RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
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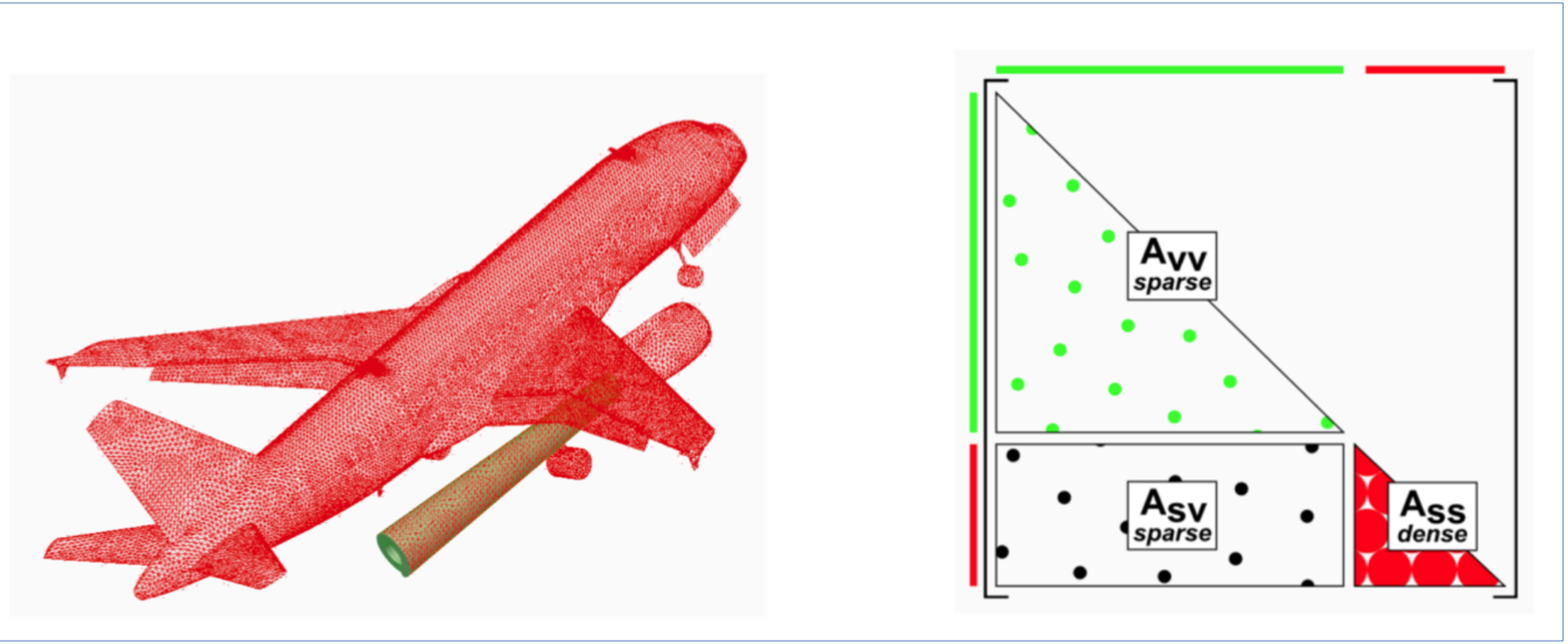
Inria

COMPOSE

Équipe **CONCACE**

Compose
l’algèbre Linéaire Composable



simulation parallèle en **aéro-acoustique** (Airbus – CERFACS - Inria)

