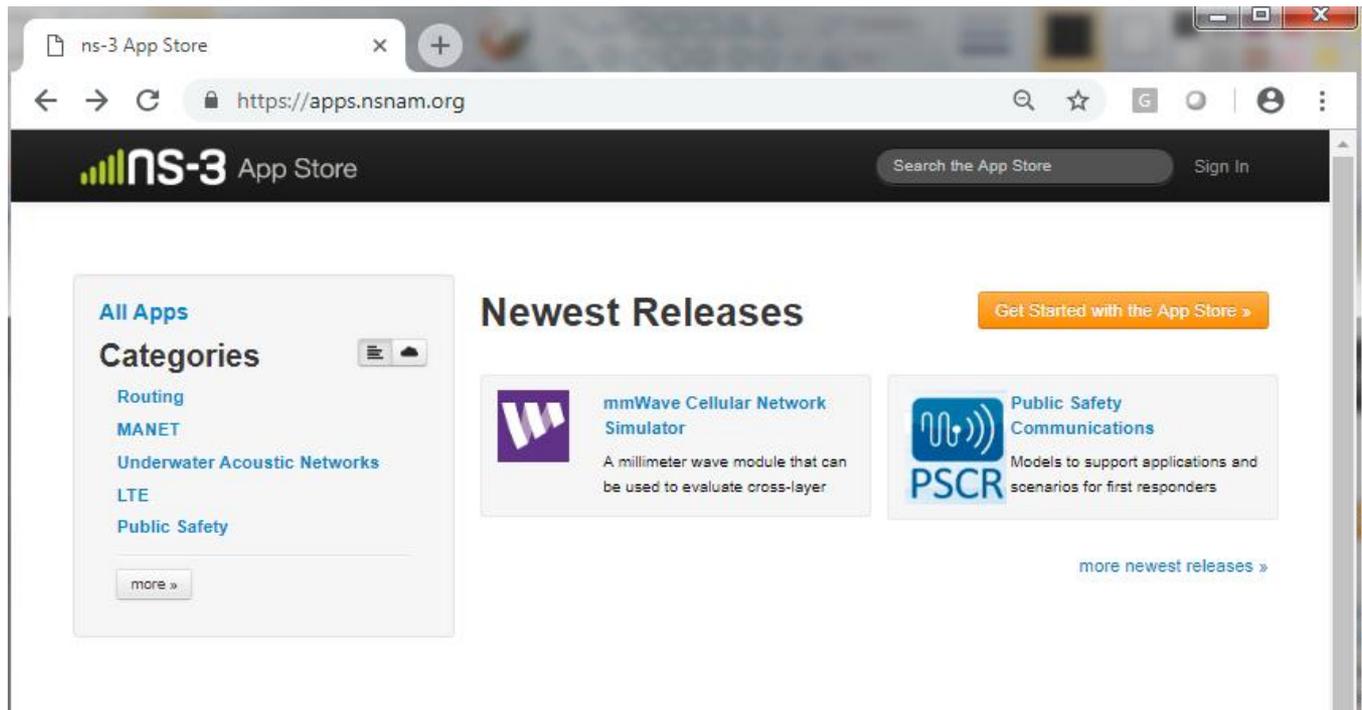# ns-3 App Store Overview

September 2018

What is the ns-3 app store?

- The ns-3 app store is a supplemental web site allowing users to find and learn about extensions to the mainline ns-3 releases

Motivations for the ns-3 app store

- Provide a central place for structured information about ns-3 extensions

- Move the ns-3 project towards a more federated development environment, with a smaller core

- Provide guidelines to reduce the software incompatibility between various extensions

