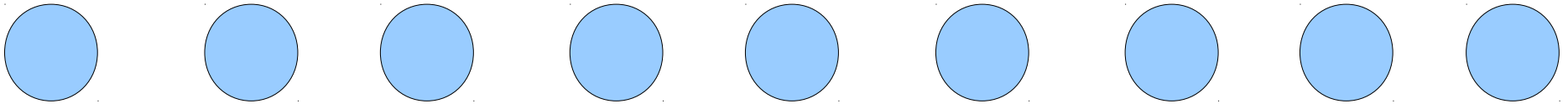
Using NEPI to conduct CCNx experiments on PlanetLab

Our experiment consists of
9 PlanetLab Europe nodes
connected throughout Europe



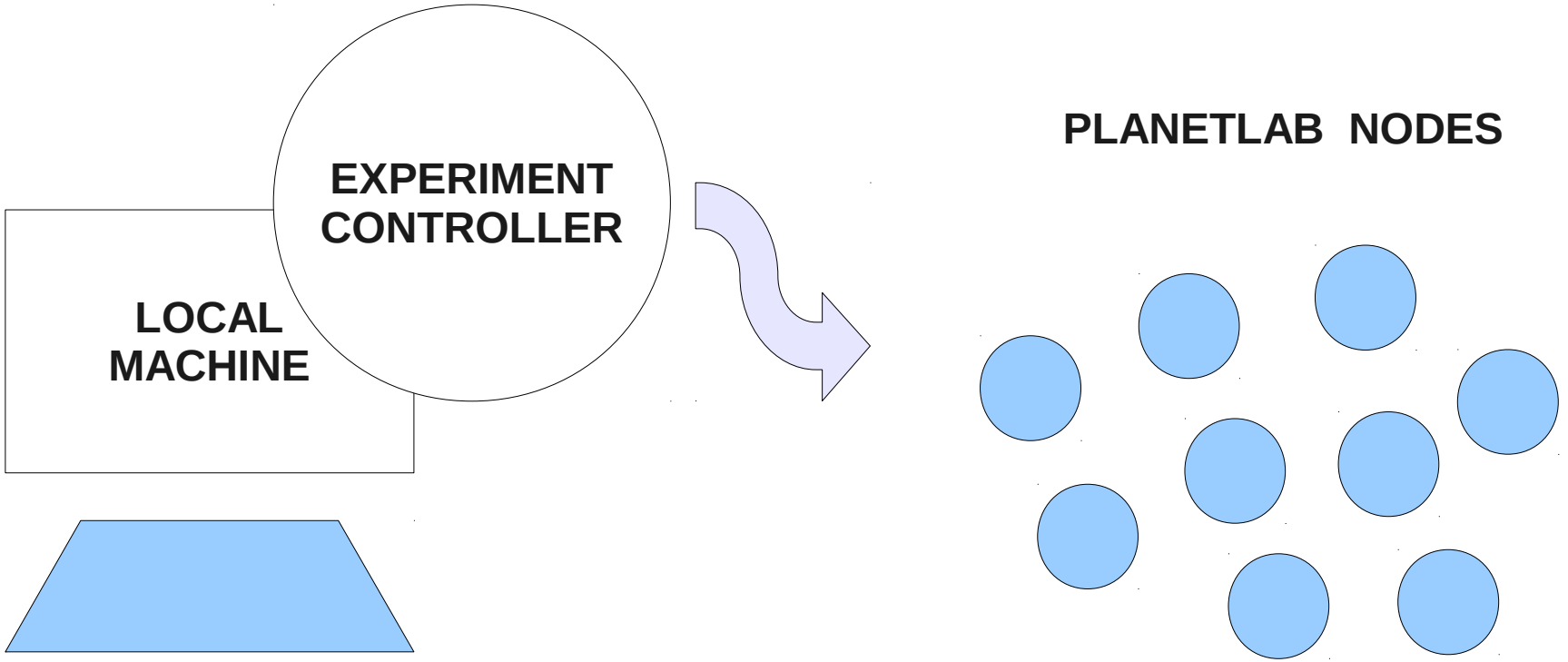
1. openlab02.pl.sophia.inria.fr
2. merkur.planetlab.haw-hamburg.de
3. planetlab1.cs.uit.no
4. planetlab3.cs.st-andrews.ac.uk
5. planetlab2.cs.uoi.gr
6. planet2.inf.tu-dresden.de
7. planetlab3.xeno.cl.cam.ac.uk
8. planetlab2.csg.uzh.ch
9. planetlab2.upm.ro

