

Determining Sugiyama Topology with Model Order

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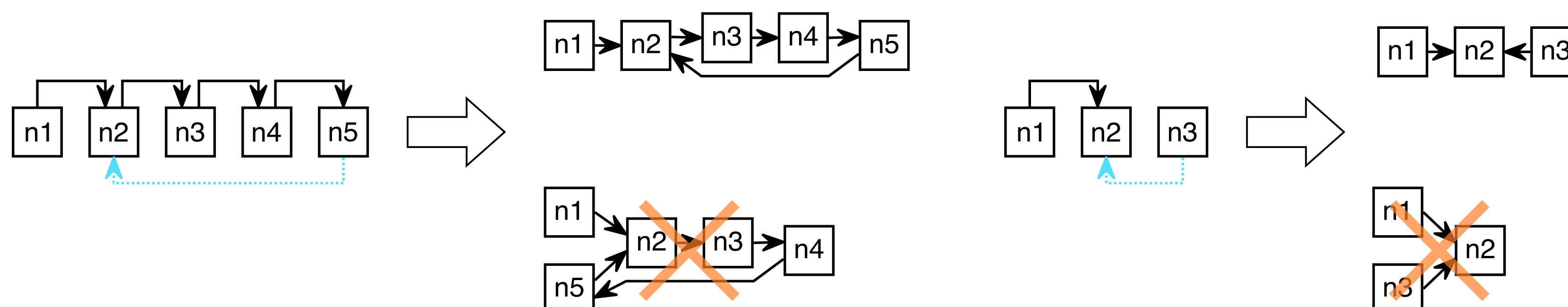
Model Order

If we consider an **ordered graph** $G = (V, E)$ consisting of an **ordered** set of edges and an **ordered** set of nodes, model order may **control** the layout visualizing **secondary notation** already in the textual model.

