Abstract template for the conference "A century of national forest inventories – informing past, present and future decisions"

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On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

Abstract title:		The GFBI data center: Global-level integration of national and local forest inventories using BigData technology and advanced computing
Take-home message:		*The Global Forest Biodiversity Initiative (GFBI) is gathering the largest ground-sourced database of forest inventory plots worldwide to promote cutting-edge global research on forest ecosystems. Complex NFI data are combined with more local forest inventories using bigdata analytics. Data upload, integration and request are managed through the GFBI data centre. The GFBI can contribute to integrating, harmonizing and making available forest inventory data at the global level.*
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General topic, see website: (please double click on the check box and activate the relevant one)	☐	Improving future NFIs by learning from the past
	☒	NFIs today and in the future
	☒	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	☒	Oral presentation
	☐	Poster
Abstracts will be reviewed by members of our scientific committee and you will be given information on decisions in due time after the submission deadline has passed.		

The GFBI data center: Global-level integration of national and local forest inventories using BigData technology and advanced computing

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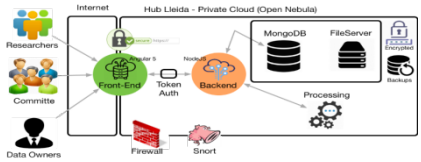
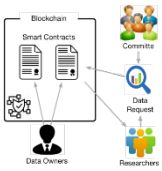
Introduction: The *Global Forest Biodiversity Initiative* (GFBI) aims at addressing prominent scientific questions on the ecology and management of global forests based on ground-sourced forest inventory data. Based on both NFI data and local forest inventories, the GFBI database is the largest global ground-sourced forest inventory database, i.e., over 1.2 million plots from more than 70 countries (Liang and de-Miguel, 2018). Dealing with such complex BigData requires appropriate technology to handling data upload, integration and sharing in a flexible, efficient and secure way. Data are managed through the data center at the *GFBI Hub* (University of Lleida, Spain), which aims at becoming a benchmark "data lake" for global forest inventory data sharing, cleaning, validation, profiling and standardisation.

Materials and methods: Standardisation and interoperability are the key-stones for BigData integration in a scalable platform. The big challenge of combining multi-scale, highly heterogeneous data into meaningful, valuable and secure information to the community in a smart forest data repository is tackled through: 1) standardisation based on XML-schemes to connect data, providers and terms, 2) R library to help users to transform any data into standardised formats, 3) cloud-based service to automate integration of standardised and non-standardized data, 4) *blockchain* technology to generate smart, highly trustworthy, transparent and incorruptible contracts to prevent modifications of data transactions, 5) data connection and visualisation based on Hadoop, Spark, MongoDB and specific analytics via web apps (Angular) with dashboards, tables, maps, networks and visual components and Restful API.





Results: The *GFBI data center* is planned to be fully operative during the second half of 2018. Cutting-edge research based on the GFBI database (Liang et al., 2016) showed a positive relationship between forest biodiversity and productivity at global level, whereby a continued biodiversity loss would result in an accelerating decline in forest productivity worldwide. This study estimated the value of biodiversity in maintaining commercial forest productivity alone in the range US$166–490 billion per year, i.e., over two to six times the total estimated cost that would be necessary for effective global forest biodiversity conservation. GFBI is currently investigating global forest biodiversity, carbon sequestration, symbioses and interaction between climate change, forest sector and biosphere.

Conclusion: The GFBI is gathering the largest global ground-sourced database of forest inventory plots to promote cutting-edge global research on forest ecosystems. NFI data are combined with more local forest inventories using BigData technology. Data upload, integration and sharing are managed through the GFBI data center. The GFBI aims at becoming a benchmark data lake for the integration and sharing of inventory data at the global level to tackle crucial scientific questions on forests of planet Earth.

References:

Liang J., de-Miguel S. 2018. Did you know? The GFBI. FAO-Silva Mediterranea Newstletter, 28:7-8
Liang J. et al. 2016. Science, Vol. 354, Issue 6309, aaf8957, DOI: 10.1126/science.aaf8957

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