- Allow ns-3 module developers to publish their own releases on their own timetables
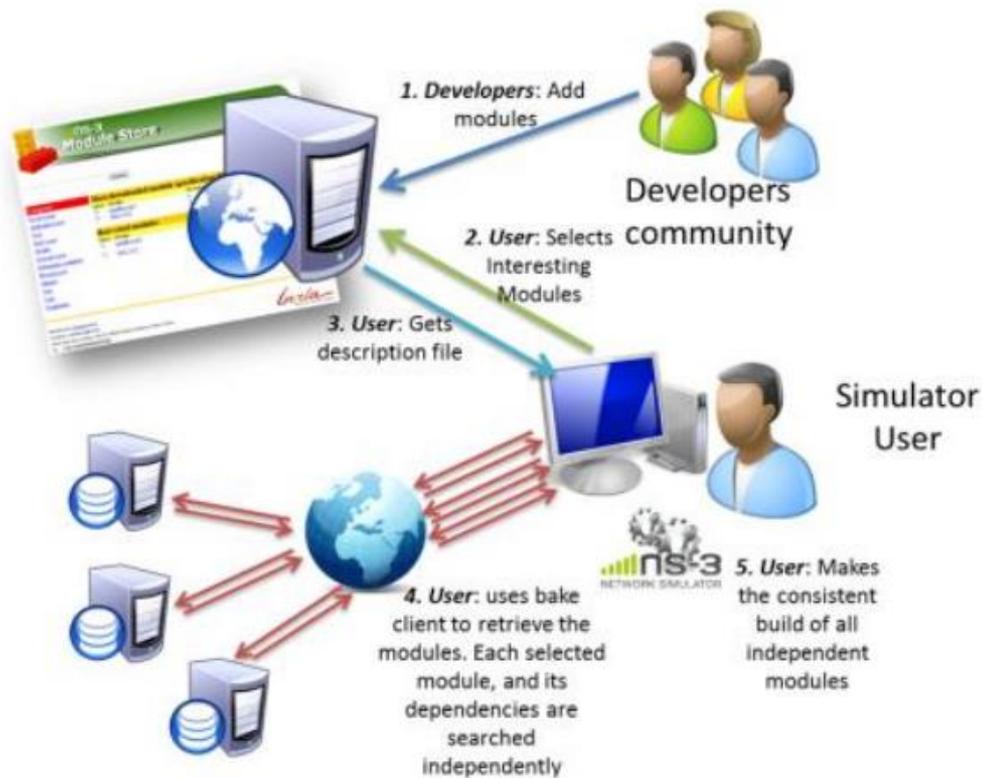
Terminology

An ns-3 **'module'** is a collection of models built as a shared library and linked with ns-3 main programs

- In ns-3, these are organized as directories under the 'src/' directory; e.g. 'olsr' and 'wifi'

- Additional modules can be added to the 'contrib/' directory

- The '**app store**' is the front-end Web site that enables third-party module providers to publish and advertise their modules

- Modules are meant to extend an existing ns-3 release

An ns-3 **'fork'** is a modified version of the ns-3 mainline release or development code

- One or more mainline modules of ns-3 are modified in a fork, along with possibly some additional modules

