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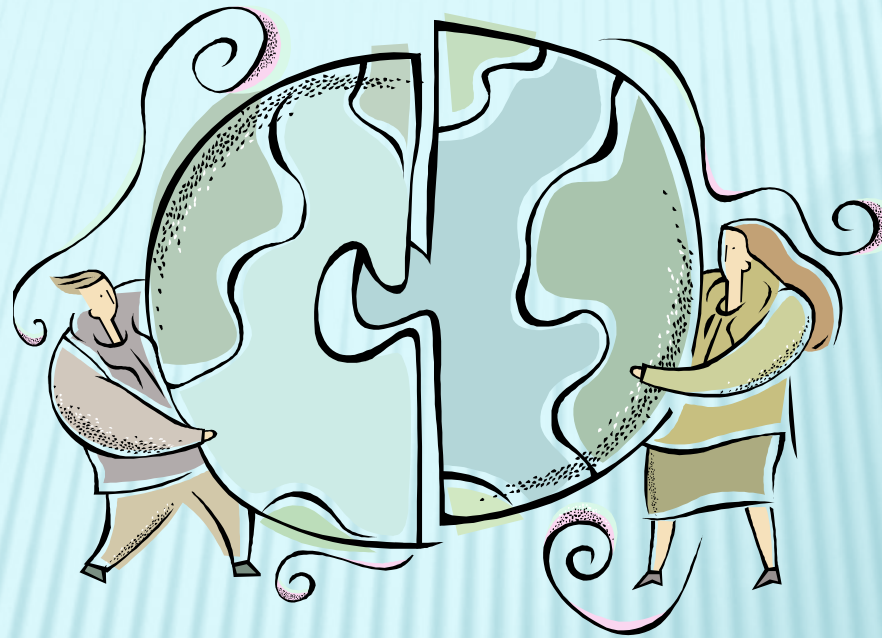
IMPACT OF GENOMICS ON INTERNATIONAL COOPERATION FOR DAIRY GENETICS

Vision



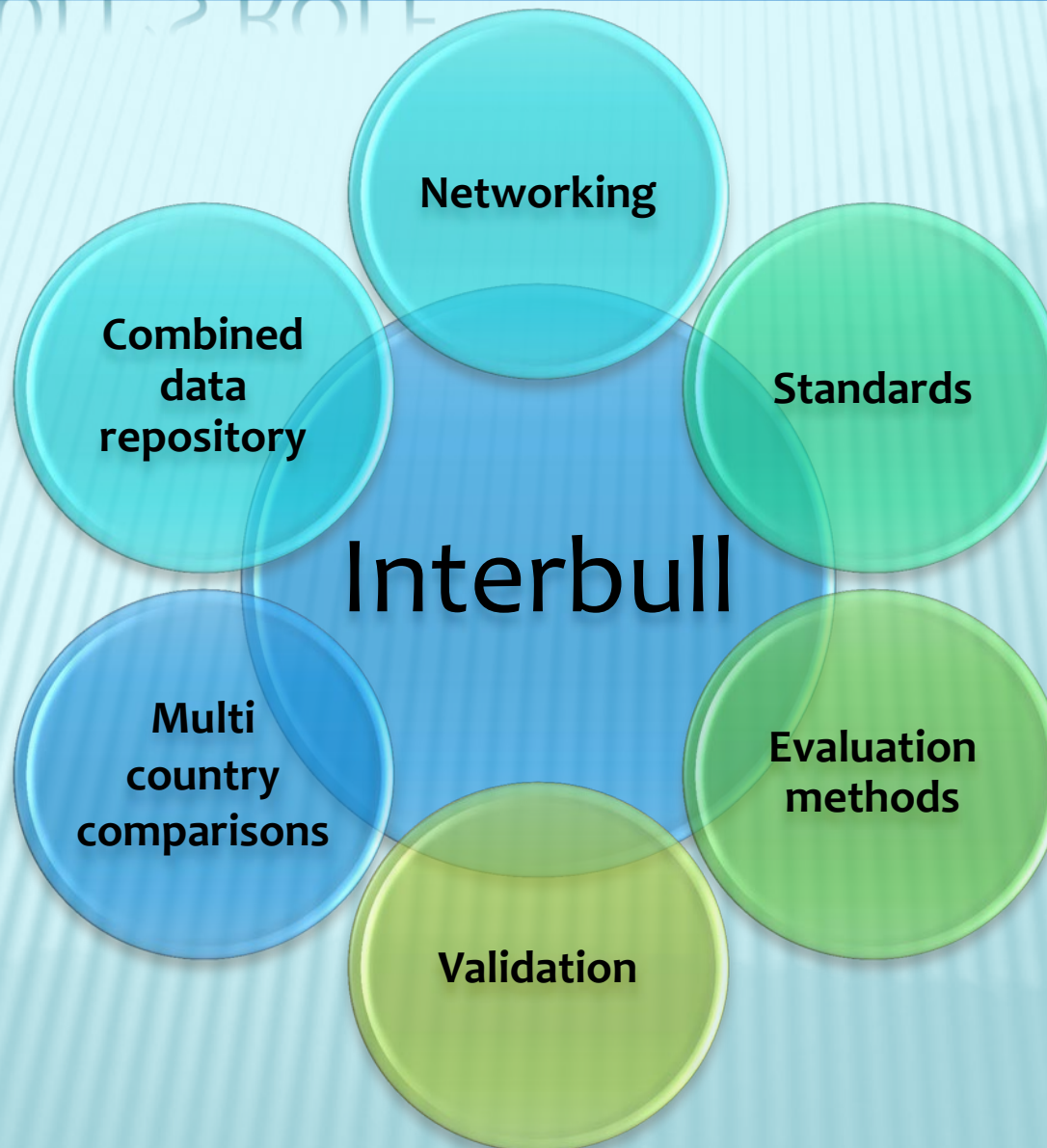
**Interbull: the worldwide network
providing genetic information services
for improvement of livestock**