NEPI provides a Python API to describe experiments and execute them

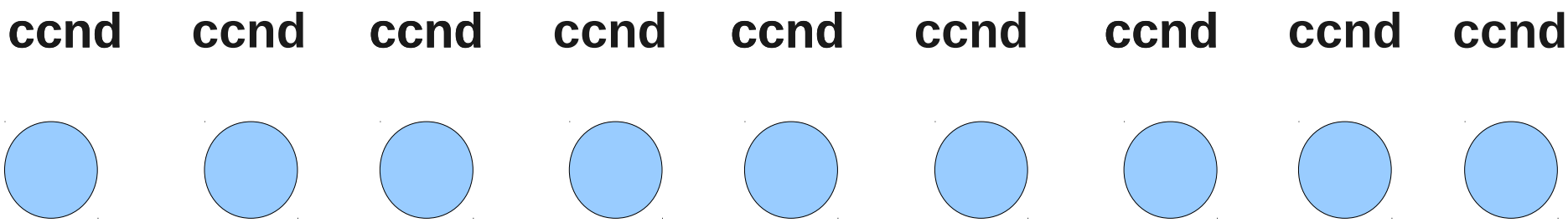
The resulting Python script can be then invoked to launch the experiment

$ python my_nepi_experiment.py

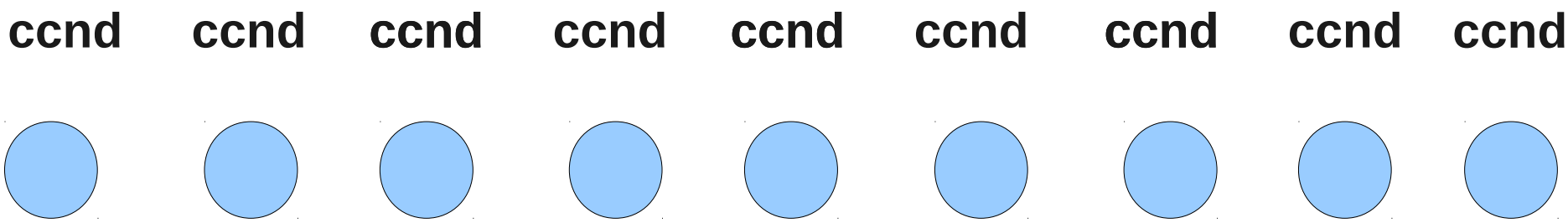
At the beginning of the experiment, NEPI will instantiate the Experiment Controller which will automatically provision PlanetLab Nodes, and deploy applications



We use NEPI's ability to automatically deploy applications to run a CCNx daemon on each node