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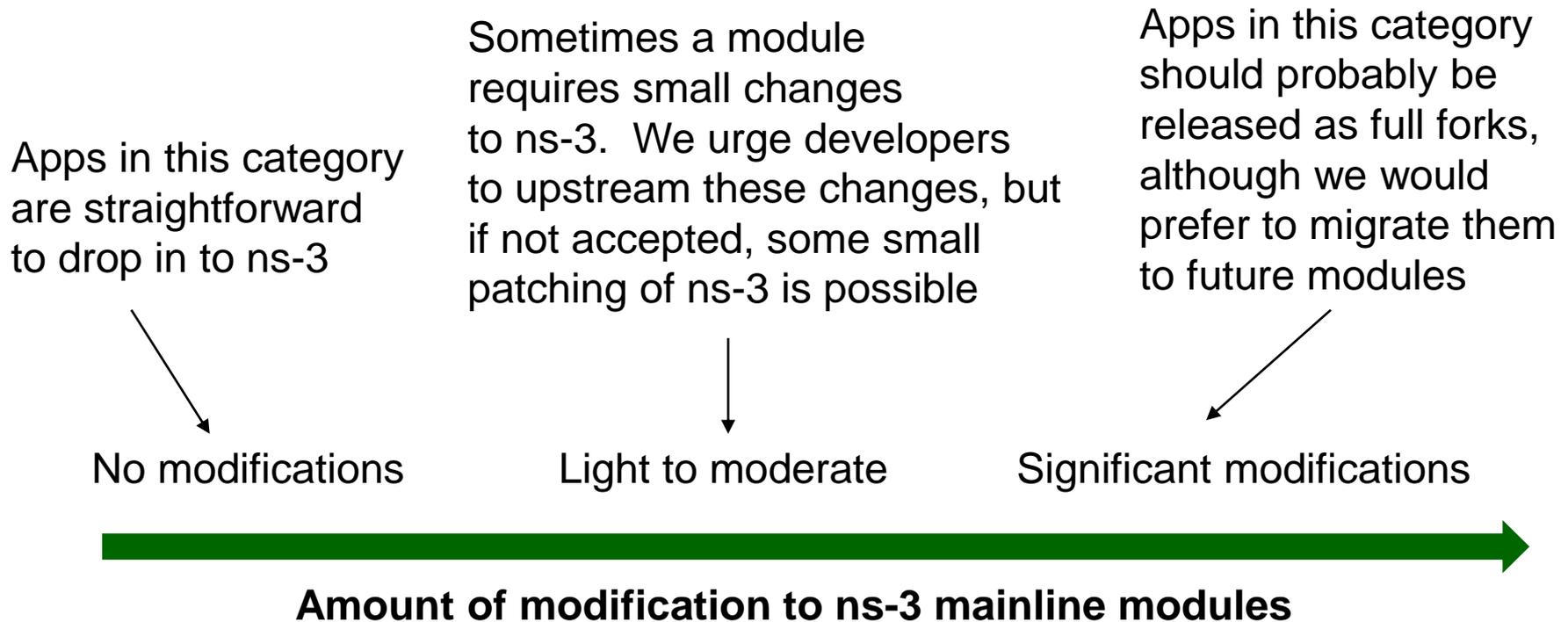NETWORK SIMULATOR

Workflow

1. *Developers*: Add modules

2. *User*: Selects Interesting Modules

3. *User*: Gets description file

Developers community

Simulator User

4. *User*: uses bake client to retrieve the modules. Each selected module, and its dependencies are searched independently

5. *User*: Makes the consistent build of all independent modules

Figure source: Daniel Camara, INRIA

Developers work with ns-3 maintainers to publish their extension (app) on the app store

Users can visit the app store to learn about the extension and to either download it directly or fetch it using the ns-3 bake build tool