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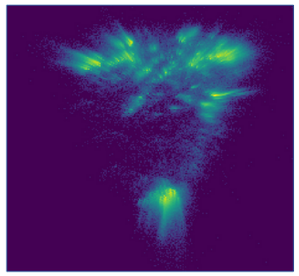
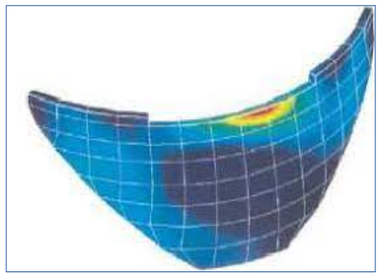
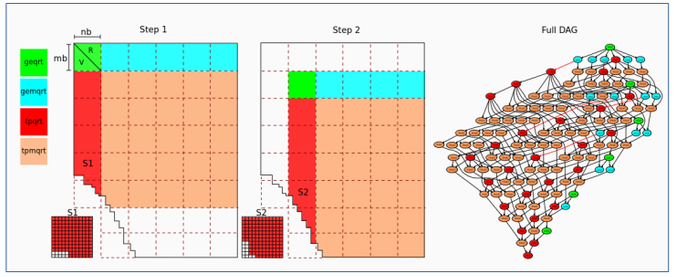
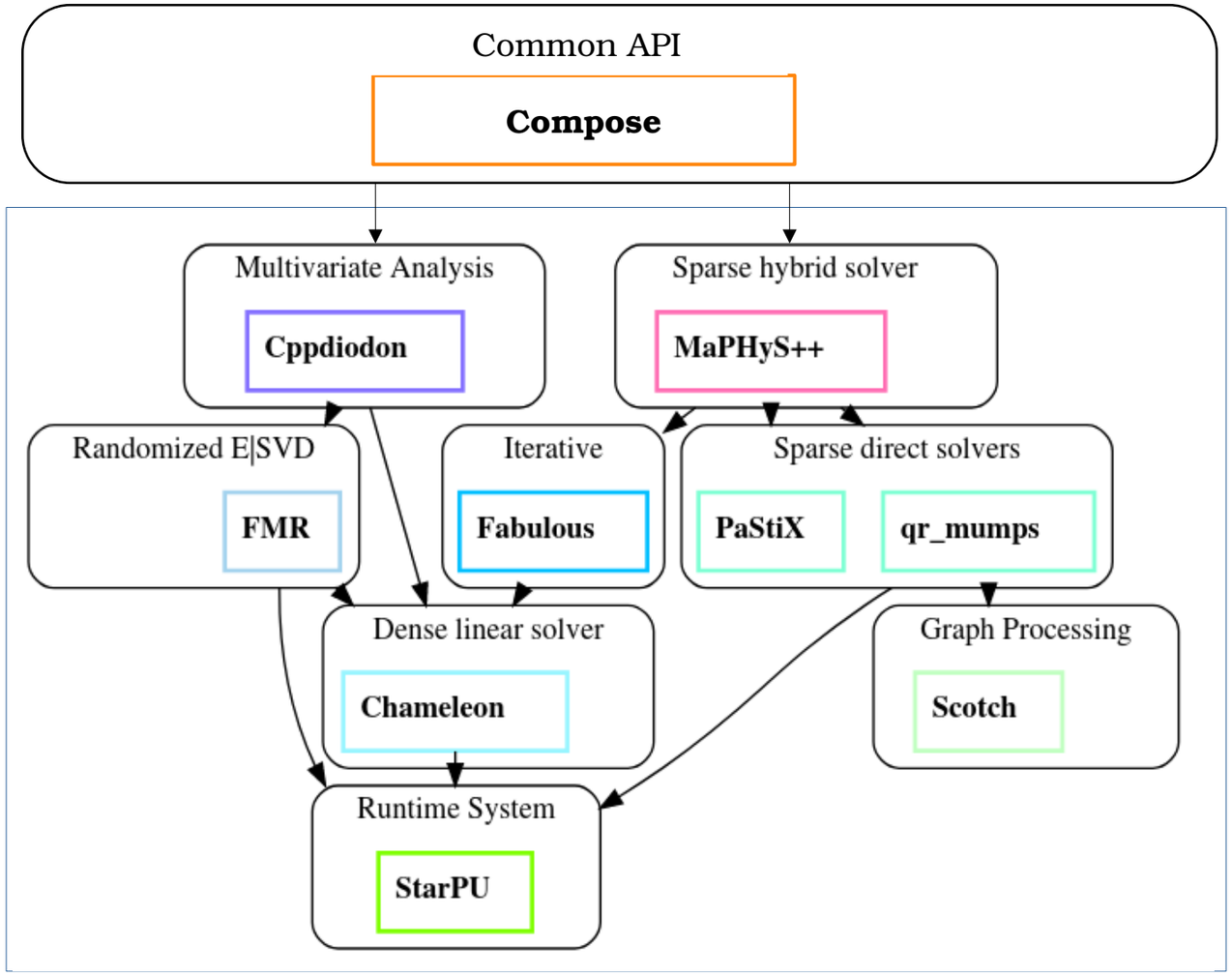
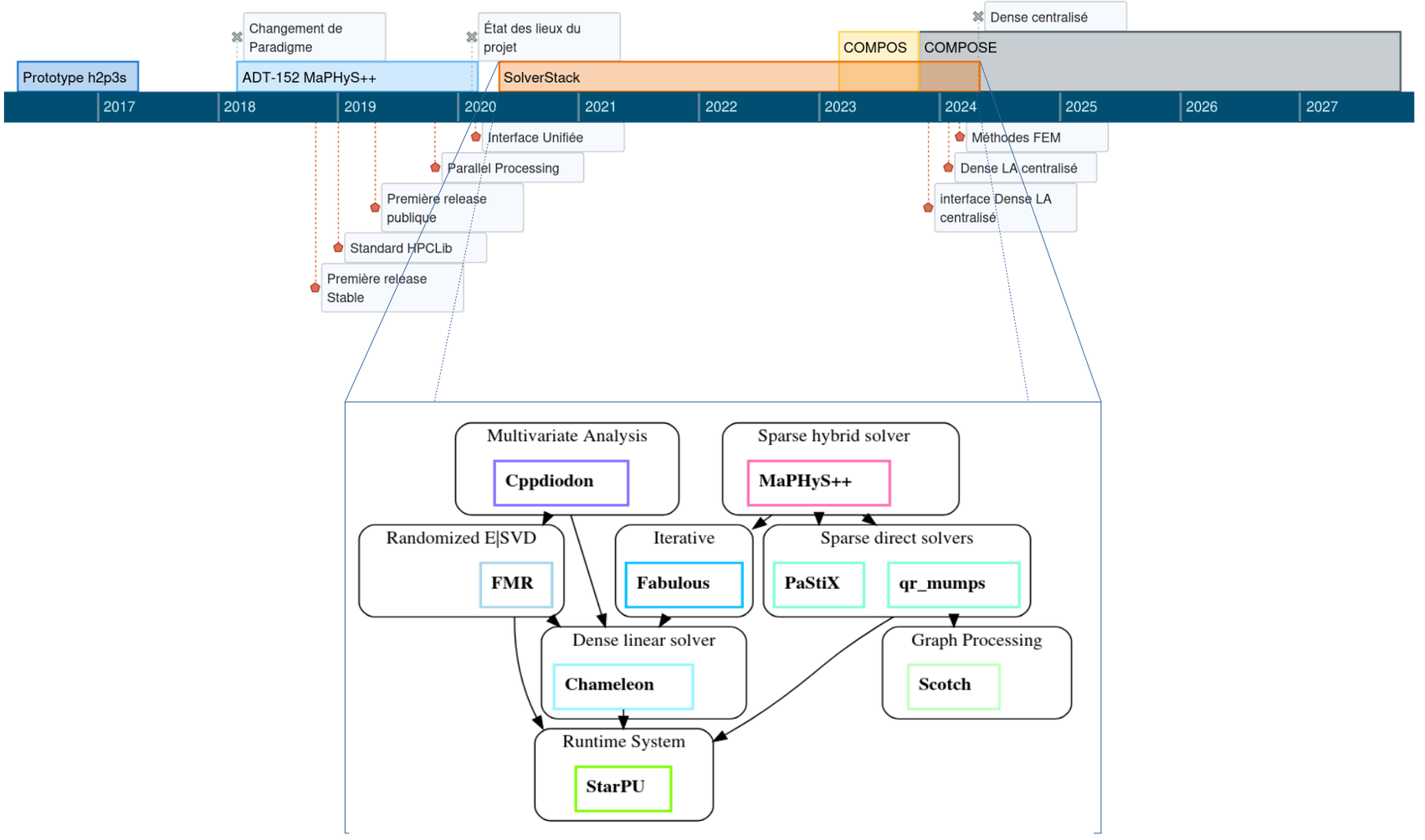








