Altium

Power Nets Management

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Power pins are generally used to indicate a user of power. Power pins can be treated differently from other pins at ERC time.

- A greater level of care is required to avoid fatal errors like power starved components or shorts. The set of nets that collect current to ground constitutes another ‘power network’.
- Within each of these power networks, a unique point connects to external power resources.
- The net that is connected to this point is truly a power net. In the schematics of PCB projects, a new directive will be available, called ‘Power net directive’.
- When placed on a given net, it will identify it as the unique net that connects to external power resources.

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New compilation errors can indicate incoherent situations which could lead to errors
- Missing power net directive on power network.
- Power net directive conflict on power network.
- Missing power pin on power net.
- Starved local power net.

A power networks report will contain information about-
- The list of nets involved in a given power network
- The list of components and their see-through pin pairs involved in the power network
- The details of the power net of a given power network.
- The list of the whole network ‘boundary pins’.

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Some possible approaches for solutions, while trying to estimate the development effort involved to implement these.

- **Elementary problems -** Each power network should ultimately be connected to some external source of power. Also, where power networks interact with signals, no spurious errors should be generated, obscuring the real errors.

- **Problems of a more complex nature –** Of concern is the amount of current provided under which voltage (for the supply side), and how it is collected and returned.

- **Problems with more advanced issues -** The PCB needs to be designed in a way that physically satisfies the power requirements of the parts used. To avoid repetitive work and errors, these design constraints should be automatically calculated from the schematic information.

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Some possible approaches for solutions, while trying to estimate the development effort involved to implement these.

Simple power connection checking:

- There is at least one producer of power on the network.
- The power produced on the network is greater or equal to the power consumed.
- The voltage ranges of devices connected to the network should at least intersect.

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There can be a number of problems:

•Firstly, it raises the issue of data updating, both in a library and design context.
•Secondly, opinions seem to diverge regarding the naming and the concepts underlying these types.
•There is also the issue of parts characteristics that vary depending on the way they are used in various designs.

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Then, given a power network, the basic checks can easily be performed

- The connection types allow to check for the absence of producer or consumer.
- All producers power [produced] can be added, and all consumer power [consumed] can be added. These two values can then be compared to check for imbalance of the power network.
- Finally the voltage ranges of each connected pin power tag can be compared to check for a valid match.

Definintion: A ‘Power Tag’ is simply a connection description. It is defined by a type a power rating, a voltage range and a free text description.

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Advanced power management and analysis

In terms of automatic rule generation, a number of architectural problems would have to be solved in the software, like the ability to define binary rule at the schematic level for instance. Then the guidelines for the automatic rules generation would have to be clearly investigated and defined, with possibly, new rules introduced at the PCB level.

Also, in the world of simulation of the final result, some brand new technology would have to be either developed or acquired. A number of strategic steps would have to be taken first in order to address these aspects effectively.

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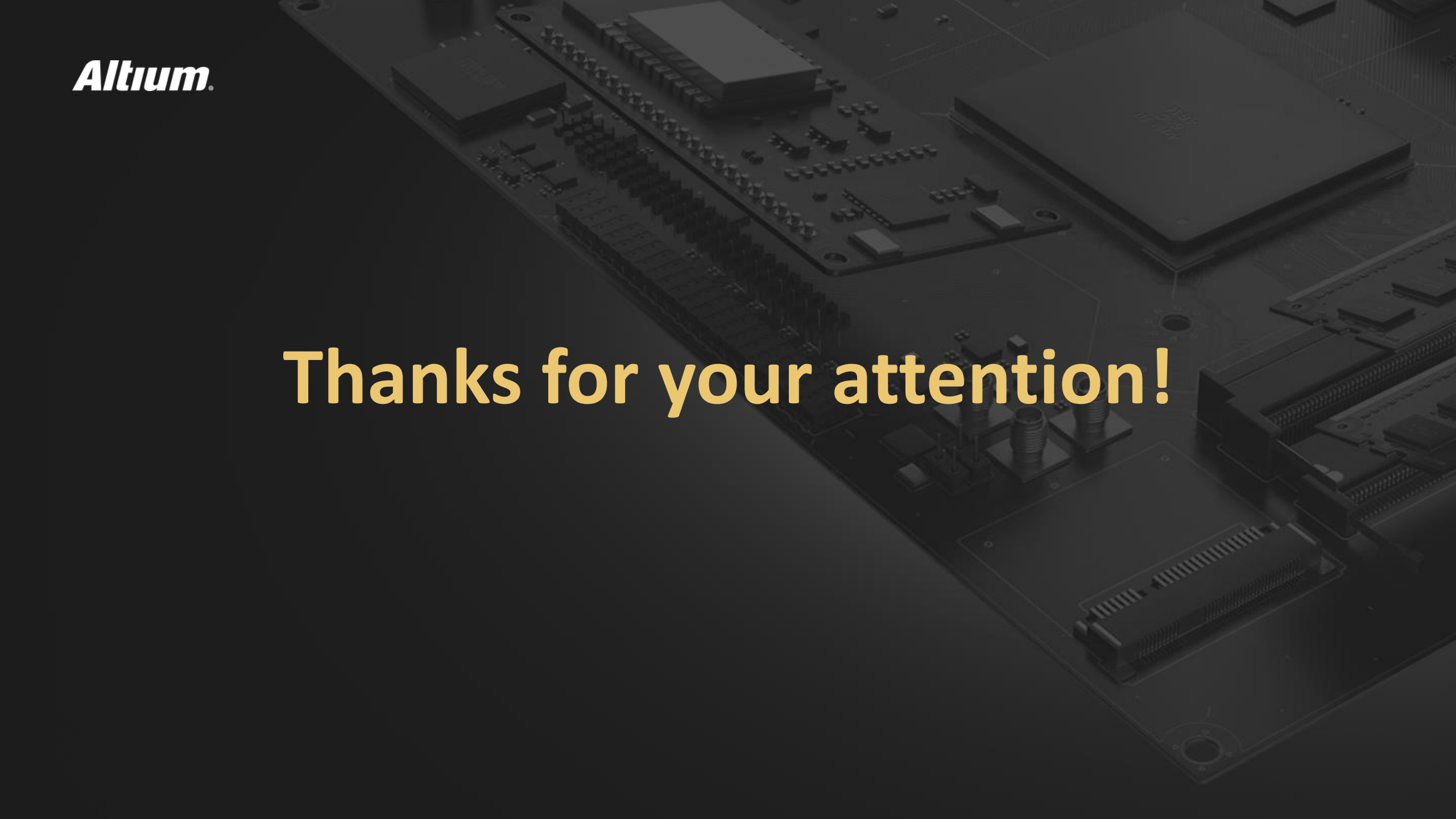

Thanks for your attention!