Sugiyama Topology

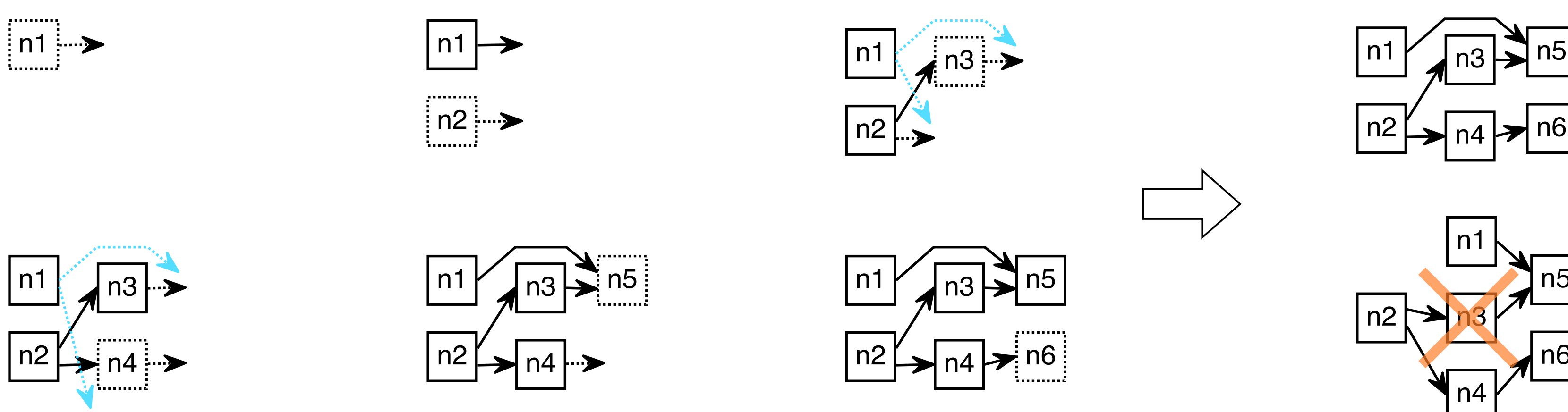
Cycle Breaking

Traditional: Minimizes backward edges
Model order: Creates **desired flow**



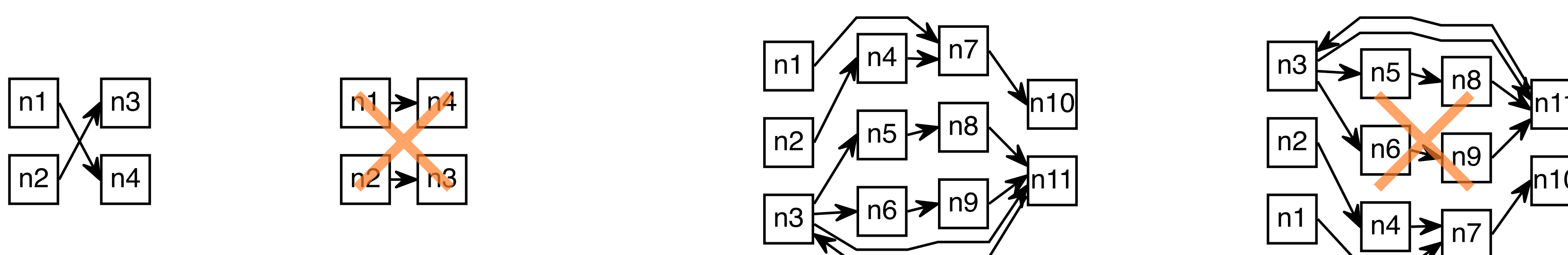
Layer Assignment

Traditional: Minimizes edge length
Model order: Creates **desired alignment**



Crossing Minimization

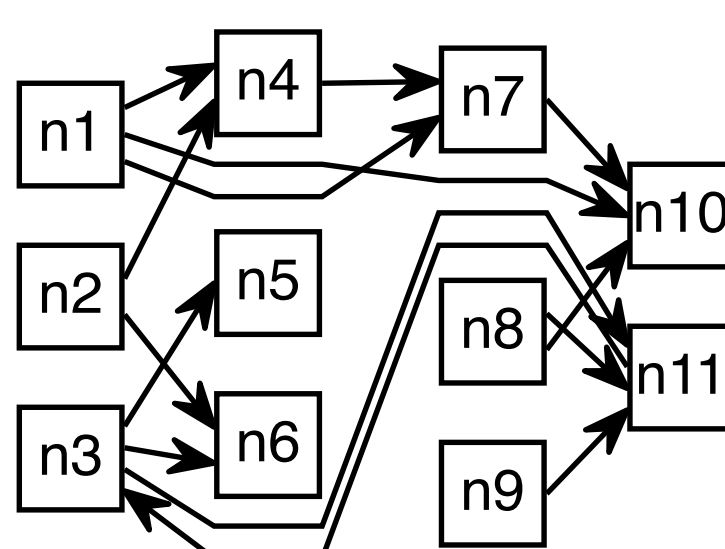
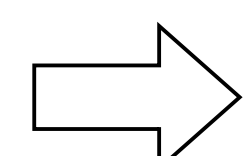
Traditional: Minimizes edge crossings
Model order: Creates **desired order**



Crossing minimization is already solved by the order given by layer assignment.

Control over the layout and its **secondary notation** is often more desirable than optimizing aesthetic criteria.

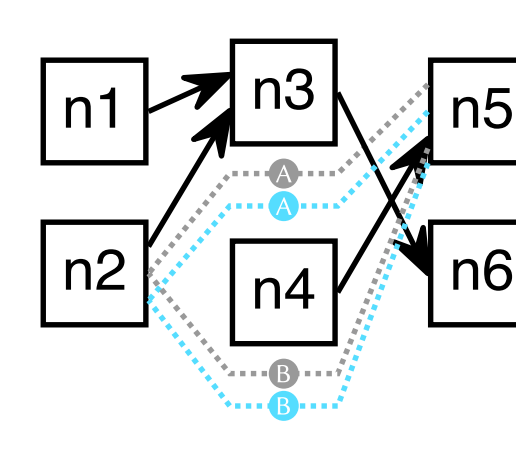
node n1
edge e1: n1 -> n4
edge e2: n1 -> n10
edge e3: n1 -> n7
node n2
edge e4: n2 -> n4
edge e5: n2 -> n6
node n3
edge e6: n3 -> n5
edge e7: n3 -> n6
edge e8: n3 -> n11
node n4
edge e9: n4 -> n7
node n5
node n6
edge e10: n7 -> n10
node n7
edge e11: n8 -> n11
edge e12: n8 -> n10
node n8
edge e13: n9 -> n11
node n9
node n10
node n11
edge e14: n11 -> n3



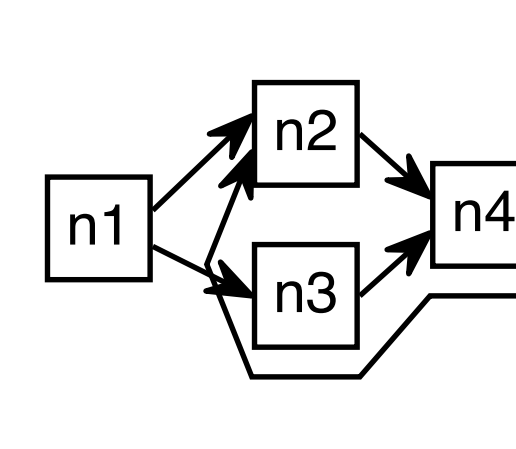
Layout **responsibility** is directed to the developer

Obviously-Not-Optimal Layouts

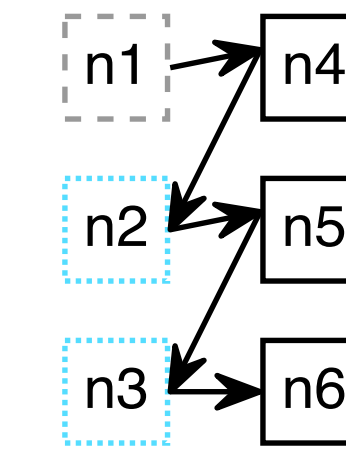
Dangling Nodes



Feedback Edges



Group Model Order



Contact Persons

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Related Publications

- [1] S. Domrös, M. Riepe, R. von Hanxleden. Model order in Sugiyama layouts. In Proc. VISIGRAPP 2023 – Volume 3: IVAPP, 2023. doi:10.5220/0011656700003417.
- [2] S. Domrös and R. von Hanxleden. Diagram control and model order for Sugiyama layouts. In Proc. DIAGRAMS '24. To be published, 2024
- [3] K. Sugiyama, S. Tagawa, and M. Toda. Methods for visual understanding of hierarchical system structures. IEEE Trans. Syst. Man. Cybern., 1981. doi:10.1109/TSMC.1981.4308636.

The Framework is part of



ELK

Eclipse Layout Kernel

On the web:
<https://eclipse.dev/elk/>