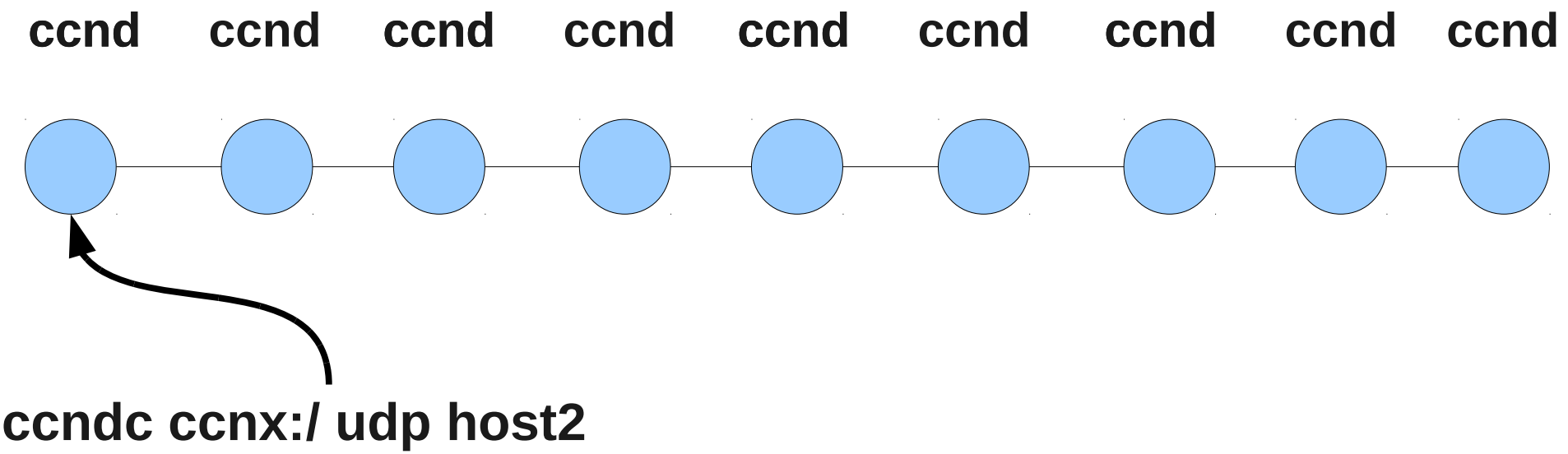


NEPI can compile and install
CCNx source code from a local tarball

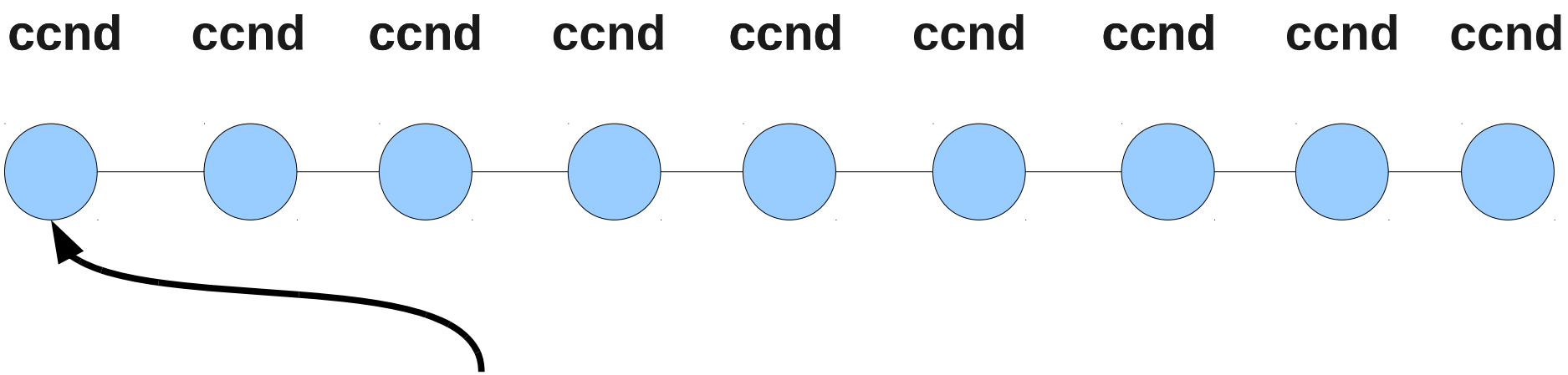


This feature allows researchers to test
