The Square Kilometre Array (SKA)

Next Generation radio telescope – compared to best current instruments it offers

...100 times more sensitivity, \( \sim 10^6 \) times faster imaging

100,000’s of antenna’s

Many science projects relate to gravity

World wide science – cf. CERN

Cambridge University leads computing
Data Processing Pipeline

Antennas

Central Signal Processing (CSP)
Transfer antennas to CSP
2020: 20,000 PBytes/day
2028: 200,000 PBytes/day
Over 10’s to 1000’s kms

Imaging (SDP) HPC problem
2020: 100 PB/day, 300PF
2028: 10,000 PB/day, 30 EF
EB archive
10’s to 1000’s kms

World wide science
Analytics
Scheduling
Data replication

2015-04
## Revolutionary sensor data processing

<table>
<thead>
<tr>
<th><strong>Data</strong></th>
<th><strong>Software</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Massive volumes of input deliver to processors cannot keep it Some data is not precious! Exa-byte archive output data World wide dissemination and scheduling of data analytics through cloud</td>
<td>Telescope age ~50 years Software must adapt to 1. new hardware 2. new algorithms Approach: advanced programming – data flow, automatic optimization, domain specific languages</td>
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