.
- Member libraries that do not utilize a local authentication service, but that purchase online resources beyond those provided by NC LIVE, are required to maintain and distribute multiple passwords to end users, thus increasing the likelihood of failure.

## **The Goal**

The overall goals for any authentication system are to expand access to content and services, and ultimately increase the use of such services. In order to increase end user access to online resources, NC LIVE believes that shifting the model from a single uniform entry point to a multi-faceted approach will better respond to individual circumstances and expectations, and reduce the barriers to licensed content. The solutions outlined in this document are intended to align with, and improve upon, the existing authentication systems implemented by member libraries, as well as increase the overall convenience of access.

## **Background**

In order to assure vendors and publishers that remote use of NC LIVE licensed resources would not result in unauthorized pirating of content, staff created the member library password system in September 1999. While several options relating to the frequency of password changes were discussed, ultimately the decision was made to change the password twice annually. This password system provided member libraries with a uniform statewide experience for users, however, in many cases it diverged from local practices and systems implemented by member libraries. In the summer of 2007, NC LIVE reduced the frequency of password changes and began exploring alternatives that would eliminate the password system all together.

By 2009, it was widely recognized that with the variety of member libraries and end users NC LIVE serves, a single authentication alternative would be difficult to implement. NC LIVE staff continued the password system through the 2009/10 academic year with the intent of finding a new authentication model by the end of the calendar year. Staff developed a pattern matching authentication system (EasyOn) which was originally planned to match against library cards, student ID numbers, or some other institutionally specific number system. In the summer of 2010 the new EasyOn system was piloted with selected community college and public libraries. The EasyOn pilot project resulted in an increase in successful log-ins at all of the public libraries, but failed to do so at all but one community college. In the end, staff determined that increasing success rates required libraries to use a truly ubiquitous identifier, and in the community colleges where the success rate did not rise, students frequently keyed in some other non-library issued campus issued identification number.

NC LIVE staff continued to use the legacy password system through the 2010-11 academic year, but this time it was rolled out in conjunction with EasyOn authentication in over 60 public libraries. The virtue of EasyOn was that it utilized credentials already familiar to library users. This method was well received by member libraries, though it did have limitations, including the fact that the user's path to successful access of NC LIVE sponsored content was often completely different from that of locally purchased content. This disparity created a disjointed user experience and forced end users to overcome unnecessary barriers.

In addition to changes within NC LIVE's authentication infrastructure, the past few years have resulted in more North Carolina libraries implementing local authentication services. Once considered an option primarily for organizations with large IT and electronic resources infrastructures, proxy services, facilitated by OCLC's purchase of EZ Proxy, are now available at 61 of our member libraries. While this trend may continue, more than two thirds of NC LIVE members would benefit from proxy services, especially, as they increase their purchasing of online resources. Anecdotal evidence gathered from member libraries also suggests that even after implementing local proxy servers, libraries have struggled to maintain these services due to challenges in staffing changes and consolidations, as well as technology infrastructure costs.

Examples of those struggling to maintain or implement their local authentication methods include the Charlotte Mecklenburg Library and Southern Pines Public Library.

There has also been an increase in interest in Shibboleth-enabled authentication (referred to here as Federated ID) by some of the larger educational institutions across the state. In 2010 a handful of North Carolina colleges and universities joined the NC Trust, a pilot project facilitated by MCNC. Membership to the NC Trust pilot included several UNC campuses, NCICU members, community colleges, and K-12 school districts. As NC LIVE provided the only common content among all participants, NC LIVE acted as the “proof of concept” collection, successfully providing access to the streaming video collection during the pilot. Going forward, NC LIVE staff are interested in exploring Federated ID as a better solution to a number of current methods of authentication.

## **Section 1: Authentication methods**

The following section outlines methods by which NC LIVE will certify the identity of a user to provide access to licensed online resources.

Each section consists of a description, use case, prerequisites, advantages/challenges, notes, and recommendations. The methods were identified, assembled and endorsed by staff and members of the joint Technical Advisory Committee / Web Advisory Committee.

## A. EasyOn

**Description:** To access resources, library patrons enter a library card number (or some other ubiquitous identifier) in lieu of an NC LIVE password. The system matches the library card's pattern to the known pattern stored in the database. If the pattern matches, the user is authenticated. Libraries no longer need to distribute the NC LIVE password to users in order for patrons to access content.

**Use case:** Libraries that use library card numbers to authenticate access to locally-purchased (non-NC LIVE) resources will be able to extend library card number authentication to NC LIVE resources.