Compose
10 ans de consolidation logicielle



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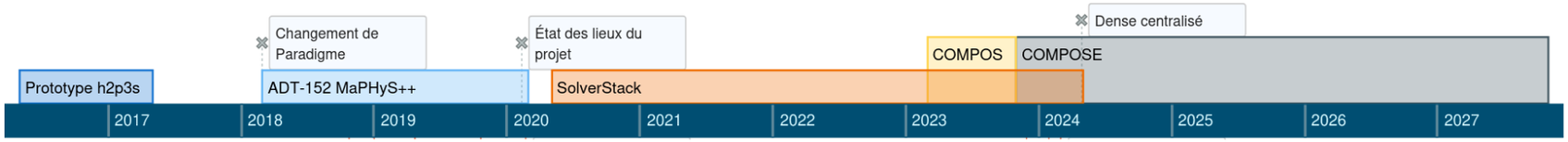

pastix | ScalFMM | Chameleon (magma-morse) | m@phys++ | StarPU | Fabulous | pt-scotch

Objectif: CMake « à la SuiteSparse »
Base technologique: ExternalProject_Add()
Résultat: CMake commun, pratiques cohérentes - une distrib ?

Objectif: **Distribution commune** – 2 critères: *non root* usage + paquets propriétaires
Base technologique: CMake + spack
Résultat: CMake : Construction & détection (FindPackage [quarks, scotch, scalapack, petsc…])
spack : Définitions des variantes et gestion des dépendances
→ Uniformisation construction + déploiement pour les logiciels identifiés – processus qualité

Objectif: **Contrôle Continu de la qualité** pour les logiciels Inria
Base technologique: forge → gitlab + CI + SonarQube
Résultat: gitlab + CI : mise en œuvre des pratiques associées (branch, test, analyse, MR …)
SonarQube : qualité logicielle

Objectif: Intégration de Chameleon dans une application de ML - Passage à l'échelle
Base technologique: CMake + Guix + SVD
Résultat: Guix :résolution de la gestion des paquets propriétaires, flexibilité d'usage (with-source, with-git-url, substitution…)
SVD : utilisation d'une implémentation C++ HPC pour classification du vivant (Inrae)

Objectif: **Portail Commun de diffusion**
Base technologique: tout le travail précédent
Résultat: automatisation du process de release source, élaboration d'une vitrine commune (web, doc, perfs, support …)
packaging étendu : spack, guix, brew, « debian »

Projet : Morse
(**2013**)
Ingénieur : C. Castagnède *80%*

Projet :HPC Collective
(**2014-2016**)
Ingénieur : F. Pruvost *80%*

Projet : HPC Lib
(**2017-2018**)
Ingénieur : F. Pruvost *80%*

Projet : Gordon (2019-2020)
Ingénieur : F. Pruvost *80%*
Projet : Guix-hpc
(2019-2020)
Ingénieur : L. Courtes *80%*

Projet : Distrib (2020-2021)
Ingénieur : F. Pruvost *20%*
Projet : Guix-hpc
(**2020-2021**)
Ingénieur : L. Courtes *80%*