INTERBULL GOAL



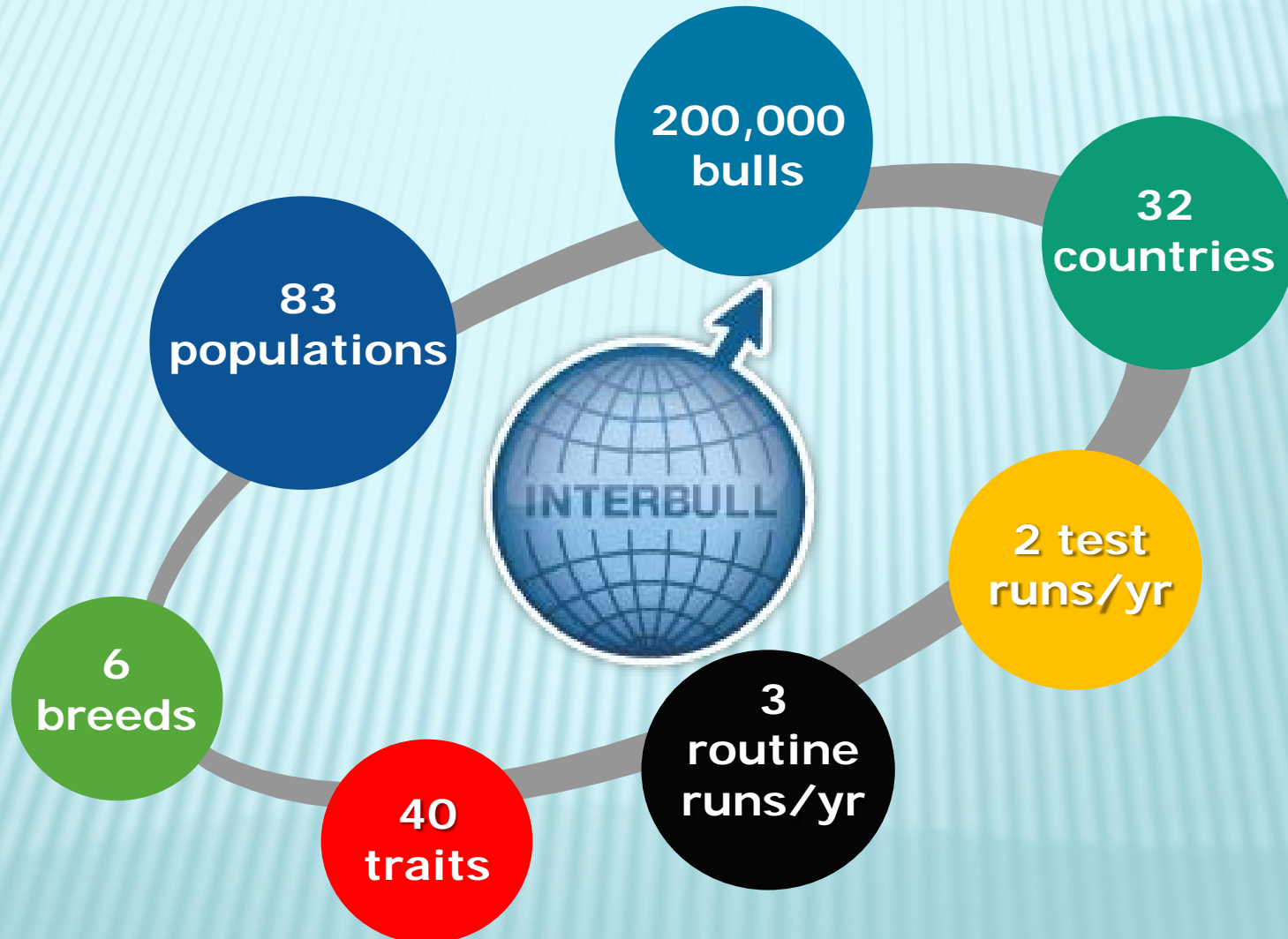
Facilitate INTERNATIONAL TRADE
of cattle genetics!

INTERBULL'S ROLE





SUMMARY OF THE OPERATION





POPULATIONS IN MACE (2013-08)

Breed Group	Production (3)	Conformation (23)	Udder Health (2)	Longevity (1)	Calving (4)	Female Fertility (5)	Workability (2)	TOTAL (40)	Number of published proofs (production)
Brown Swiss	10	8	10	10	5	9	6	58	9663
Guernsey	6	4	6	6	0	6	0	28	1046
Holstein	31	25	29	19	15	20	9	148	133028
Jersey	11	9	8	8	0	8	4	48	10738
Red Dairy Cattle	14	9	13	9	5	10	5	65	14060
Simmental	11	0	10	4	0	0	0	25	27135
TOTAL	83	55	76	56	25	53	24	372	195670

SIZE OF OPERATION (MACE)



Country-breed-traits evaluated	1,763
Number of independent evaluations	171
Number of estimated genetic correlations	12,193
Number of bulls converted into other scales	4,847,044