ideas by directly modifying CCNx

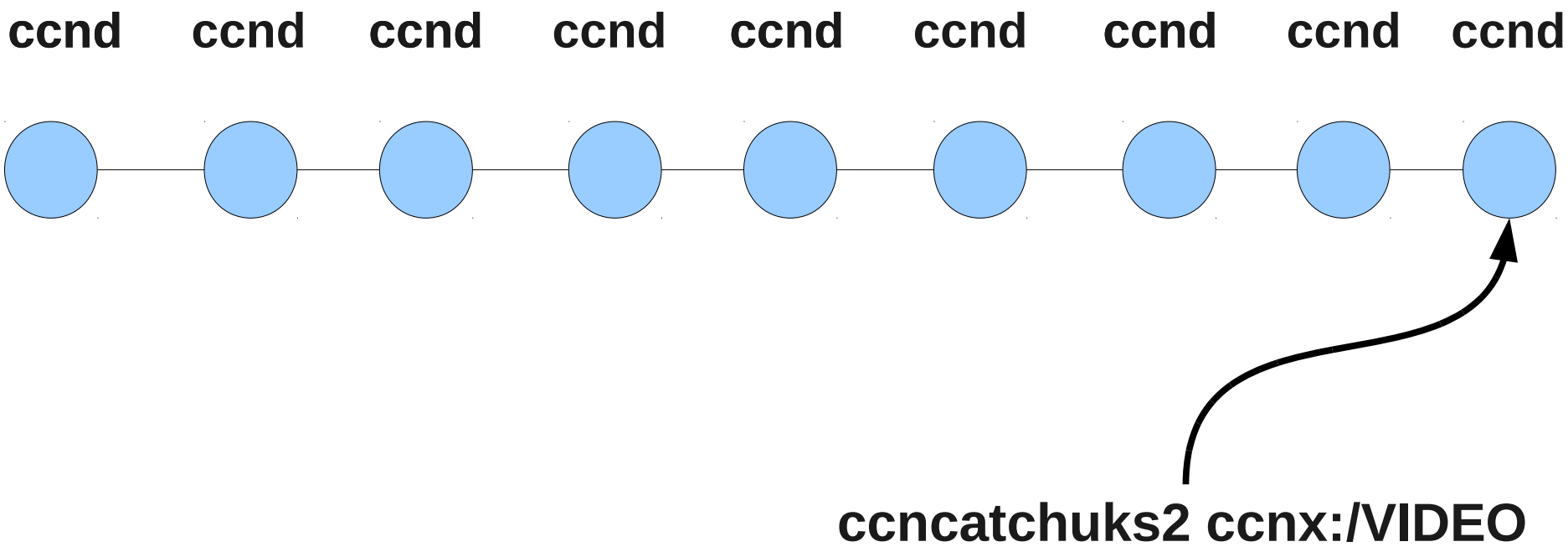
As a demonstration experiment, we chose to associate nodes in series using UDP unicast FIB entries



