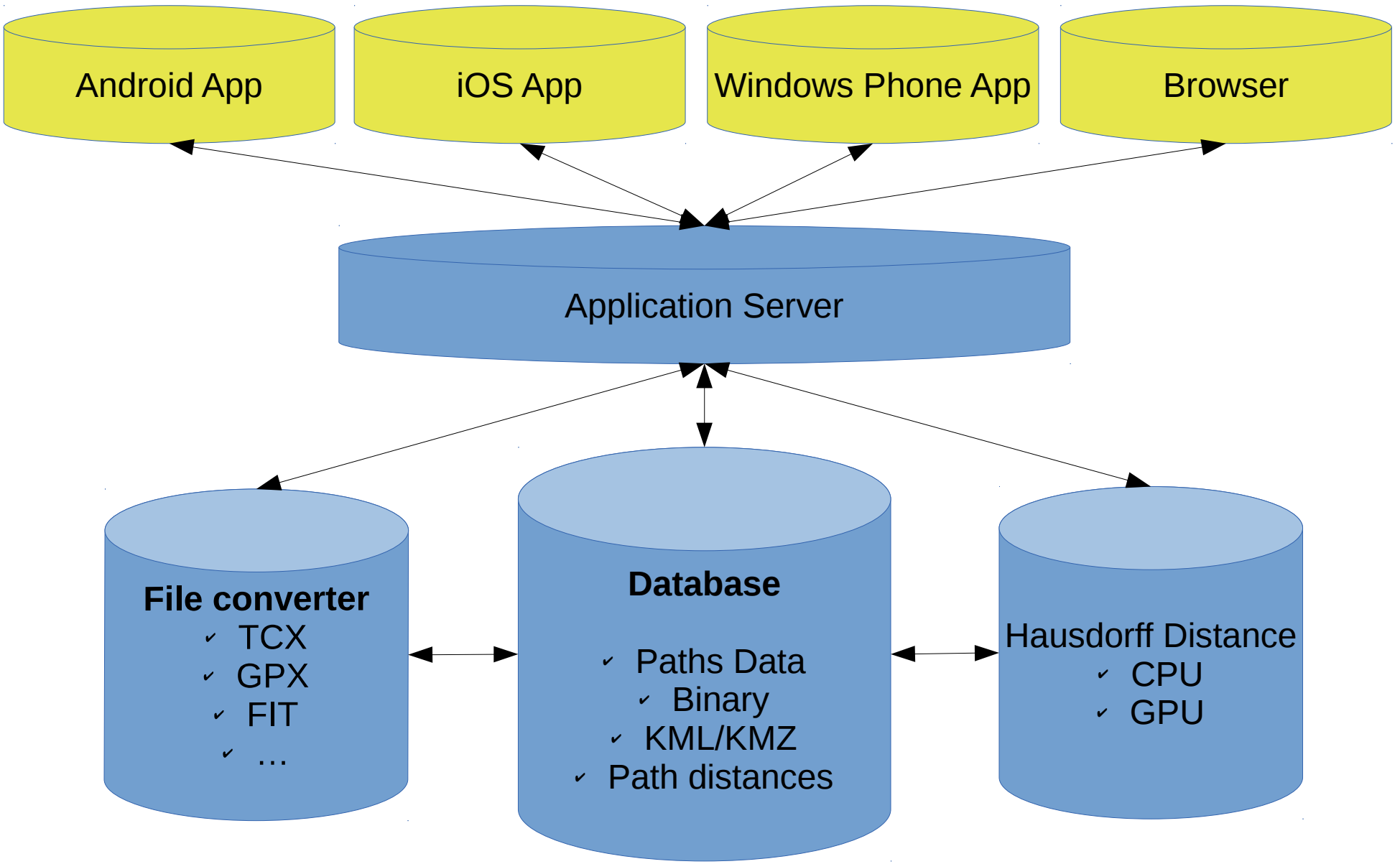
Architecture



Database records

User	String
Date	Only for testing, not visible
Length	10.319895 km
Mean Point	(0.796049, 0.161785) radians
Median Point	(0.797042, 0.162133) radians
KML or KMZ file (Google Earth)	
Binary file for path distance algorithm	Optimized for fast copy and scan

Binary path file structure

Type	Description	Unit
uint32_t	Number of points (N)	
float	Latitude 0	Radians
float	Longitude 0	Radians
...	...	...
float	Latitude N - 1	Radians
float	Longitude N - 1	Radians
uint32_t	Number of points (N)	
uint32_t	Checksum	

Use cases

- Create new user
- Add new path
- Delete an existing path
- Find paths near my current position
- Find paths near a given position
- *Find paths similar to my paths*

Privacy guidelines

- User private data will never be visible
  - Hearth rate and speed will never be recorded in binary and KML/KMZ files
  - Path date and time will be used only for testing purposes

Hausdorff Distance

- Named after Felix Hausdorff (1868-1942), Hausdorff distance is the «maximum distance of a set to the nearest point in the other set»
- Hausdorff distance from set A to set B is a maximin function, defined as:

$$h(A,B) = \max \{ \min \{ d(a,b) \} \}$$

$$a \in A \quad b \in B$$

Hausdorff Distance

- Hausdorff distance is asymmetric, most of times h(A, B) is not equal to h(B, A)
- A more general definition of Hausdorff distance would be :

$$\mathbf{H(A,B)= max \{ h(A,B), h(B,A) \}}$$