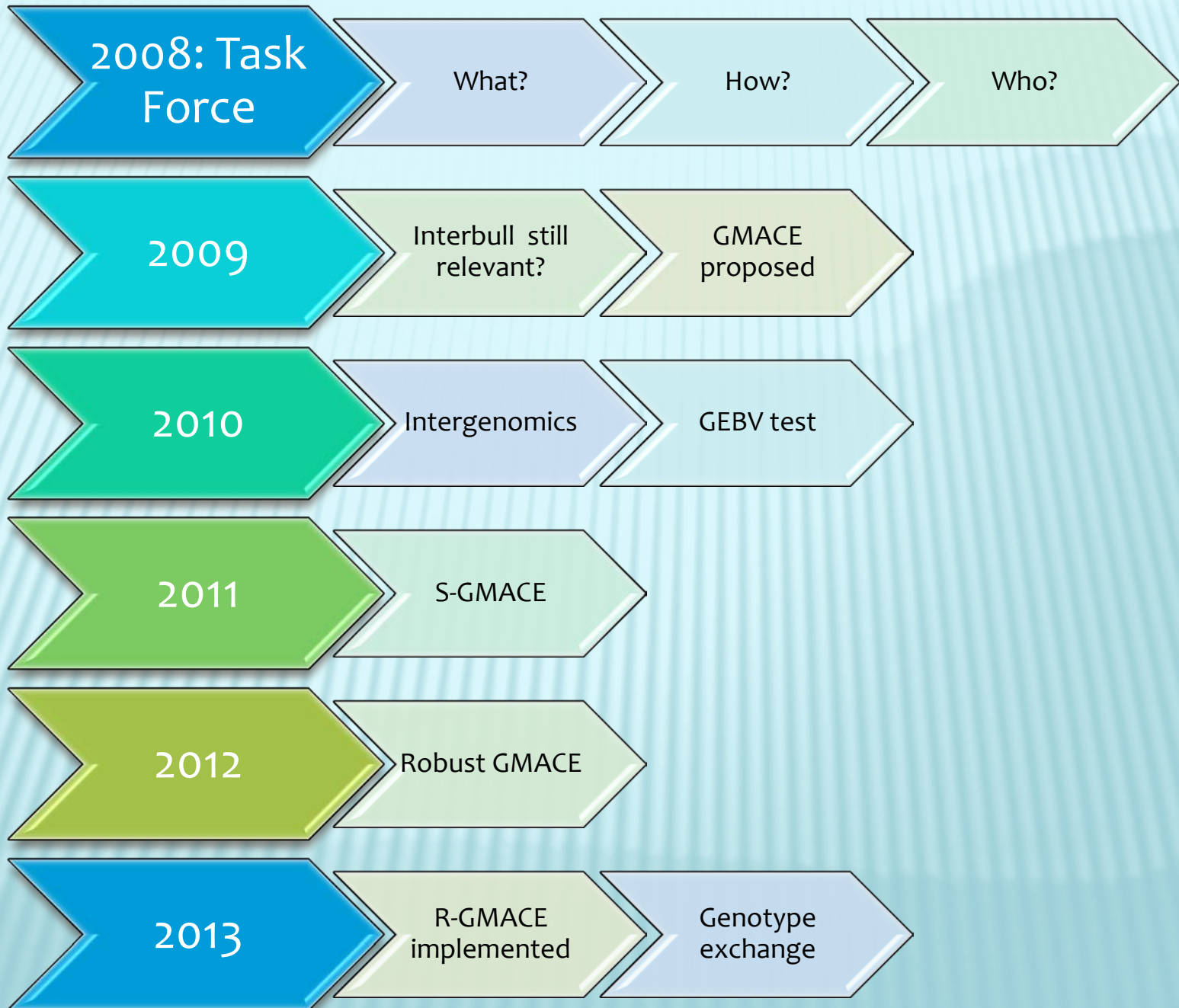
STRATEGIC POSITION

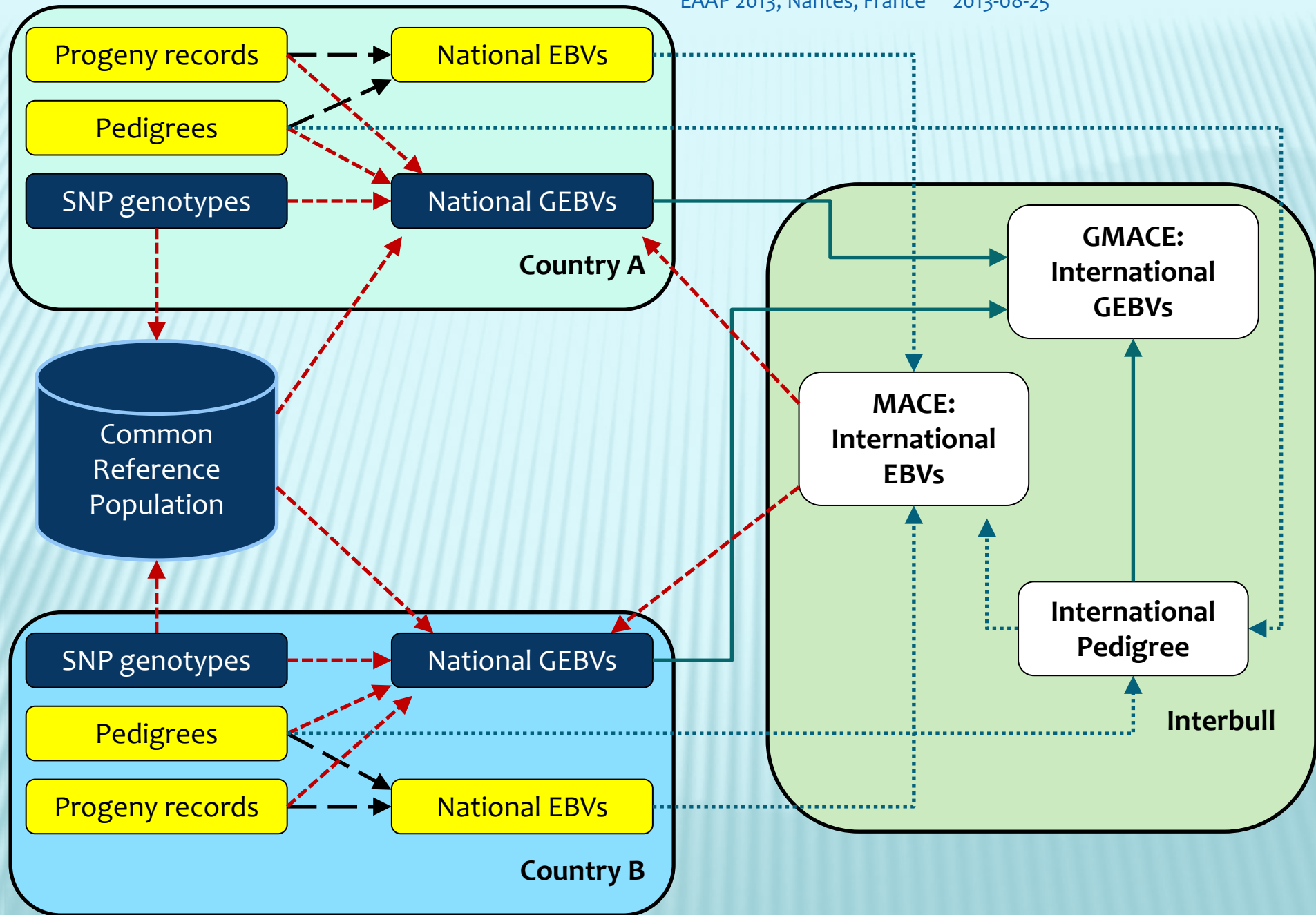


- ✘ The existing Interbull framework proved to be instrumental in the onset of genomic applications on dairy cattle selection by providing the forum for development of methods and policies to incorporate the new technologies into the existing national and international evaluation systems.