**Prerequisite:** Library card number (or other identifier) must have a known pattern to match.

**Advantages:**

- Users do not need to contact the library to obtain an NC LIVE password.

**Challenges:**

- Libraries/Colleges that use multiple identification card numbers (student ID/library card/financial account number) may have a reduced benefit due to the likelihood of confusion by the end user about the correct number to use.
- No way to “remove” users who have had access, but are no longer associated with the library including expired users and alumni (once a number works, it works forever until the library changes the library card pattern).

**Notes:** At this time NC LIVE has more than 60 public libraries and 4 community college libraries using this method. Adoption rate has been high in public libraries. While there has been some interest from academic libraries, NC LIVE staff are hesitant to market this option to non-public libraries due to pilot findings that suggested it may not improve success rates of academic logins.

**Findings:** EasyOn is viewed as a successful implementation of integrating NC LIVE authentication with local forms of authentication. While the option has been marketed primarily to public libraries, NC LIVE has not attempted to market it much beyond that Community of Interest (COI). Since the system is fully developed, extending it to member libraries that wish to participate would provide some value to member libraries without incurring additional expense for NC LIVE.

## **B. Geolocation**

Description: Geolocation identifies a user's location by determining their IP address and performing a geographic look-up of that address. If the IP address of the user identified resolves to a location within the state of North Carolina, the system authenticates the user. While NC LIVE could develop a product /service to perform this function, some content providers and third party vendors also provide a solution of this type.

Use case: Depending on the service used and the resources targeted, this method could be used by all NC LIVE member libraries.

Prerequisite: This option has no library prerequisites. If NC LIVE targets a subset of resources, staff may need to provide alternate entry points; additionally, web pages and links would need to be updated to allow access.

Advantages:

- Home users experience fewer barriers to resources when using a device that is located in North Carolina.
- NC LIVE resources are licensed to most libraries within the state, so this would represent an opportunity to increase access to content.

Challenges:

- Concerns were raised because this method could potentially bypass the need to have a library card or student id.
- Depending on the process of implementation, this method may allow unauthorized access to resources by the same vendor not purchased by NC LIVE.
- Requires an evaluation of how statistics would be attributed to individual libraries since geolocation does not require specific affiliation with a specific institution; may need an additional mechanism to associate the library, if necessary.

Notes: Need to confirm availability with vendors when licensing the collections for the 2012-2014 resource cycles. Alternatively, if not approved by vendors, geolocation could be used for specific partnership resources or web sites, like NC Health Info and NCpedia.

Findings: Geolocation was viewed as the most significant option to removing barriers to resources for a majority of end users. Committee members felt that the resource selection process would be an opportunity for NC LIVE to negotiate this as a future method of authentication. While it was recognized that NC LIVE would need to continue to provide alternate authentication options, this method would provide nearly seamless access for many.

### **C. User created NC LIVE account**

Description: Users create an account within the NC LIVE web environment and NC LIVE will use those credentials to authenticate.

Use case: A users from any member library will be able to select their institution and create a personal account in NC LIVE. This will be purged at a defined cycle (such as annually) and the user will be prompted to update or re-validate her affiliation with an NC LIVE member library.

Prerequisite: There are no pre-requisites for member libraries to participate.

Advantages:

- A user will be able to easily reset and personalize their password.

Challenges:

- Users may not want to create another login/password.
- Auditing the validity of the affiliation with the parent library will be difficult.
- We may need to collect and store personal information like member library, user id, password and zip code; could become a hacking target because of stored personal data.

Findings: User created accounts, and by extension Open ID, is seen as a potentially appealing option from an end user perspective, but with so little information on how this would be implemented or what the flow would look like, it was difficult to determine whether this would be seen as a significant improvement over other options.

## **Section 2: Authorization methods**

The following section outlines methods by which NC LIVE will rely on a trusted third-party service for identity verification

Each section consists of a description, use case, prerequisites, advantages/challenges, notes, and recommendations. The methods were identified, assembled and endorsed by staff and members of the joint Technical Advisory Committee / Web Advisory Committee

#### **D. Proxy Hand-off**

Description: If an end user whose library provides proxy services comes to the NC LIVE site directly to access NC LIVE provided resources, they will be re-directed to their library's proxy login.

Use case: Currently, 61 member libraries host their own proxy service (see attached). As many of these institutions expect their users to access NC LIVE-purchased content through their library's web site, they do not provide users with credentials that can be used on the nclive.org site. NC LIVE staff frequently receive contacts from users who find themselves on the NC LIVE site with no way to authenticate. To mitigate this circumstance, NC LIVE would store the libraries' proxy URLs and redirect a user based on the library they select from the dropdown menu. Once the user successfully authenticates using the local proxy, their IP will be recognized by the NC LIVE system, and they would be re-routed to the content.