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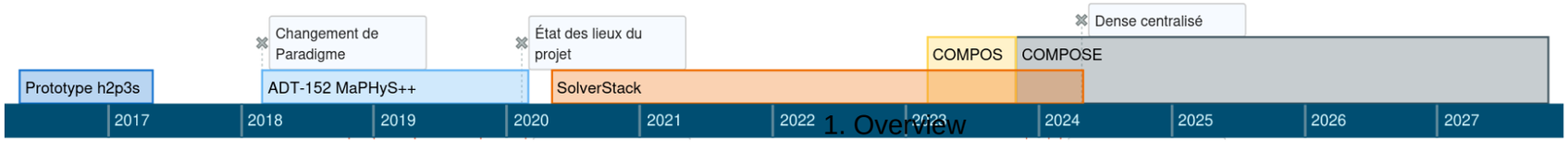
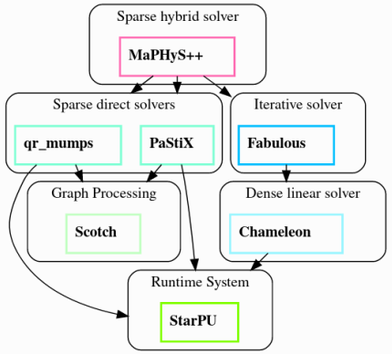


SI Inria cnrs université de BORDEAUX

SOLVERSTACK@INRIA BORDEAUX SOLVERS NEWS

Solverstack@Inria Bordeaux

Solverstack@Inria Bordeaux aims at providing a C/C++ and Fortran software distribution of parallel algorithms for computing dense and sparse linear algebra and for solving linear systems with factorization techniques LL^T, LU, QR, Least Squares, SVD, EVD. One of the main objective is the *portability of performances*, from labtops to supercomputers. The softwares are mainly developed by researchers and engineers working in, or in strong collababoration with, Inria joint project-teams with Bordeaux INP, Bordeaux University and CNRS (LaBRI UMR 5800) HiePACS, Storm and TADaaM located at Inria Bordeaux Sud-Ouest.



1. Overview

DISTRIB

Direct and Iterative Solvers on Top of Runtimes at Inria Bordeaux

1. Overview

DISTRIB aims at providing a C/C++ (Fortran) software distribution of parallel algorithms for computing dense and sparse linear algebra and for solving linear systems with factorization techniques LL^T (Cholesky), LU, QR, least squares, SVD, EVD. One of the main objective is the **portability of performances**, from a labtop to any supercomputer. The softwares are mainly developed by researchers and engineers working in, or in strong collababoration with, Inria project teams TADaaM, Storm and HiePACS located at Inria Bordeaux Sud-Ouest.

DISTRIB is actually a collection of software libraries with some dependencies between them. This software collection gathers:

- graphs partitioning and sparse matrix ordering with **PT-Scotch**,
- tasks scheduling with the **StarPU** runtime system,
- linear algebra on dense matrices with **Chameleon**,
- linear algebra on sparse matrices with **PaStiX** and **qr_mumps**,
- iterative solver **fabulous**,
- hybrid direct/iterative solver based on algebraic domain decomposition techniques with **MaPHyS++**.

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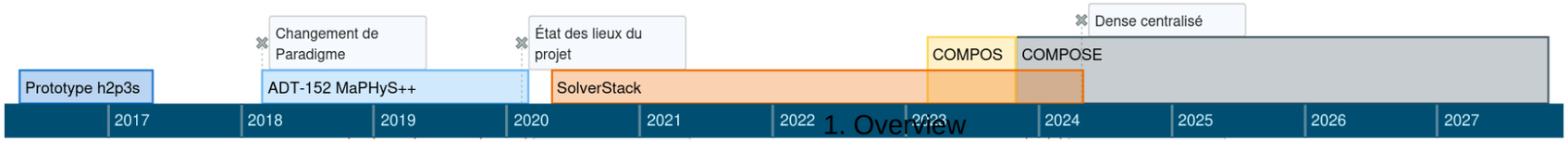

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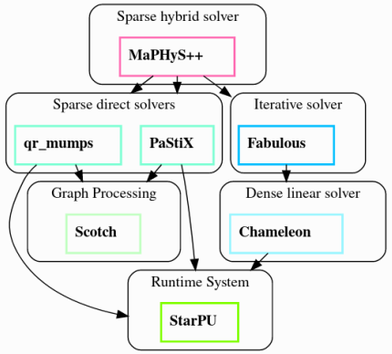