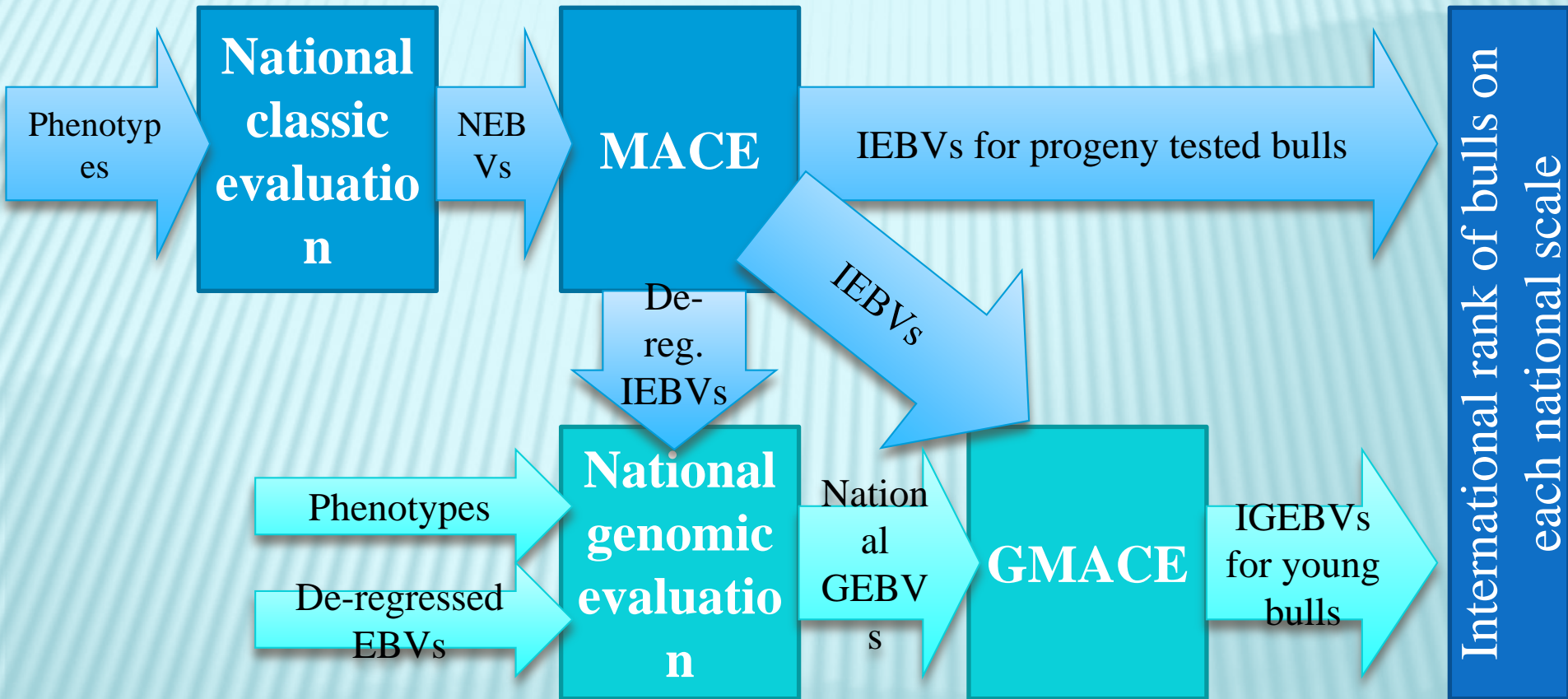
INTERBULL & GENOMIC SERVICES

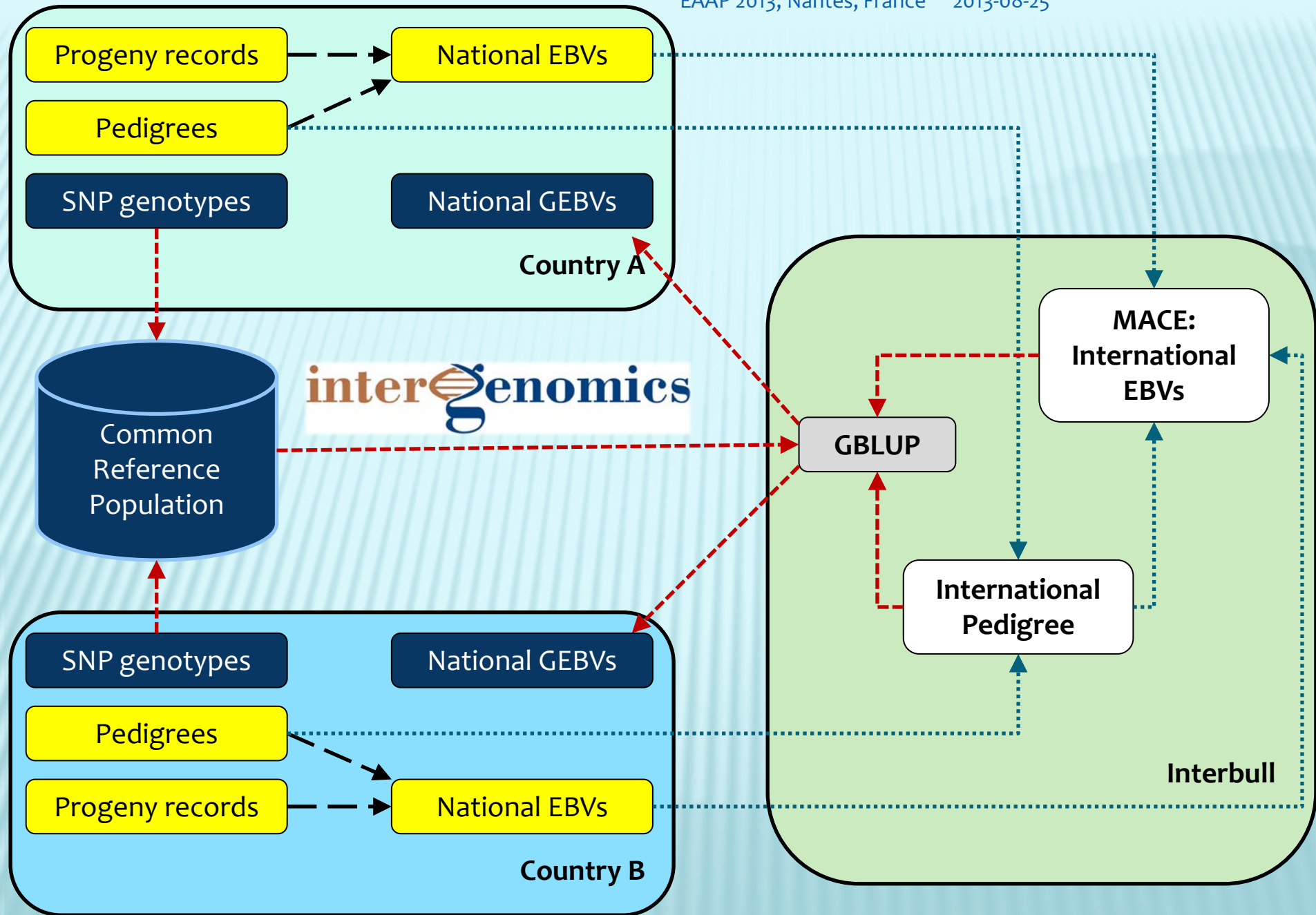






OPTIMAL SCENARIO: SEQUENTIAL RUNS





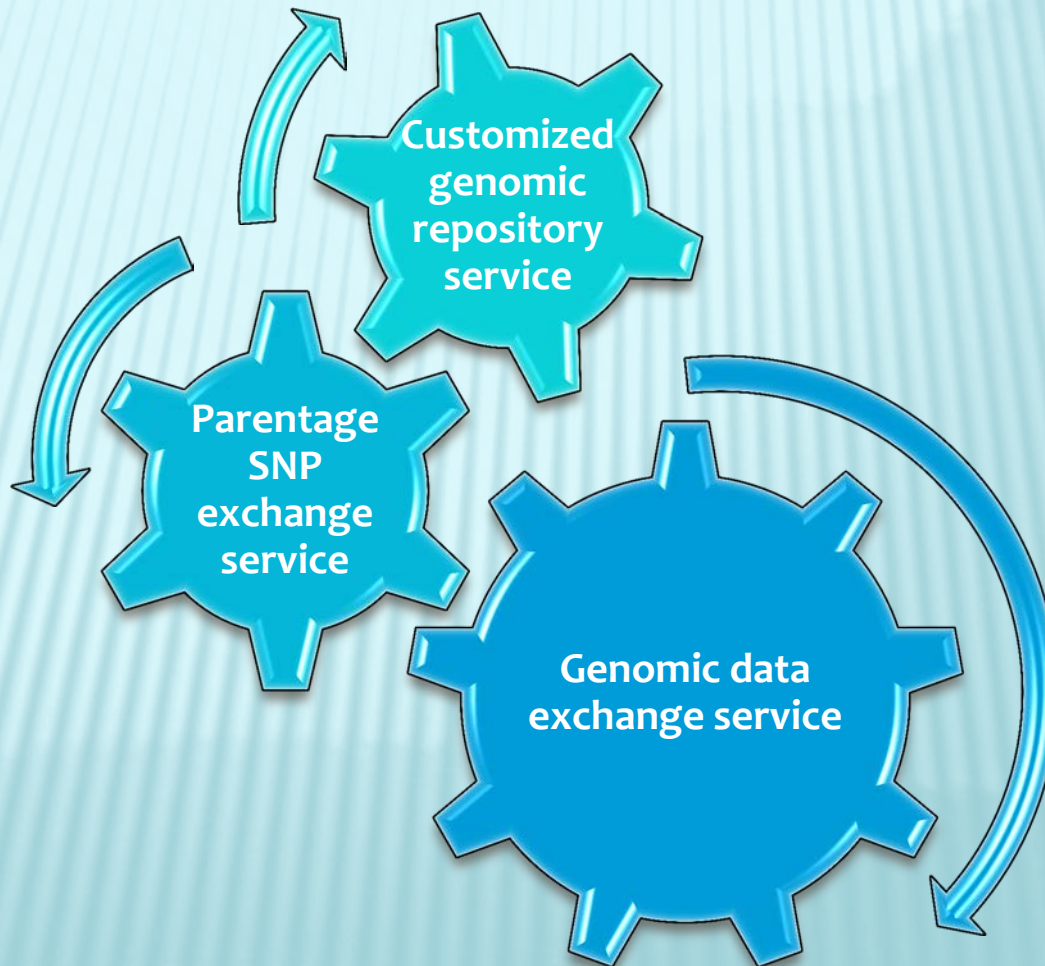


INTERGENOMICS - BSW

