"Convergence" background
www.exascale.org/bdec

The BDEC "Pathways to Convergence" Report

Toward a Shaping Strategy for a Future
Software and Data Ecosystem for Scientific Inquiry

Successor to *The International Exascale Software Roadmap*, by many of the same authors and new authors from big data
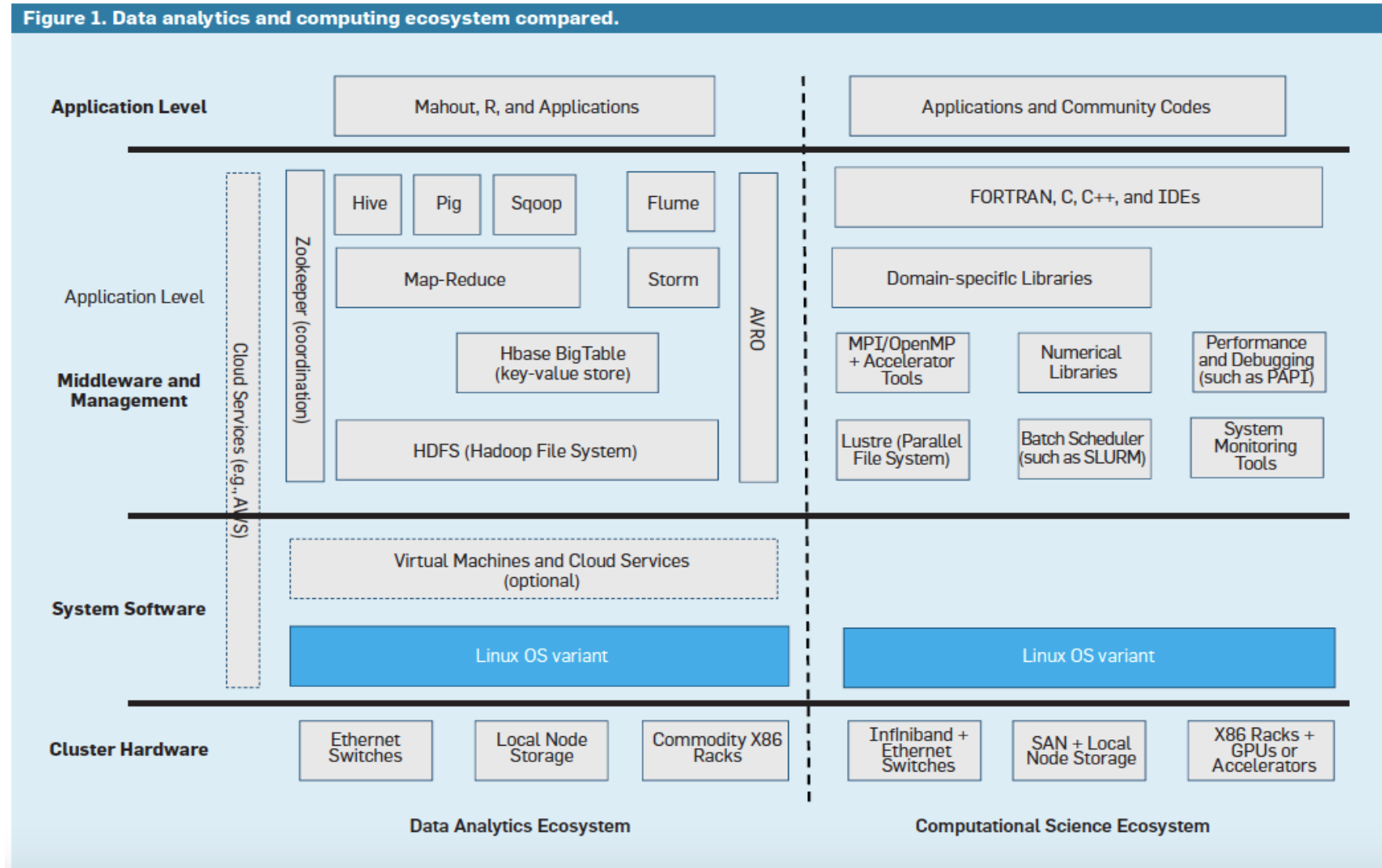
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Opportunity for applications: merging software for 3rd and 4th paradigms

Figure 1. Data analytics and computing ecosystem compared.

c/o Reed & Dongarra, Comm. ACM, July 2015

Interactions between application archetypes
Increasingly, there is scientific opportunity in pipelining
➜ *Convergence is ripe*

		To Simulation	To Analytics	To Learning
3rd	**Simulation provides**	–		
4th (a)	**Analytics provides**		–	
4th (b)	**Learning provides**			–

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4th (b)	**Learning provides**	**Smart data compression; Replacement of models with learned functions**		—

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4th (a)	**Analytics provides**	**Steering in high dimensional parameter space; *In situ* processing**	—	**Feature vectors for training**
4th (b)	**Learning provides**	**Smart data compression; Replacement of models with learned functions**	**Imputation of missing data; Detection and classification**	—