2. News

- 06/10/2021: first content of the common website showcase for *Solverstack* available at https://solverstack.gitlabpages.inria.fr/.
- 16/08/2021: new **DISTRIB** website under construction.
- 26/07/2021:
  - Update Brew, Guix and Spack packages
  - first release of Maphys++ 1.0.0
- 21/05/2021:
  - new brew repository for MacOSX.
  - new debian/ubuntu packages recipes
- 21/04/2021:
  - modernization of CMake projects: Scotch, hqr, spm, Pastix, Chameleon, Scalfmm, Fabulous
  - new macOSX virtual machine available for CI tests
  - Spack and Guix packages update
- 21/12/2020: modernization of Morse CMake (common detection modules).
- 18/09/2020: kickoff meeting.

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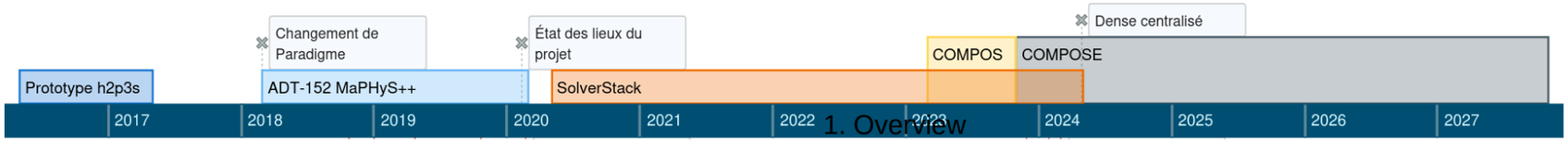

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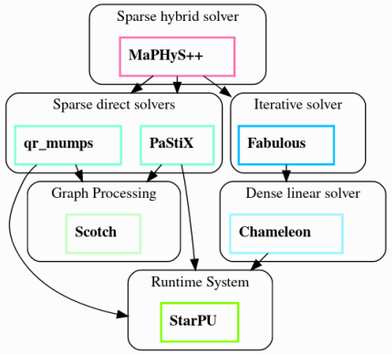

3. Download & Install methods

Depending on how much you need to tune the library installation we propose several solutions.

1. You just want to have a try, to see if it can be installed well on your system, what are the performances on simple cases, run the examples, or simply use the last stable version: we recommand to use one of our packages, .deb ones for those who work on a Linux Debian or Ubuntu distribution, Guix or Spack on other Linux systems, Brew on macOS.
2. You want to use it but you need a change somewhere in the stack like considering another version (git branch), change the default BLAS/LAPACK or MPI, use your favorite compiler, modify some sources: you may try with Guix or Spack because these package managers allow to build from sources and thus many options can be changed dynamically (command line), or directly build from source with the native build system of the library (Makefile, GNU autotools, CMake) following the procedures described in the installation guide of the library, cf. 4.
3. You need a tool for reproducibility of your experiments: Guix is recommended.

Git	Release source	Debian/Ubuntu	Brew (Mac)	Guix (Linux)	Spack (Linux/Mac)
Scotch	6.1.1	lib[pt]scotch-dev	brew-repo	[pt-]scotch	scotch
StarPU	1.3.8	libstarpu-dev	brew-repo	guix-repo	spack-repo
Chameleon	1.1.0	chameleon	brew-repo	guix-repo	spack-repo
PaStiX	6.2.1	pastix	brew-repo	guix-repo	spack-repo
qr_mumps	3.0.4	qrmumps	brew-repo	guix-repo	spack-repo
fabulous	1.1.1	fabulous	brew-repo	guix-repo	spack-repo
MaPHyS++	1.0.0		brew-repo	guix-repo	spack-repo

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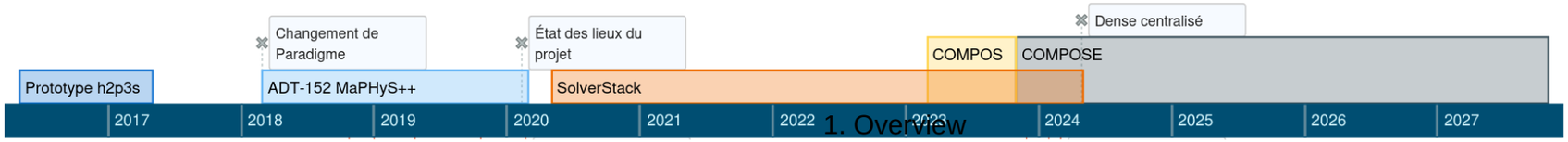

