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INTRODUCTION TO FLR

FLR Core Team

December 2, 2010



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NEED FOR FLR

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”After the people of Babel sought to build a tower to heaven, the Lord God devised a plan (Genesis 11: 4-7). ’Behold the people is one; and they all have one language; and this they began to do; and *now nothing will be restrained from them, which they have imagined to do....* Let us go down, and there confound their language, that they may not understand one another’s speech.’ Italics highlight the prospects for accomplishment with a common language, if the scientific community could ever agree on one”

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"The cosmic plan for **confounding software languages** seems to be working remarkably well among the community of quantitative fishery scientists!"

GOALS

To **promote and generalize** the use of **good quality, open source, flexible software** in all areas of quantitative fisheries research and management advice, with a key focus on Management Strategies Evaluation.

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- ▶ Support the development of new models and methods
- ▶ Promote the distribution of new models and methods to a wide public.

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- ▶ FLCore version 1.4 - 2007
 - ▶ Stable, full of treats and joy

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FLR 1.4 - *The Golden Jackal*



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- ▶ 2007-2009: The Silk Road to version 2
 - ▶ New FLQuant with 6 dimensions: uncertainty in structure
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 - ▶ New classes: FLModel
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- ▶ FLCore version 2.0 - January 2009
 - ▶ 2.2: actual stable version
 - ▶ 2.3: under development

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FLR 2.2 - *Swordfish Polka*

TOM WAITS

SWORDFISHTROMBONES



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- ▶ **extendibility** - through the provision of tools that are ready to be personalized and adapted.

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FLR's framework **facilitates and promotes collaboration** within and across disciplines, e.g. biological, ecological, statistical, mathematical, economic, and social. In particular it ensures that new modelling methods are widely available, so that alternative fisheries management strategies and procedures can be evaluated for their robustness to uncertainty before implementation.

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FLR is distributed with an **open source** license and encourages all packages to be distributed under open source licenses in order **to promote transparency and technology transfer** between disciplines and researchers.

GNU PROJECT

([HTTP://GNU.ORG](http://gnu.org))

"Free software is a matter of liberty, not price."

free = free speech
free != free beer

COLLABORATION AND OPEN SOURCE

"I think the real issue about adoption of open source is that **nobody can really ever 'design' a complex system.** That's simply not how things work: people aren't that smart - nobody is. And what open source allows is to not actually 'design' things, but let them **evolve**, through lots of different pressures in the market, and having the end result just **continually improve**"

Linus Torvalds

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- ▶ FLR Core Team, aka "*Les misérables*", code, maintenance, tests, documentation, etc.

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CUT THE CRAP, WHAT IS FLR?

**A working environment for quantitative fisheries
analysis in R!**

CUT THE CRAP, WHAT IS FLR?

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- ▶ Tools used by managers (hopefully) as well as scientists
- ▶ With many applications including:
 - ▶ Fit stock-recruitment relationships,
 - ▶ Model fleet dynamics (including economics),
 - ▶ Simulate and evaluate management procedures and HCRs,
 - ▶ More than just stock assessment (VPA, XSA, ICES uptake)
 - ▶ etc....

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R AND FLR

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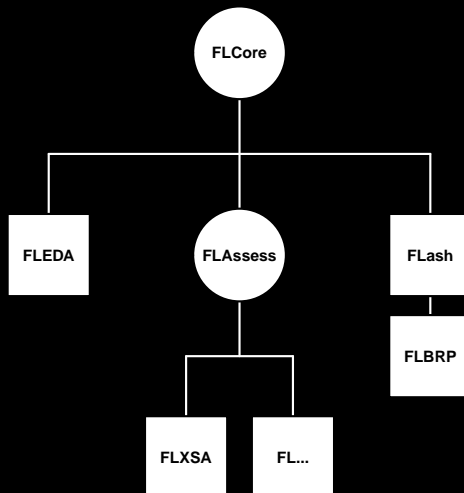
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- ▶ Open source
- ▶ Links with compiled languages like fortran, C / C++ code for speed
- ▶ Easily extendable in the form of 'packages'

PACKAGES



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- ▶ Inheritance used to extend and create new classes (FLSR inherits from FLModel)
- ▶ Classes can be members of other classes (most FLR classes include FLQuants as members)

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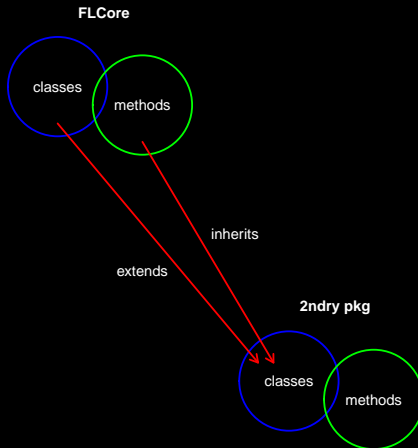
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- ▶ Link objects to create simulations - Lego blocks (MSE example)

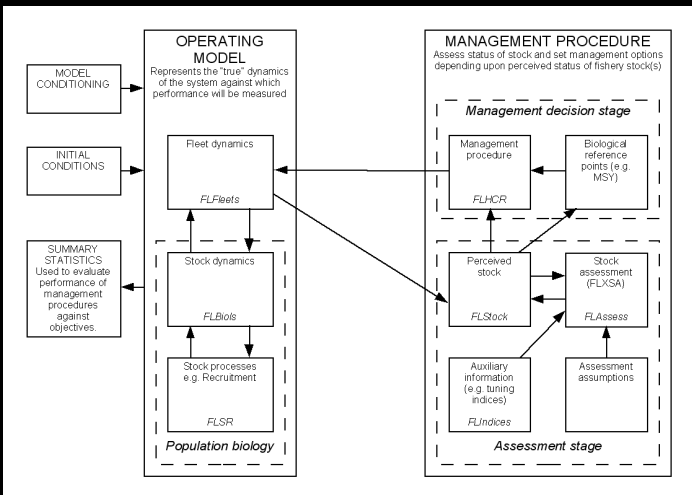
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- ▶ Link objects to create simulations - Lego blocks (MSE example)
- ▶ Learning curve: trade off between flexibility and simplicity (no black boxes and no handle turning)

FLR & S4



MSE - THE LEGO BLOCK APPROACH



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