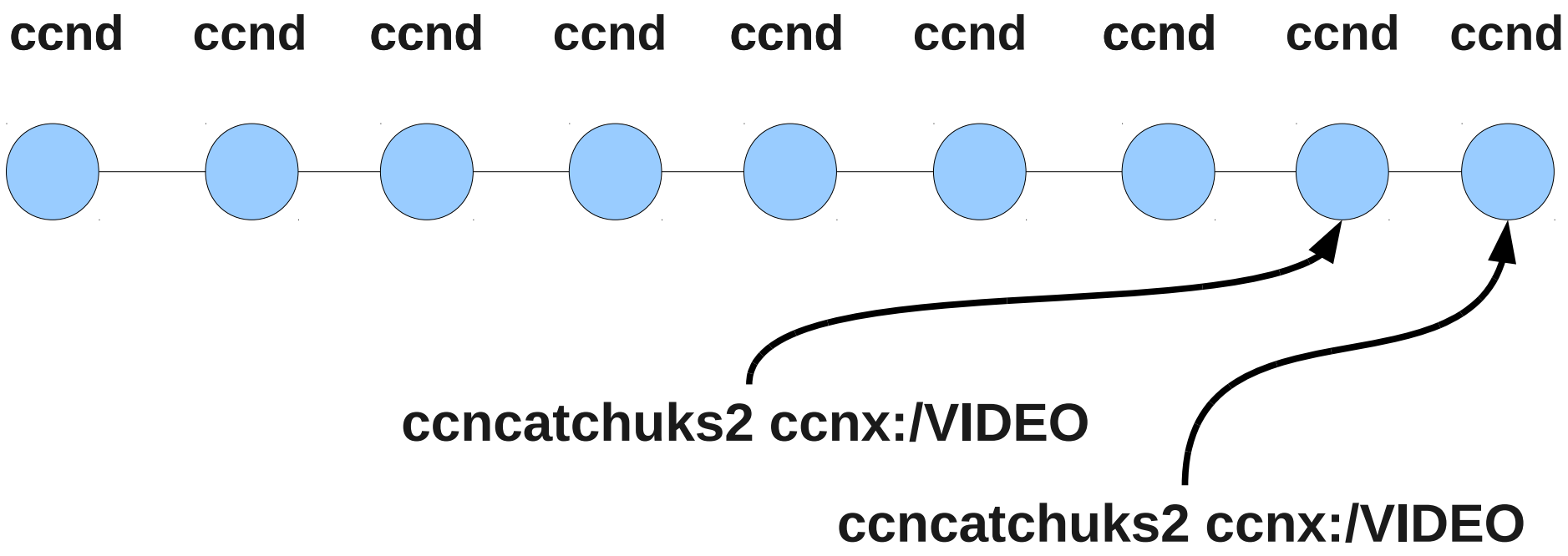
A video will be published on the first node