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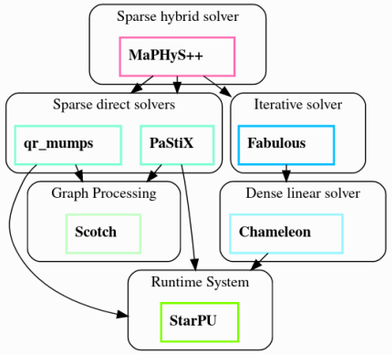

4. Quick Start guides

Here is a table of useful links to get details about installing, using and some benchmarks:

	Installation	User's guide	Benchmarks
Scotch	INSTALL.txt	pdf	
StarPU	html	html	html
Chameleon	html see 5.	html see 6.	html see 7.
PaStiX	html	html	
qr_mumps	org		
fabulous	html	html	org
MaPHyS++	org	html	html

We give here quick start examples about libraries usage once they have been installed.

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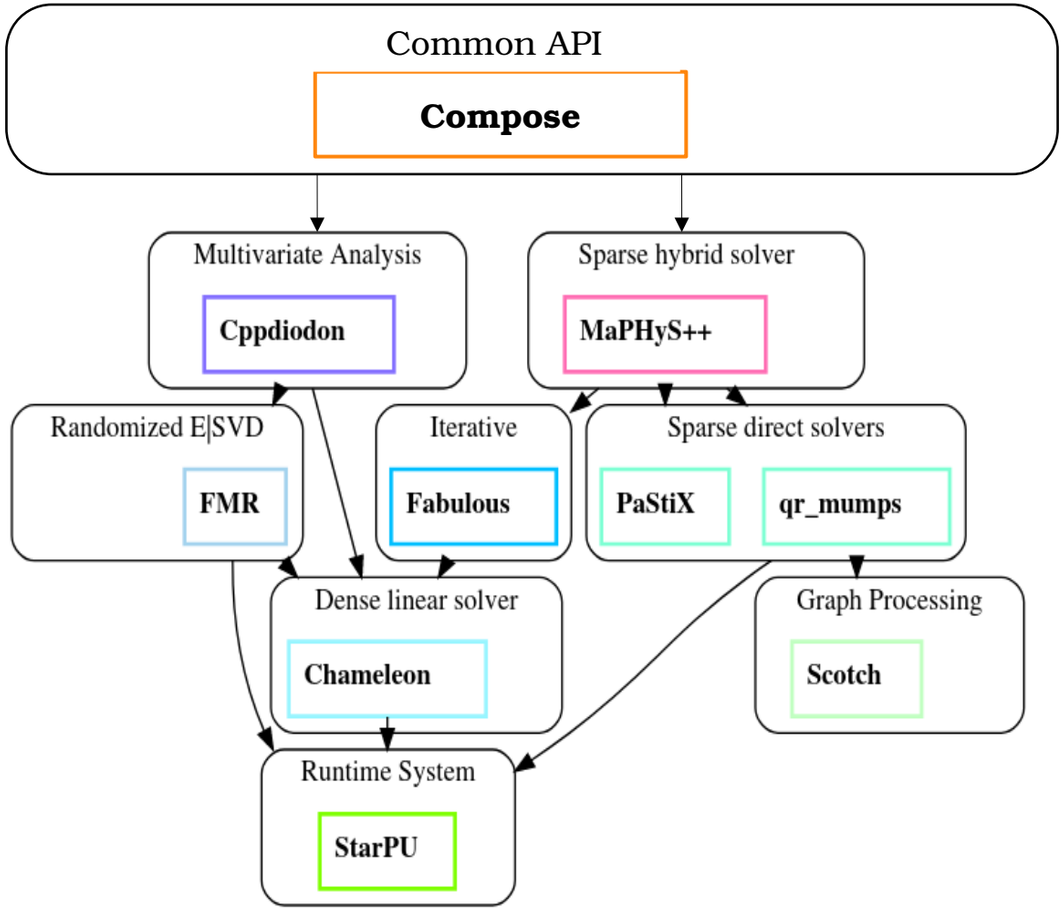