Modifications to ns-3 releases

The app store is mainly designed to facilitate stand-alone modules, but we make allowances for some projects that require some changes to the mainline releases
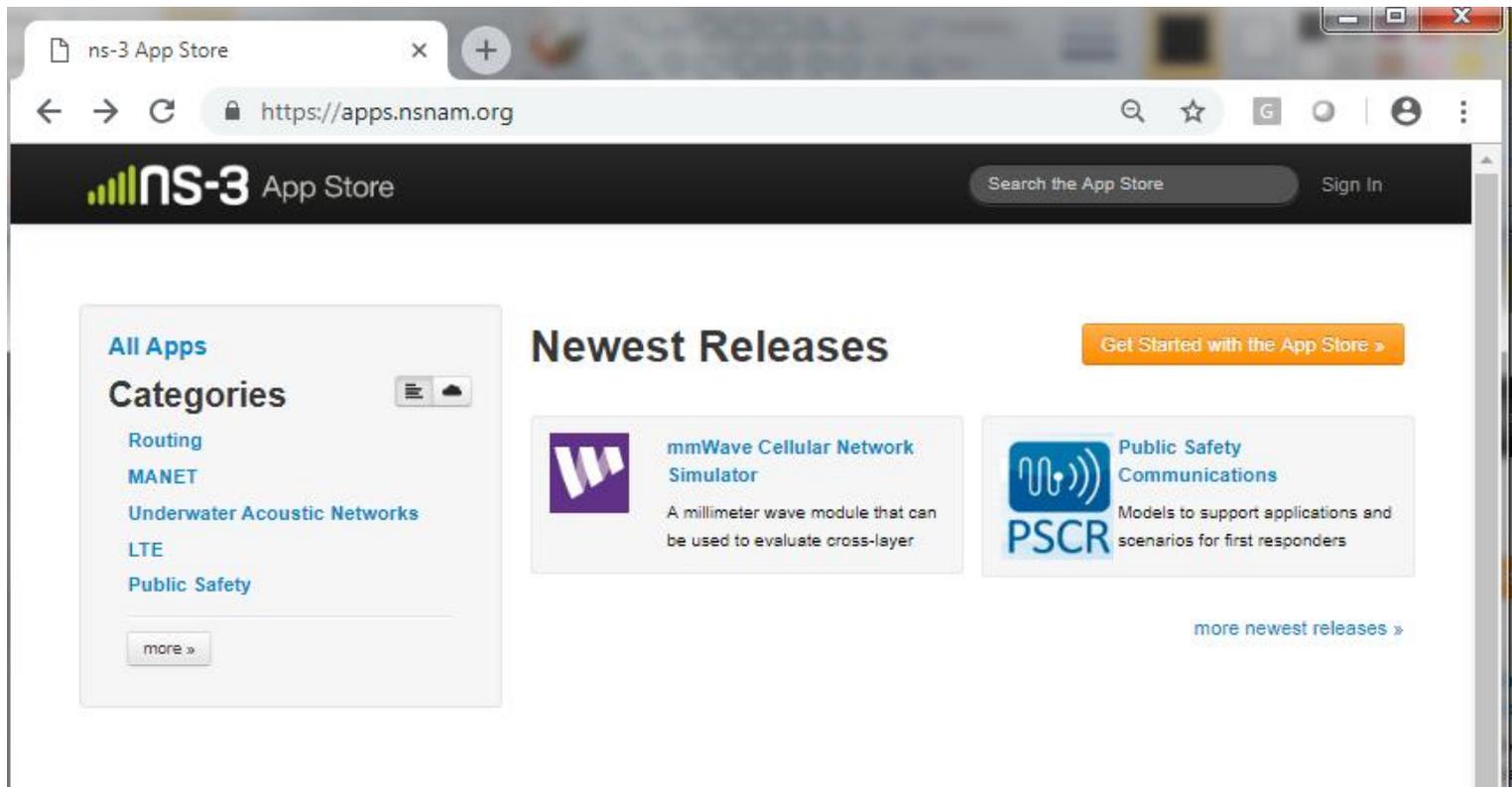
Apps in this category are straightforward to drop in to ns-3

Sometimes a module requires small changes to ns-3. We urge developers to upstream these changes, but if not accepted, some small patching of ns-3 is possible

Apps in this category should probably be released as full forks, although we would prefer to migrate them to future modules

No modifications   Light to moderate   Significant modifications

Amount of modification to ns-3 mainline modules

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Download options

- Users may download **source archives** from the app store page

- Alternatively, users may use the **bake build tool** to configure and fetch extensions, and download what is called a **modulespec** (XML description)
  - i.e., bake functions also as a package manager
  - bake can be used to deconflict version mismatches between modules
  - regression testing can also be driven by bake

Example walkthrough

- The main page lists recently published apps, app categories, and provides a search bar
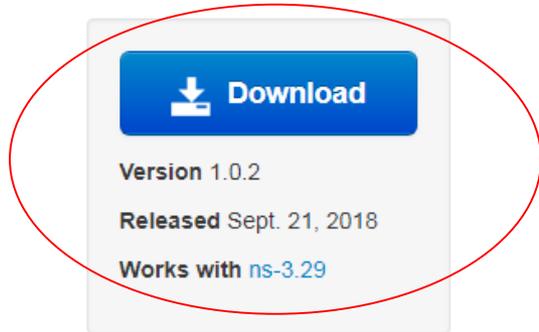
App main page

Tabs for details (screenshots), release history, installation instructions, and maintenance status