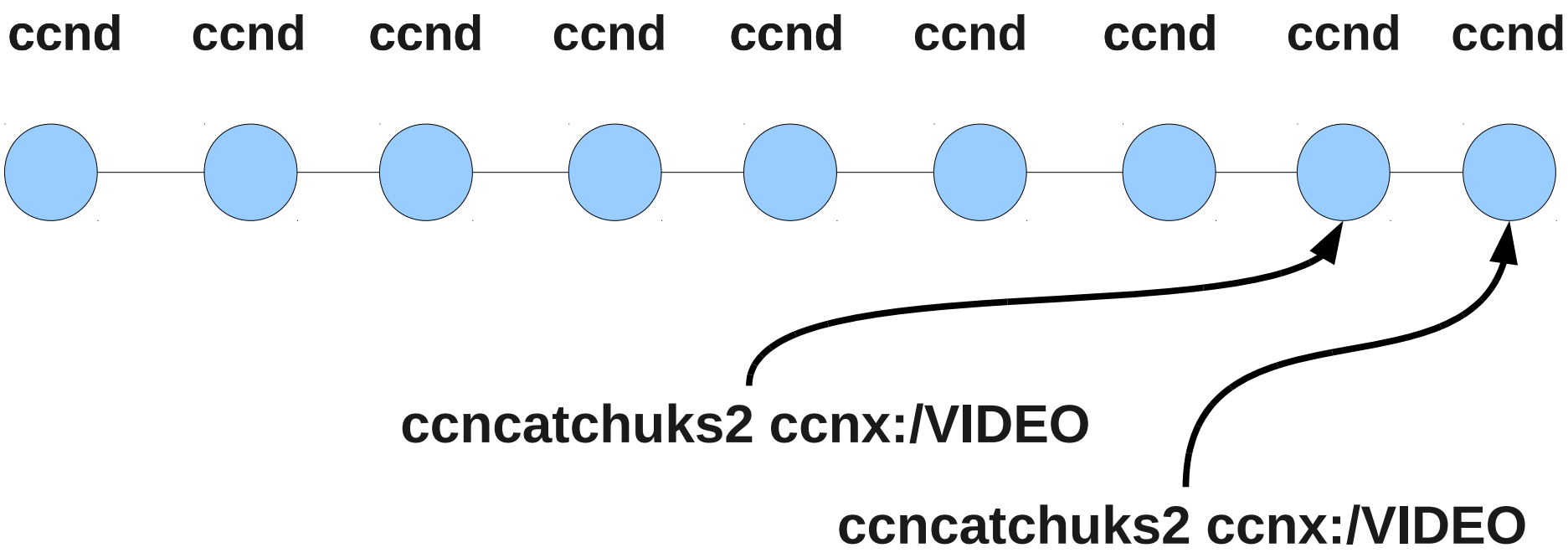
And retrieved on the last node



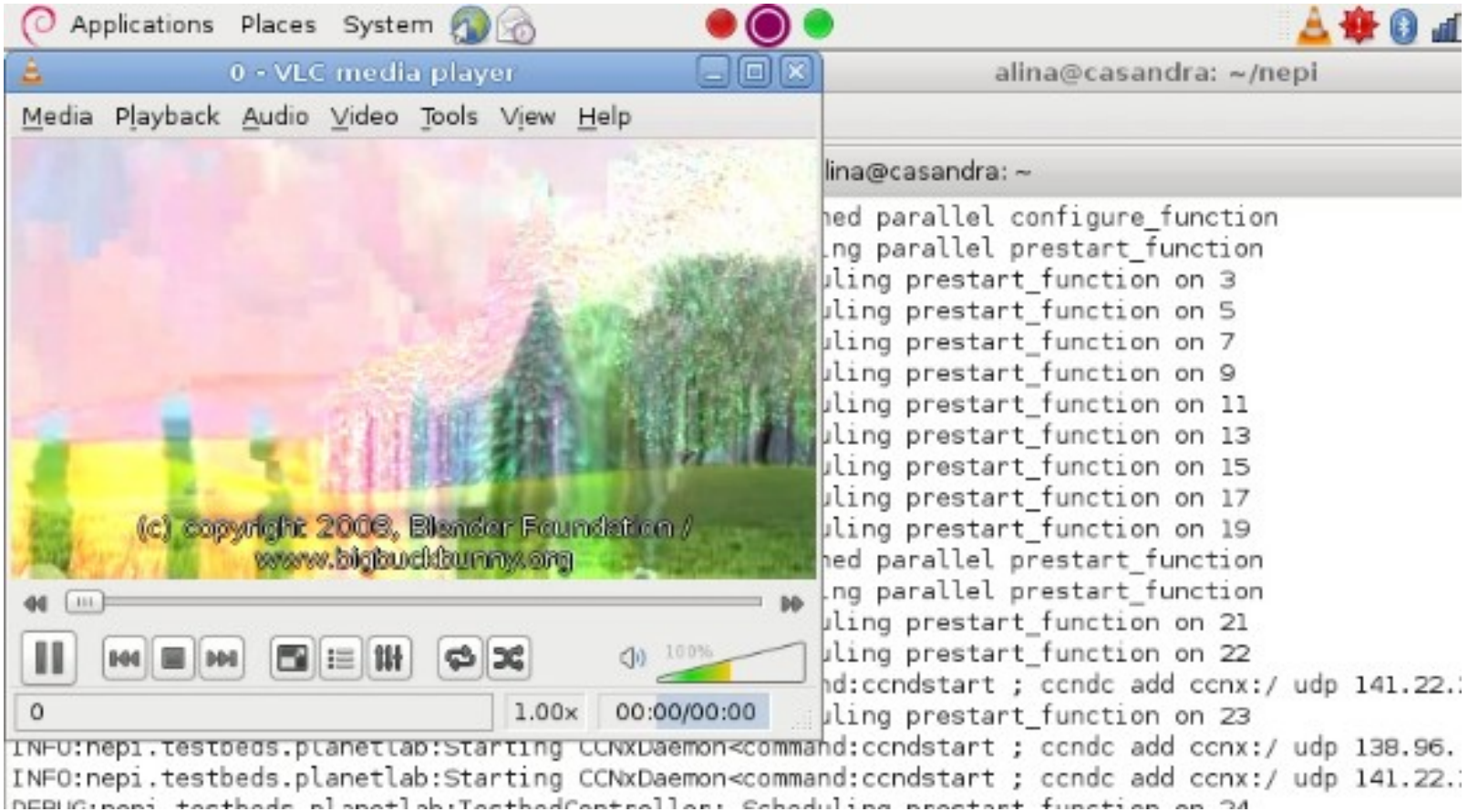
Some seconds later …
the same video will be retrieved again on the previous node