- × Multinational genomic evaluations offered since December 2011 (follows MACE calendar)
 - + Phenotypes: MACE de-regressed EBVs
 - + One evaluation/trait in each scale
- × Partners:
 - + CHE, DEU-AUT, FRA, ITA, SVN, USA
- × Stats (Aug 2013):
 - + Total number of genotypes: 12,061
 - + Size of reference population (protein): 5,803
 - + Number of country-traits: 175

GENOEX

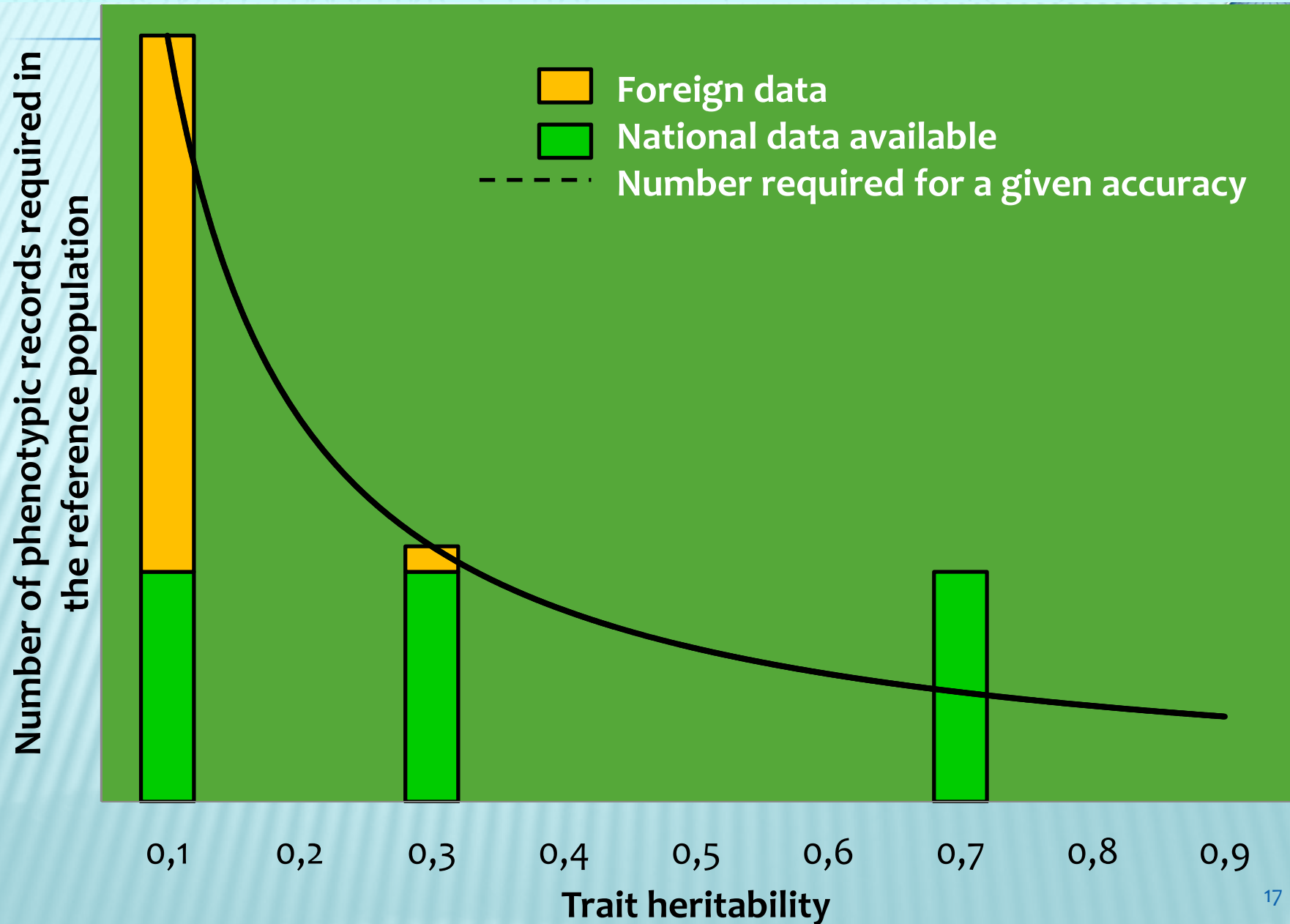
International Genotype Exchange Platform



