

A decorative geometric pattern covers the left half of the slide. It is composed of numerous small triangles in various shades of blue, green, and white, arranged in a complex, repeating pattern that creates a sense of depth and movement.

New base version, export control and distribution

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Serpent 1.1.X:

- ▶ Distribution by OECD/NEA Data Bank in 2009 and RSICC in 2010
- ▶ User registration and distribution of new updates by email

Serpent 2.1.X:

- ▶ Released in 2012 as a “beta version”, but the “test phase” eventually lasted 10 years
- ▶ Distribution by separate license to registered users of Serpent 1

The old practice was cumbersome, but still somehow manageable:

- ▶ Different license types for NEA and RSICC (single-site vs. single-user)
- ▶ Maintaining the user list became difficult as the community grew
- ▶ Different practices for countries outside NEA/RSICC distribution
- ▶ Exempt from export control, but other limitations were applied to some countries



Serpent distribution was put on hold in 2021, because of changes in export control regulations:

- ▶ According to new interpretation, Serpent is no longer exempt from export control
- ▶ Distribution to all organizations outside Finland now requires an export license from the Finnish foreign ministry
- ▶ Resuming the distribution required ~ 1 year of paper work, and some contracts are still being negotiated
- ▶ It was decided to discontinue the distribution of old versions (1.1.X, 2.1.X), and release a new base version

All users are encouraged to switch to Serpent 2.2, because the old versions are no longer maintained.

Standard research license

- ▶ Single-user license,¹ scope limited to non-commercial research and educational use
- ▶ Distribution by the OECD/NEA Data Bank, similar arrangement with RSICC being negotiated
- ▶ Pre-approved export license to EU member states, Australia, South Korea, Canada, Iceland, Japan, New Zealand, Norway, Switzerland, UK and USA²
- ▶ Requests from other countries involve separate export control process, which may take some time

Academic group license (“professor license”)

- ▶ Group license (unlimited number of users), scope limited to non-commercial academic use
- ▶ Intended for universities with large number of short-term users (reactor physics courses, student projects, theses, etc.)
- ▶ Bilateral contract with VTT, export control handled as part of the process
- ▶ One-time 3000€ processing fee

¹ NOTE: also the OECD/NEA license is now single-user type

² Because of a contract between NEA Data Bank and RSICC, the NEA may not distribute their codes to North America.

Commercial license

- ▶ Multi-user license, intended for commercial work
- ▶ License fee depends on the length of the contract and the number of users³
- ▶ Bilateral contract with VTT, export control handled as part of the process

Notes on bilateral contracts (academic group license and commercial license):

- ▶ The terms and conditions of the agreement are non-negotiable
- ▶ Some corporate lawyers have a tendency to “negotiate a better deal” by first rejecting the terms about liability, IPR, etc.
- ▶ VTT’s lawyers have never agreed to any such changes

Updates will be issued in regular intervals (every 12 months?), and distributed by OECD/NEA Data Bank or RSICC (standard research license), or by VTT (bilateral contracts).

³ In this context, “user” refers to number of simultaneous users. Individual using the code are not named in the contract.

What constitutes as commercial use?

The definition of commercial use is subject to some interpretation. It is easier to classify what is *clearly non-commercial use*:

Basic scientific research and educational use:

- Demonstration, exercises, etc. performed as part of university coursework
- Thesis work (when not carried out as part of other commercial work)
- Publicly funded and other research explicitly specified as non-commercial work (e.g. research carried out as part of Euratom projects)

Evaluation of feasibility for commercial use:

- Testing, benchmarking, etc. for the purpose of evaluating the practical feasibility of Serpent for its intended commercial use
- Familiarizing and learning to use the code

...

... and what is *clearly commercial use*:

Any use generating direct revenue:

- Consulting, contract work for a third party
- Training provided for a third party (excluding basic educational use)

Any use where Serpent forms a key part of the design, operation or maintenance process for operating reactors, fuel cycle or experimental facilities:

- Core design, criticality safety, radiation protection, etc. carried out for a commercial or research reactor
- Design of experimental facilities or individual experiments
- Verification / validation of production tools used for commercial work

Any use where Serpent forms a key part of the design process of new technology with TRL > 1:

- Design of new reactor types beyond the pre-conceptual design stage
- Design of components for fusion reactors, other experimental facilities and other technology beyond the pre-conceptual stage

For applications that are not clearly either, contact VTT (serpent@vtt.fi).

Serpent website was completely revised in May 2022:

- ▶ Content is now up-to-date
- ▶ New address <https://serpent.vtt.fi/serpent/> (old <http://montecarlo.vtt.fi> is redirected)

The discussion forum will soon be revised as well:

- ▶ Main content available to registered users only
- ▶ Old accounts deactivated (or deleted), new registration required
- ▶ Old content moved to an archive

Similar practices may be applied to Serpent wiki later.

VTT and Studsvik Scandpower (SSP) signed a memorandum of understanding on the development of a quality-assured version of Serpent:

- ▶ Based on the NQA-1-2015 standard
- ▶ Aim is to better enable using Serpent for the licensing analyses of nuclear reactors, including SMRs and emerging technologies
- ▶ In practice: development of a parallel version “Serpent-SSP”, integrated into Studsvik’s computational framework
- ▶ Development and distribution of the non-NQA version remains at VTT
- ▶ Collaboration also aims to expand the use of Serpent to new fields, such as medical physics

More about this topic in SSP’s presentation.

Thank you for your attention!

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<https://serpent.vtt.fi/serpent>