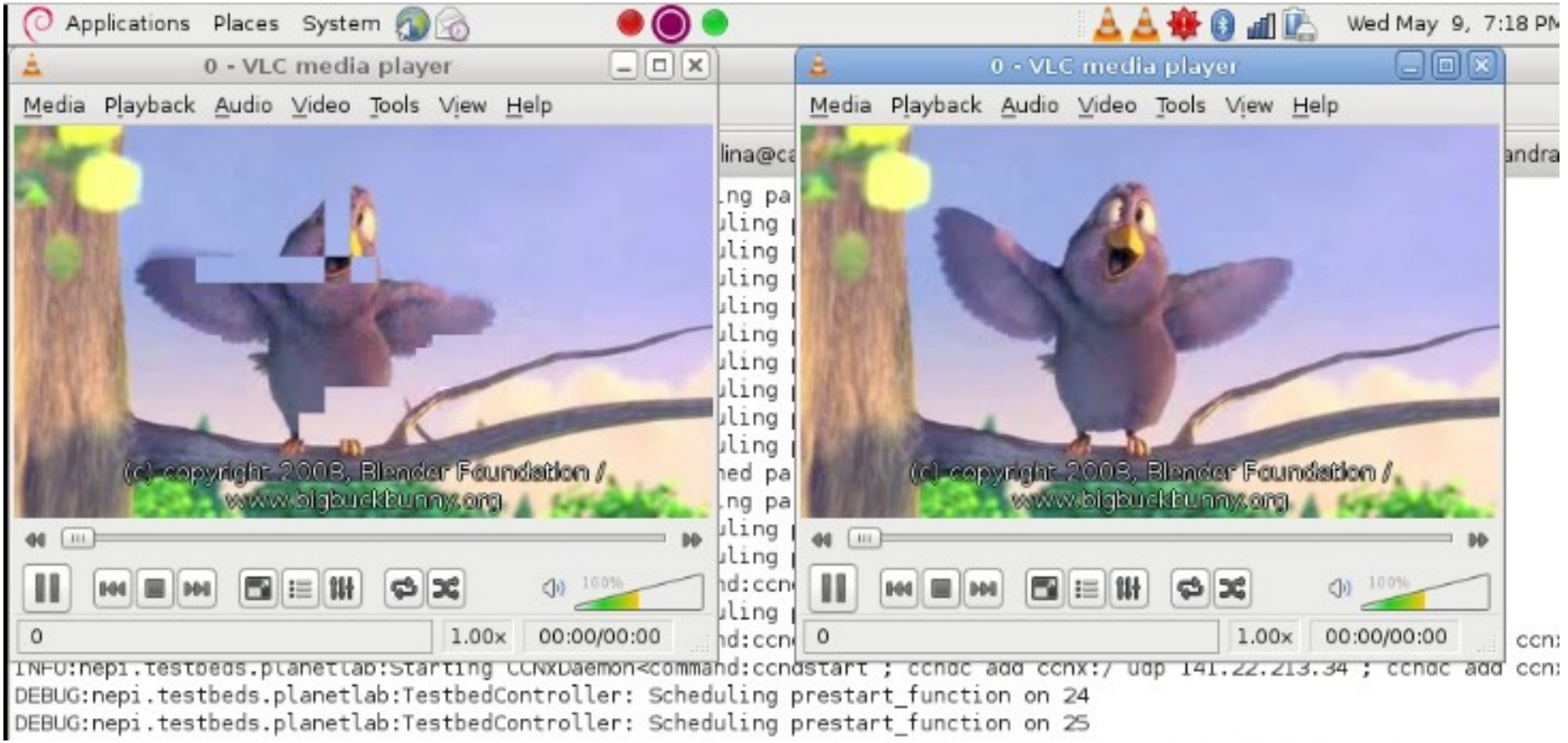
In these conditions, what are the effects of CCNx caching?