Prerequisite: The library must have a local proxy to authenticate their users and provide a proxied URL to the NC LIVE website.

Advantages:

- Ability for NC LIVE to provide a path for users who come directly to NC LIVE, instead of their library's site.
- Low level of staff resource utilization to replicate or maintain the hand-off mechanism for all member libraries.

Challenges:

- Identifying and maintaining a list of libraries that provide a proxy service.

Notes: Federated ID management is an alternate path to a similar outcome.

Findings: Proxy hand-off and Federated ID work in conjunction with a locally mounted authentication option to close the circuit for member libraries that either a) do not distribute the NC LIVE password or b) would like to stop distributing the password because they have local methods of authentication. Statistics show that some of our libraries with high NC LIVE authentication failure rates actually run their own proxy or federated ID solution, but without a link between the two, end users are not provided with that option. Those with proxy servers or Federated ID capabilities view this option as having a high impact with relatively low barriers.

## **E. Federated ID management**

Description: NC LIVE runs a Shibboleth-2 service provider that can query a user's parent institution for authentication and return the user to NC LIVE.

Use case: When a user from an institution participating in a federation, like the NC Trust, selects their institution from the dropdown list in the NC LIVE login form, NC LIVE redirects the user to their institution's Shibboleth/Identity Provider (IDP) login page. Upon successful authentication, the user is directed back to the NC LIVE site or NC LIVE resources with the institution's Shibboleth attribute(s). Then, NC LIVE sets a session cookie to enable the use of the NC LIVE resources.

Prerequisite:

The library or library's parent institution needs to participate in a Federated ID management agreement like InCommon, and must operate a Shibboleth Identity Provider.

Advantages:

- Libraries have control over their authentication system.
- Deeper and more granular control of resources, especially helpful if users with different attributes have access to different services/content (such as undergraduates, graduate students, faculty, etc.)

Challenge:

- Currently only 5 NC LIVE member institutions participate in the NC Trust agreement, though many more have InCommon capabilities.

Notes: The authentication interface will be more familiar than using the NC LIVE password and will align with the campus single sign-on.

Findings: Proxy hand-off and Federated ID work in conjunction with a locally mounted authentication option to close the circuit for member libraries that either a) do not distribute the NC LIVE password or b) would like to stop distributing the password because they have local methods of authentication. Statistics show that some of our libraries with high NC LIVE authentication failure rates actually run their own proxy or federated ID solution, but without a link between the two end users are not provided with that option. Those with proxy servers or Federated ID capabilities view this option as having a high impact with relatively low barriers.

## **F. OpenID**

Description: With OpenID a user needs only provide their email address and password, and their identity will be confirmed by a third party identity provider. Some examples of providers include Google, Facebook, Yahoo, Microsoft, AOL, and MySpace.

Use case: When a user comes to the NC LIVE site to access resources, they will be provided with the choice of Open ID providers from which to choose. After the user is authenticated by the chosen OpenID provider, NC LIVE will set a session cookie to enable access to resources.

Advantages:

- Users can use a pre-existing web identity to authenticate to NC LIVE resources.
- NC LIVE can more easily link our resources in social sites like Facebook.
- OpenID plugin is available for Drupal.

Challenges:

- Will be difficult to attribute the usage to the library they belong to without a referral URL from that library, or asking the user to choose from a menu of libraries.
- Auditing the validity of the affiliation with the parent library will be difficult without further checks which increases the friction in this approach.

Findings: User created accounts, and by extension OpenID is seen as a potentially appealing option from an end user perspective, but with so little information on how this would be implemented or what the flow would look like for an end user, it was difficult to determine whether this would be seen as a significant improvement over other options.

## **G. ILS connectors:**

Description: Develop a connector that uses an ILS authentication token to access NC LIVE resources.

Use case: When a patron from a library using ILS authentication selects their institution from the dropdown list on the NC LIVE login page, NC LIVE will redirect their browser to their library's ILS authentication page. After successfully authenticating using the ILS credentials (library card and PIN), the user will be redirected back to the NC LIVE site or the selected NC LIVE resource with the appropriate authentication token. In addition, NC LIVE will set a session cookie to access NC LIVE resources.

Prerequisite: The library must use an ILS system that enables remote authentication services.

Advantages:

- While this approach provides a similar end-user experience to EasyOn card matching, a library does not need to have a matching pattern to participate.
- Deeper control of access to resources, especially helpful if users with different statuses should not be provided access (for example patrons that owe fines)

Challenges:

- The diversity of ILS systems in use by our member libraries may be a problem for the scalability of this method (requires more investigation).
- Library does need technical staff to assist in implementation.