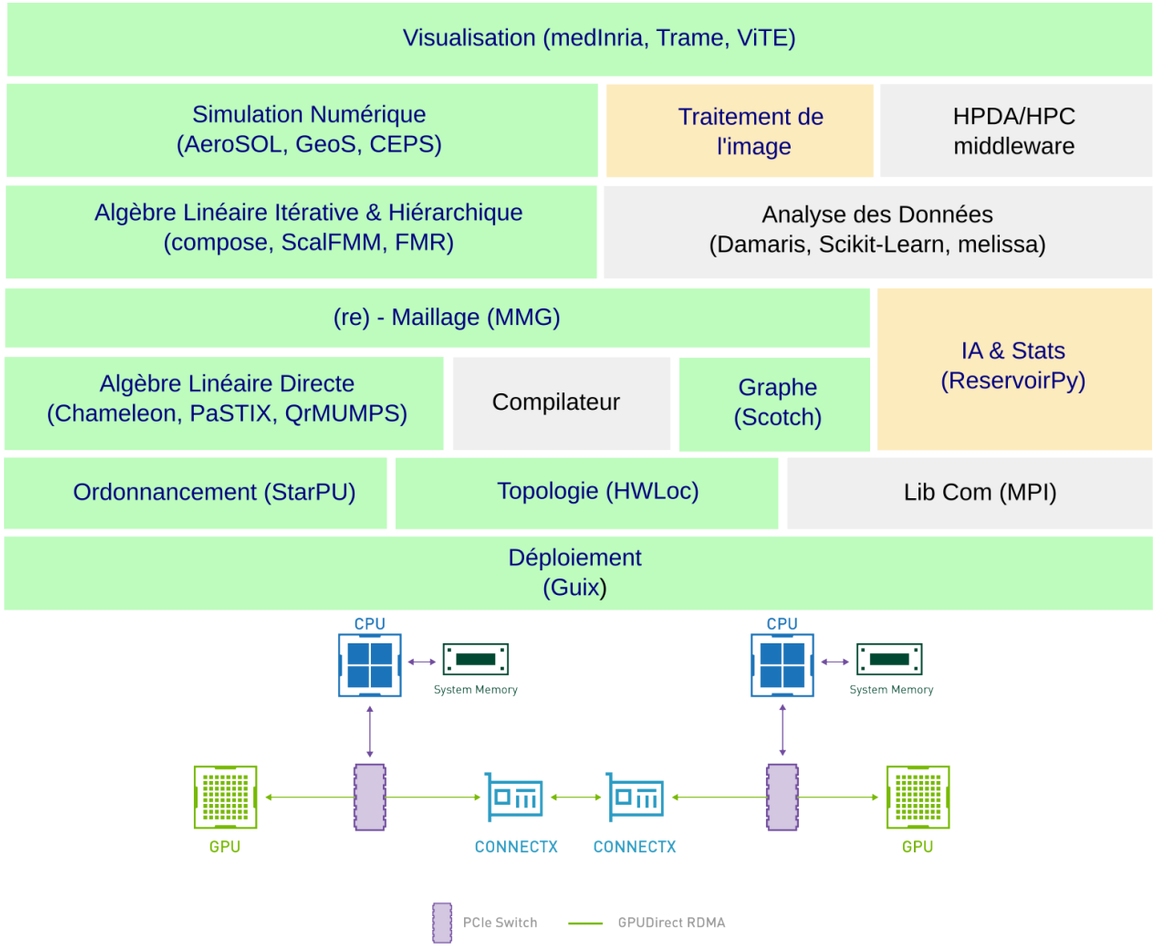

Merci.