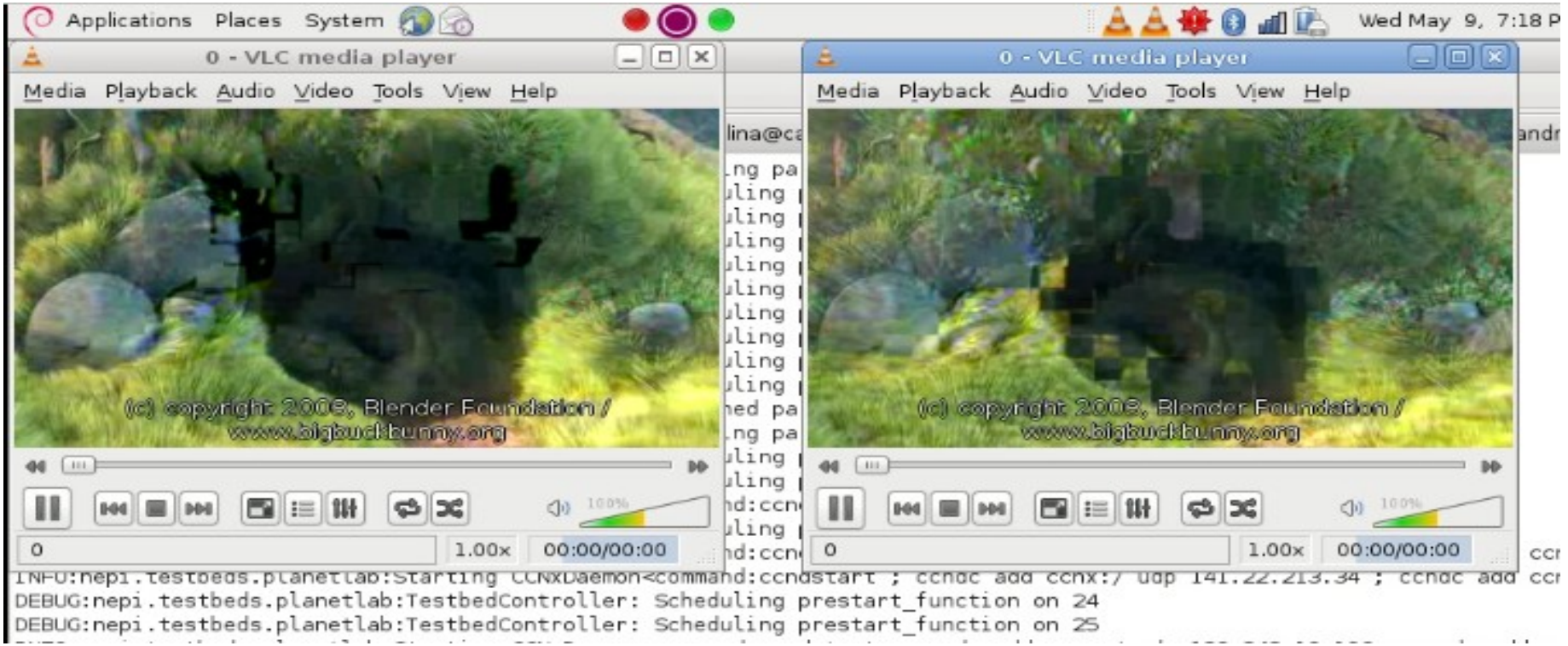
When streaming the first video we observe visual artifacts and freezing of the scenes



None of these problems are present when streaming the second video since CCNx has already cached the content



However, when the two streams synchronize and no caching is in place for the new content, we start observing the same problems in both streams



We can easily modify our original NEPI script to observe the effects of CCNx caching for other node configurations

NEPI experiments can be re-run many times, and by other researchers, allowing to verify observations