SOURCE OF PHENOTYPES



REFERENCE POPULATION SIZE REQUIRED FOR OBTAINING A GIVEN ACCURACY IN ESTIMATING GEBVS. General concept: Goddard (2009)





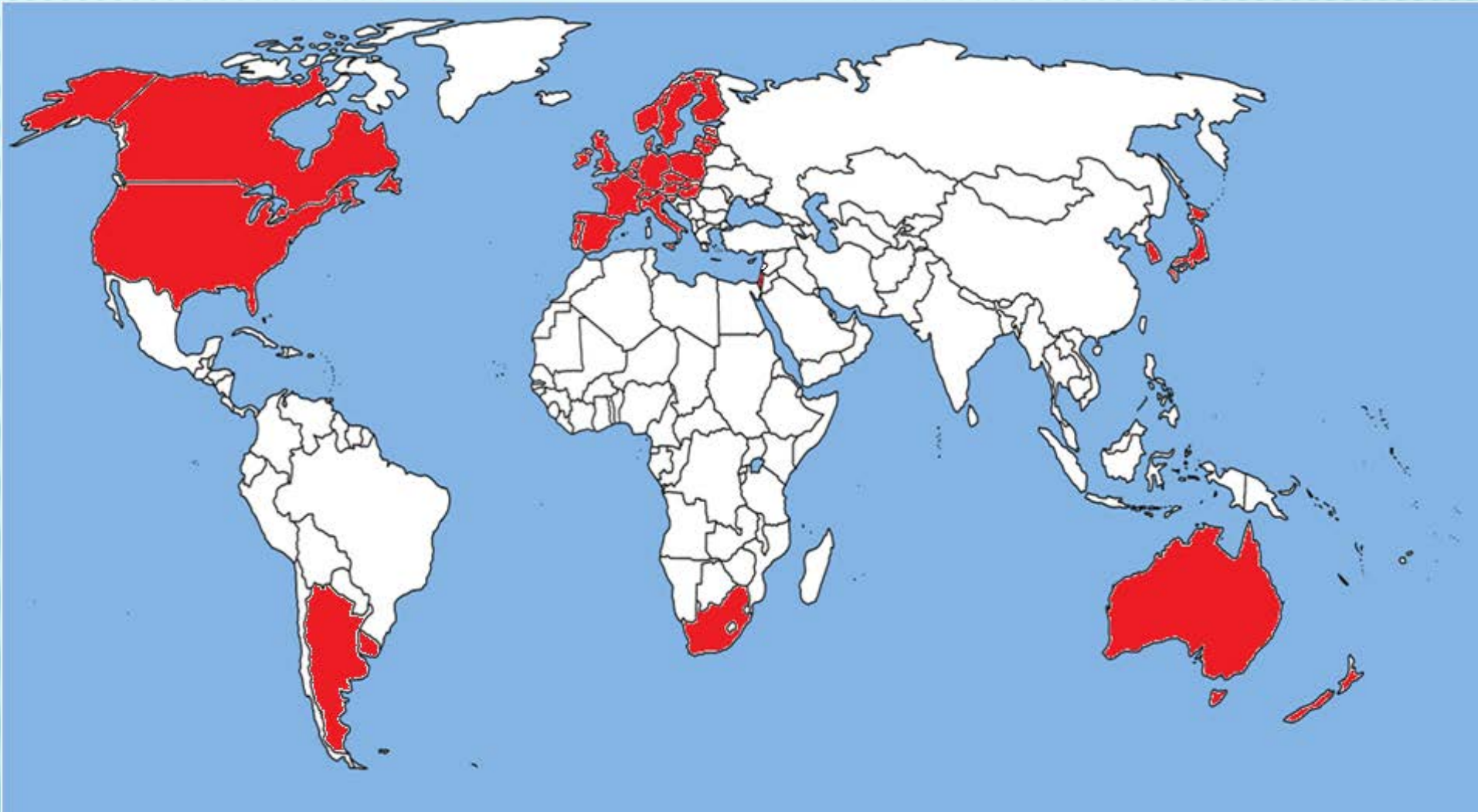
FOREIGN PHENOTYPES

- ✘ The early realization that the accuracy of genomic prediction equations is highly dependent on the size of the reference populations has amplified the importance of the Interbull MACE EBVs as source of phenotypic information on the foreign animals required as references.