Findings: Having NC LIVE interrogate a local ILS to authenticate users was seen as potentially problematic to libraries, as vendors may charge additional fees for this service to the libraries. In addition, there was question whether maintaining these linkages may be cumbersome for the NC LIVE staff. An initial pilot using the local ILS to authenticate through an NC LIVE proxy server would enable NC LIVE staff to better determine the feasibility of this approach.

### **Section 3: Authentication Service**

The following section outlines methods by which NC LIVE will provide authentication services to facilitate authorization methods.

Each section consists of a description, use case, prerequisites, advantages/challenges, notes, and recommendations. The methods were identified assembled and endorsed by staff and members of the joint Technical Advisory Committee / Web Advisory Committee

## **Hosted Proxy**

Description: A hosted proxy service would enable a local library to leverage the power and simplicity of a proxy server without having to start or maintain it themselves. The NC LIVE server site employs a proxy service to connect remote users to vendor resources. This service can be reconfigured to include electronic resources purchased directly by a library, thus providing uniformity to the patron experience.

Use case: When a remote user clicks on a resource link (regardless of whether purchased by NC LIVE or the local library), the patron will be routed to the NC LIVE hosted proxy service. NC LIVE will authenticate the user through one of the above authorization methods. After successful authentication occurs, the user will be sent to the desired resource.

Prerequisite: Libraries must license one or more non-NC LIVE resources. The library must also use NC LIVE's current authentication method for a portion of their logins. Libraries must have the ability to update the links on their website to reflect the new URLs provided by NC LIVE.

Advantages:

- Users will be authenticated to all of the electronic resources in a consistent manner.
- NC LIVE staff will handle all technical maintenance of the proxy server.

Challenge:

- The member library will need to be able to make changes on their website to link(s) to use hosted proxy services.
- Member library staff will need to communicate to NC LIVE staff when new resources are added, changed, or dropped to ensure proper functioning of the proxy service.
- Scalability and sustainability on behalf of NC LIVE; investigation and pilot may be needed to determine.
- NC LIVE staff will need to maintain all vendor resource links to be proxied.

Notes: This service is already being piloted with Charlotte Mecklenburg Library. NC LIVE staff are currently in discussion with Southern Pines Public Library to determine the feasibility of assisting them in their implementation of a local federated search product. NC LIVE staff will assess the impact and scalability of the project.

Findings: Hosted proxy was a compelling option for all of our Communities of Interest. While roughly one-third of member libraries run their own proxy servers (see appendix), hosting and maintaining them requires ongoing staff and technology support among competing technology demands. Member libraries with proxy servers view them as vital to providing appropriate access to online resources, but face challenges with implementation including set-up, configuration, customization, and troubleshooting.

#### **Section 4: Other Considerations**

Initial discussion contained two additional options that were determined to have an excessive risk-to-impact ratio, and were dropped from consideration by the TAC/WAC. The two options were:

- **Embedded Password:** In this option, links would be provided to member libraries for NC LIVE resources. Those links would contain the NC LIVE password in the URL, allowing libraries to post those links to web pages secured by local authentication methods.
- **Learning Management System Connectors (LMS):** This option would have required NC LIVE staff to work closely with member libraries, and LMS administrators to allow authentication using the end users' LMS login credential.

## **Next Steps**

After careful consideration of the options identified in this report, the TAC/WAC endorsed moving forward with the following in order to extend access and increase use:

- 1) Prioritize projects based on anticipated impact to member libraries and their end users.
- 2) Identify additional research that needs to be completed to sufficiently scope pilot projects for maximum impact.
- 3) Create project plans for the first round of projects, and schedule them based on the anticipated resources available to deliver a successful project.
- 4) Enlist volunteer pilot libraries for relevant projects.

## **Appendix**

## **Potential Pilot Libraries**

The list of pilot libraries was compiled based on a representative sample of all libraries (all four COIs representing all of our geographic regions). Potential pilot libraries fit at least one of the following criteria:

- a. Lower than average usage of NC LIVE resources based on their peers
- b. High authentication failure rate using the current NC LIVE methods
- c. Actively using NC LIVE authentication methods in conjunction with the use of a proxy server.