Resources menu for website, repository, issue tracker (etc.) links, and a Download button
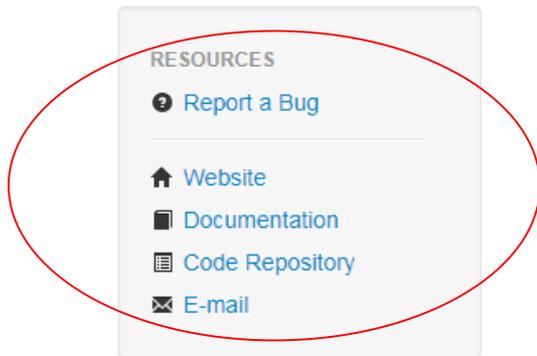
Resources menu

This ns-3 extension is a **separately maintained fork**.

Whether the app is a module extension or a fork (a complete variant of ns-3)

⬇ **Download**

Version 1.0.2

Released Sept. 21, 2018

Works with ns-3.29

Download button may link to a source archive or a release page. The latest version of the module is displayed with its release date and the version of ns-3 with which it is compatible.

RESOURCES

? Report a Bug

🏠 Website
📖 Documentation
📇 Code Repository
✉ E-mail

The main links for users to follow to get more information or help with this module or fork

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Details

The Details tab provides a summary and citations related to the module

Release history

Releases tab lists all releases of the module, the compatible ns-3 version, and a Bakefile modulespec if available

Installation

Public Safety Communications

Models to support applications and scenarios for first responders

★★★★★ (2)

| Details | Release History | Installation | Maintenance | Development |

The Public Safety Communications repository is a self-contained ns-3 repository and follows the same installation process as the main release of ns-3.

The installation tab may list out any specialized installation steps or requirements (e.g. new library dependencies)

This ns-3 extension is a separately maintained fork.

⬇ Download

Version 1.0.1

Released Sept. 10, 2018

Works with ns-3.29

RESOURCES

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🏠 Website
📖 Documentation
🗔 Code Repository
✉ E-mail

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Maintenance

The maintenance tab informs users as to who is maintaining this module, and where to get some support on usage or problems encountered

Public Safety Communications
Models to support applications and scenarios for first responders

★★★★★ (2)

| Details | Release History | Installation | Maintenance | Development |

Installation support:

Due to limited resources, we will provide assistance only for issues related to the installation of this code. We strongly recommend to install the standard version of ns-3 prior to installing this repository.

Link: https://www.nsnam.org/docs/tutorial/html/getting-started.html

Users can get support for issues related to ns-3 installation from the ns-3-users Google Group.

Link: https://www.nsnam.org/support/mailing-list/

Afterwards, the user can install this repository and report to us only the issues related to this repository's installation.

Bugs:

If you find a bug when running the provided scenarios, please report it, including detailed information about the scenario and error(s) observed, and how to reproduce.

Please report issues to psc_ns3@list.nist.gov

This ns-3 extension is a separately maintained fork.

⬇ **Download**

Version 1.0.1
Released Sept. 10, 2018
Works with ns-3.29

RESOURCES
🛈 Report a Bug

🏠 Website
📓 Documentation
🗔 Code Repository
✉ E-mail

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Development

The development tab describes how to develop further enhancements, and where to send modifications (such as pull requests)

Public Safety Communications
Models to support applications and scenarios for first responders

PSCR

★★★★★ (2)

| Details | Release History | Installation | Maintenance | Development |

Enhancements:

We welcome contributions to this module. To do so, please make a pull request against the psc-dev branch on the github repository. Please do not issue pull requests for new features against the release branches.

This ns-3 extension is a separately maintained fork.

⬇ **Download**

Version 1.0.1

Released Sept. 10, 2018

Works with ns-3.29

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📘 Documentation
🖼 Code Repository
✉ E-mail

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Versioning

- Module authors may make releases, based on their own numbering system

  - e.g. epidemic-routing 1.0, 1.1, etc.

