

# Arrangements in CGAL — More Generic than Ever!

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**Abstract.** Arrangements of planar curves are fundamental structures in computational geometry and have numerous applications. We describe the recent developments in the arrangement package of CGAL, the Computational Geometry Algorithms Library, making it easier to use, to extend and to adapt to a variety of applications. We have tightened the requirements of the arrangement *traits-concept*, and allowed for an alternative subset of requirements using a tag-dispatching mechanism. This enables easier development of external traits classes. (In the arrangement *traits-concept* we assemble the primitive geometric objects and operations on them required to handle a specific family of curves). We have introduced a new traits class that handles segments which avoids cascaded representation of intersection points with exponentially long bit-length. We have implemented a polyline traits-class that uses a segment traits-class to handle the piecewise linear-segments polylines are made of, exploiting existing segment traits-classes with different characteristics. We also provide an alternative approach to maintain curve history in form of meta traits-classes. All these improvements do not come at the expense of efficiency as we mainly use generic-programming techniques, which make dexterous use of the compilation process. To the contrary, we expedited key operations, as we demonstrate by experiments.