### **Public Libraries:**

Avery-Mitchell-Yancy Public: High Failure/Low Usage

Iredell County Public: High Failure/Average Usage/Proxy Library

Fontana Regional Public: Average Failure/Low Usage

Southern Pines Public: High Usage/Proxy Library

Charlotte Mecklenburg Public

### **Community Colleges:**

Rockingham Community College : High Failure/Average Usage/Proxy Library

Wake Technical Community College: High Failure/High Usage

Davidson County Community College: High Failure/Low Usage

Alamance County Community College: High Failure/High Usage

Vance-Granville Community College: Average Failure/Low Usage

### **Independent Colleges:**

Mount Olive College: High Failure/High Usage/Proxy Library

Montreat College: High Failure/High Usage/Proxy Library

Elon University: High Failure/Low Usage/VPN

Belmont Abbey College: High Failure/Average Usage

### **UNC:**

NC Central University: High Failure/Low Usage/VPN

UNC-Charlotte: High Failure/Average Usage/Proxy

UNC-Pembroke: High Failure/Low Usage/Proxy

NCSU: High Failure/High Usage/Proxy

## **NC LIVE Libraries with Proxy Servers**

The following libraries are known to provide proxy services locally. As this information is somewhat difficult to attain, there may be some libraries missing from the list.

### Community Colleges

Asheville-Buncombe Tech Community College  
Blue Ridge Community College  
Cape Fear Community College  
Catawba College  
Central Piedmont Community College  
College of the Albemarle  
Guilford Technical Community College  
Rockingham Community College  
Surry Community College  
Wayne Community College

### Independent Colleges & Universities

Barton College  
Belmont Abbey College  
Campbell University  
Chowan University  
Davidson College  
Gardner-Webb University  
Guilford College  
High Point University  
Johnson C. Smith University  
Lees-McRae College  
Lenoir-Rhyne University  
Mars Hill College  
Meredith College  
Methodist University  
Montreat College  
Mount Olive College  
NC Wesleyan College  
Peace College  
Salem College  
Shaw University  
Wake Forest University  
Warren Wilson College  
Wingate University  
Greensboro College  
Pfeiffer University

Public Libraries

Lee County

New Hanover County Public

Pender County Public

Public Library of Charlotte & Mecklenburg County

Randolph County Public

Southern Pines Public

Wayne County Public

University of North Carolina

Appalachian State University

East Carolina University

Elizabeth City State University

Fayetteville State University

NC A&T State University

NC State University

UNC-Asheville

UNC-Chapel Hill

UNC-Charlotte

UNC-Greensboro

UNC-Pembroke

UNC School of the Arts

UNC-Wilmington

Western Carolina University

Winston-Salem State University

**Total Validations by COI and Percentage of Failures**

| <b>Totals Aug 2009-Jan 2010</b> |                |                |                       |                            |
|---------------------------------|----------------|----------------|-----------------------|----------------------------|
| <b>COI Name</b>                 | <b>Success</b> | <b>Failure</b> | <b>Total Attempts</b> | <b>Percentage Failures</b> |
| <b>Com</b>                      | 106931         | 29611          | 136542                | 22%                        |
| <b>Pub</b>                      | 161716         | 21907          | 183623                | 12%                        |
| <b>UNC</b>                      | 5021           | 4268           | 9289                  | 46%                        |
| <b>Ind</b>                      | 19769          | 7092           | 26861                 | 26%                        |

| <b>Totals Aug 2010-Jan 2011</b> |                |                |                       |                            |
|---------------------------------|----------------|----------------|-----------------------|----------------------------|
| <b>COI Name</b>                 | <b>Success</b> | <b>Failure</b> | <b>Total Attempts</b> | <b>Percentage Failures</b> |
| <b>Com</b>                      | 95585          | 35455          | 131040                | 27%                        |
| <b>Pub</b>                      | 105765         | 23789          | 129554                | 18%                        |
| <b>UNC</b>                      | 3924           | 3518           | 7442                  | 47%                        |
| <b>Ind</b>                      | 4563           | 6917           | 11480                 | 60%                        |

**Total Validations for August and September 2010 by COI**

| COI | Aug-10            |                | Sep-10            |                | Aug 10 - Jan 10   |                   |
|-----|-------------------|----------------|-------------------|----------------|-------------------|-------------------|
|     | Total Validations | Percent Failed | Total Validations | Percent Failed | Total Validations | Percentage Failed |
| Pub | 15455             | 26.7%          | 15386             | 30.8%          | 129554            | 18%               |
| Com | 7976              | 39.3%          | 21122             | 36.5%          | 131040            | 27%               |
| Ind | 1266              | 45.7%          | 2768              | 70.8%          | 11480             | 60%               |
| UNC | 1582              | 25.2%          | 1582              | 51.3%          | 7442              | 47%               |