- Each release should identify which ns-3 release (or releases) the module is compatible with

  - A new modulespec that specifies this should be generated and uploaded to the app store for each app release

- bake should fetch and build the module version compatible with the user's ns-3 release

modulespec example

key attributes are 'name', 'type' of 'ns-contrib', and
min_version for minimum ns-3 version

```
<configuration>
  <modules>
    <module name="epidemic-routing" type="ns-contrib" min_version="ns-3.27">
      <source type="git">
        <attribute name="url" value="https://github.com/tomhenderson/epidemic-
routing.git"/>
        <attribute name="module_directory" value="epidemic-routing"/>
      </source>
      <build type="none">
      </build>
    </module>
  </modules>
</configuration>
```

module_directory attribute declares how the module will be
named under the contrib/ directory

ns-3 releases

- ns-3 release managers will work with module maintainers during release testing to work out compatibility issues

  – modules that become unmaintained and outdated with the ns-3 releases will be flagged

  – Apps that are actively maintained will be included in ns-3 regression testing/continuous integration

- Depending on interest, future ns-3 releases may bundle apps with the core software release

  – similar in concept to Linux distribution 'spins'

How to contribute an app

- Contributor creates a public repository (recommended) or a file server to download a source archive

- ns-3 maintainer works with contributor to create a new app page and fill in the details
  - In general, this amounts to providing the list of data items shown in the previous slides
  - ns-3 maintainer will create the initial Bake XML modulespec

- ns-3 maintainer then creates an app store Editor account for the app store maintainer so that he or she can make future edits and post new releases, and turns it over to the Editor

How to contribute an app (example)

- Consider a standalone module that was created by the ns-3 'create-module.py' file and doesn't have new library dependencies for ns-3

  - For example, 'simple-wireless'

- The contributor should establish a repository (e.g. GitHub, GitLab, or Bitbucket) containing the module by itself

  - A clone or release of the repository should unpack to a standalone module directory, not the entire ns-3 source tree

- The contributor should then contact the ns-3 release manager to populate a new app page, review and test the code for compatibility, and prepare it for publishing

Contribution checklist

- Can the module be downloaded into the `contrib/` folder, and does it successfully build in debug and optimized modes?

- Is any Sphinx documentation available in the `doc/` directory?

- Are example programs and any regression tests provided?

- Is the module generally conformant to ns-3 coding style and published with a GPLv2-compatible license?

- Is there a numbering plan for this and future releases?

- Do you have a name and thumbnail icon for the app page?

- Do you have draft content for the various app store tabs?

- Does it require any patches to the rest of ns-3?

Please contact the ns-3 team about specific questions/concerns.

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FAQ

Q. Will ns-3 maintainers stop reviewing code contributions?

A. ns-3 maintainers will prioritize mainline code reviews but will still offer some review (especially at app publishing time). However, one goal of the app store is to help contributors avoid the bottleneck of waiting for maintainers to review large code contributions to the mainline.

Q. What happens if apps stop being maintained?

A. They will continue to exist for older versions of ns-3 but it will be up to future users to port them to new ns-3 versions

Q. Can contributors use the ns-3's main code server, Bugzilla, or wiki as resources for their modules?

A. We prefer that users establish separate trackers and accounts using code sites such as GitHub. Authors can use ns-3-users Google Group for answering email from users, or else establish their own mailing lists if the discussion load on ns-3-users starts to get high.

Current status

- As of September 2018, we have prepared two initial apps compatible with the recent ns-3.29 release: **public safety extensions for LTE**, and **millimeter wave models**
  - These are both of the 'fork' variety, although we would like them to eventually be standalone modules if their LTE integration can be improved
- We will be working with other module providers to continually add to the app store
  - Contact Tom Henderson (tomh@tomh.org) if interested

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Credits

- The app store, and the bake build tool to support it, was originated and initially developed by INRIA (Mathieu Lacage, Daniel Camara, Walid Dabbous) many years ago

- Abhijith Anilkumar developed the ns-3 app store website as a Google Summer of Code 2017 project
  - We thank the Cytoscape open source project for allowing us to reuse their similar Web framework

- Ankit Deepak made extensions to bake to support contributed modules