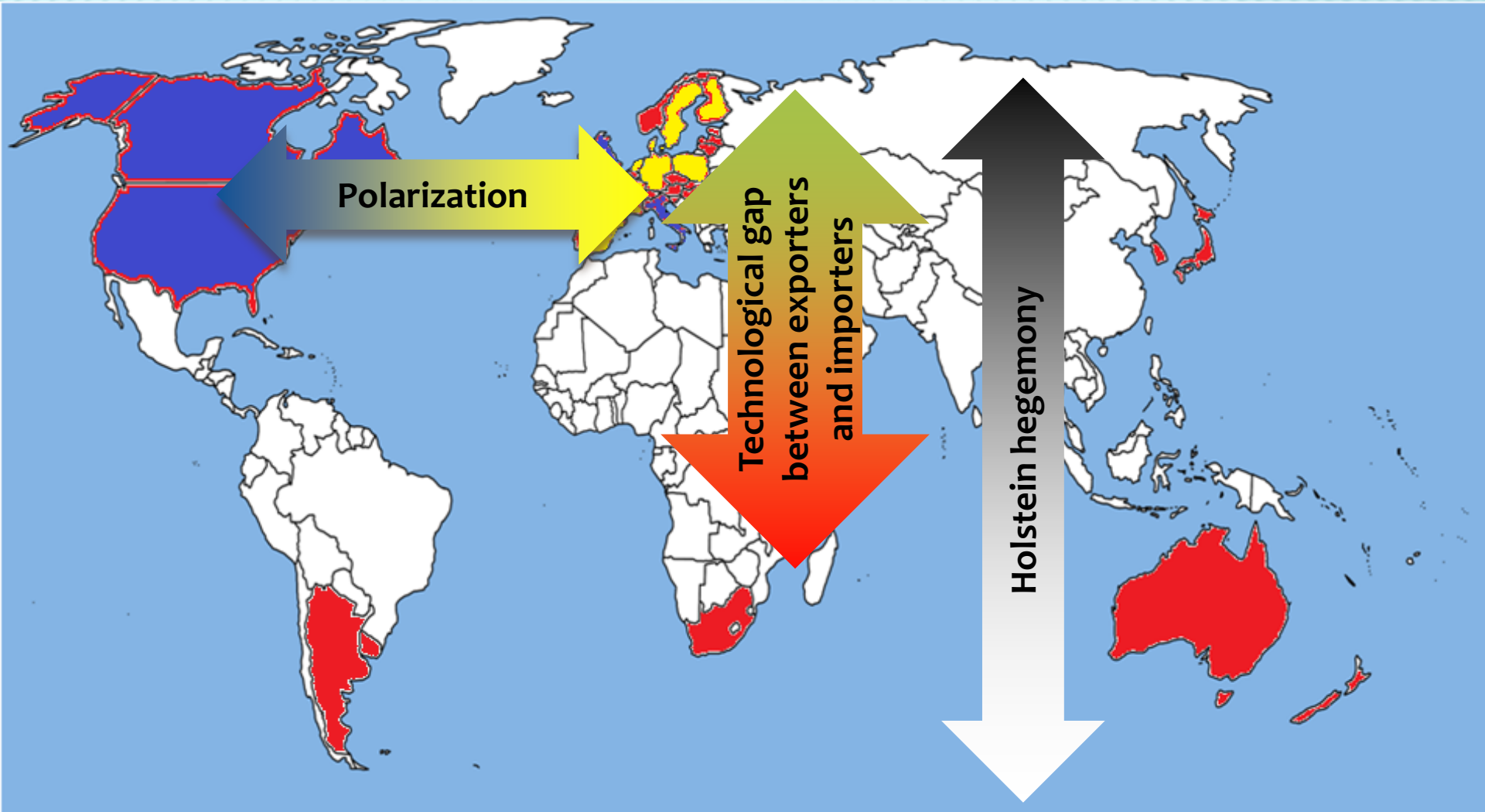
SHARING GENOTYPES




INTERBULL MAP BEFORE GENOMICS



INTERBULL MAP AFTER GENOMICS



 Intercontinental consortium (Holstein)

 Eurogenomics consortium (Holstein)

WHERE IS DAIRY GENETICS GOING?





FUTURE IS ALREADY HERE?

- **Data ownership** became the center of the debate and the control over the animal improvement process is shifting
 - **Phenotypes** > Genotypes
- Traditional players have their **business model** challenged
- New (or restructured) **actors with differentiated resources** are more likely to take the lead and supply **innovative options** to dairy breeders in a similar fashion to what happens in the poultry and swine industries



CONCLUSIONS

- *Rapid adoption of genomic technologies changed the face of the industry*
 - *Large consortia for genotype sharing*
 - *Polarity between blocks of exporters*
 - *Increasing technological gap between exporters and importers*
 - *Amplification of the Holstein hegemony*
 - *Data ownership dictates the direction*
 - *Traditional players have to restructure their business*
 - *New actors likely to become more influential*



CONCLUSIONS

- International cooperation through Interbull still has a major role to play:
 - Networking more needed than ever
 - Methodologies still suboptimal
 - Supplier of phenotypes for foreign animals
 - Facilitate data exchanges
 - Harmonization
 - Common ground for comparisons
 - Efficient distribution channel



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