Implementing Grids

Pilot to Production - Some observations

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Corus Automotive

- Part of Corus, the multinational metals group
- 30 people based in Coventry, UK
  - Mostly engineers with an Automotive background
- Supporting Corus business units in the application of metals solutions in the Automotive Industry
- Significant emphasis placed on engineering analysis
  - All major FE codes used by Automotive OEM's are supported
  - Component, System and Full Vehicle simulations

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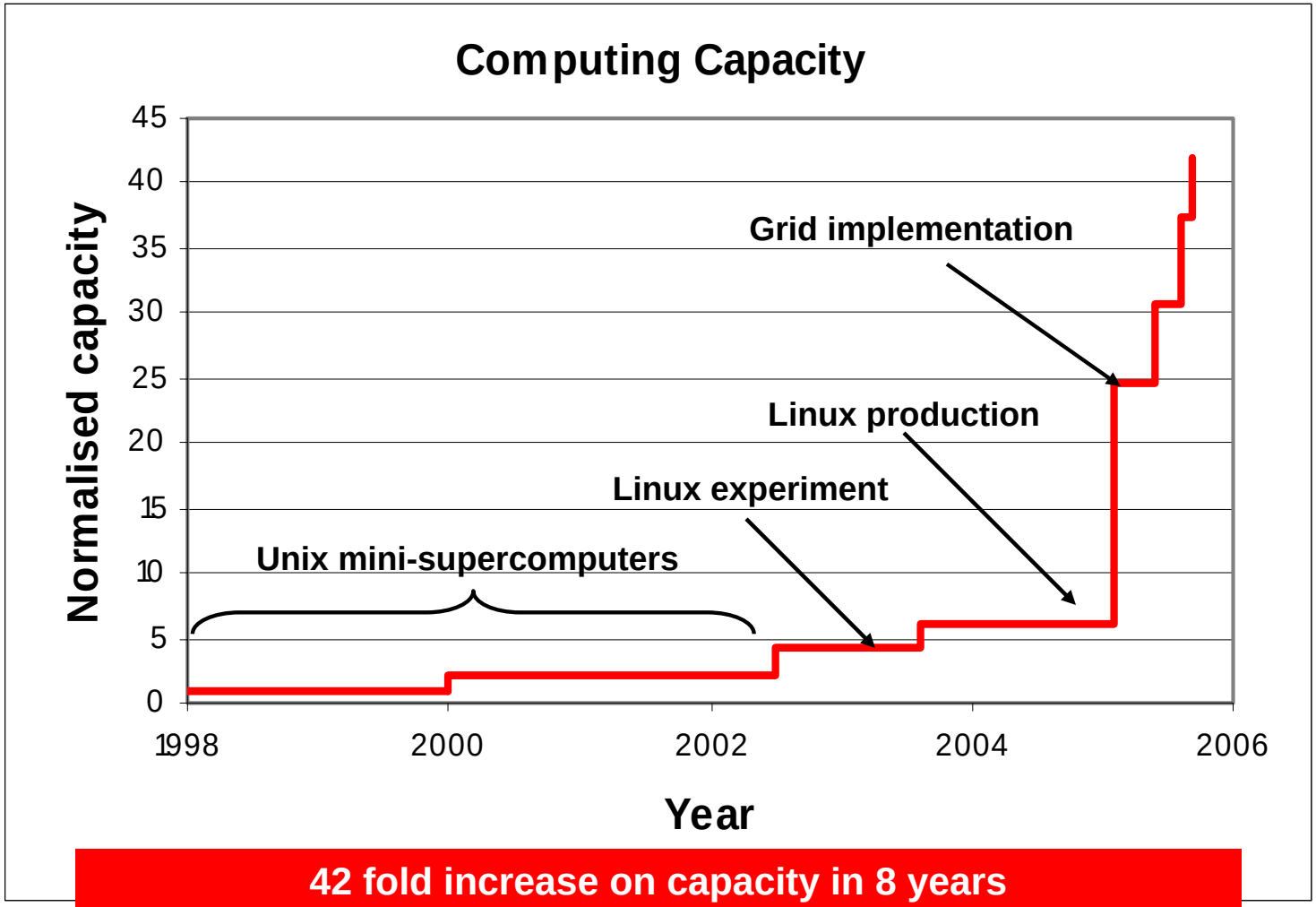
Computing Evolution



42 fold increase on capacity in 8 years
6 fold increase in 7 years due to hardware
7 fold increase in last 8 months mainly due to Grid technology

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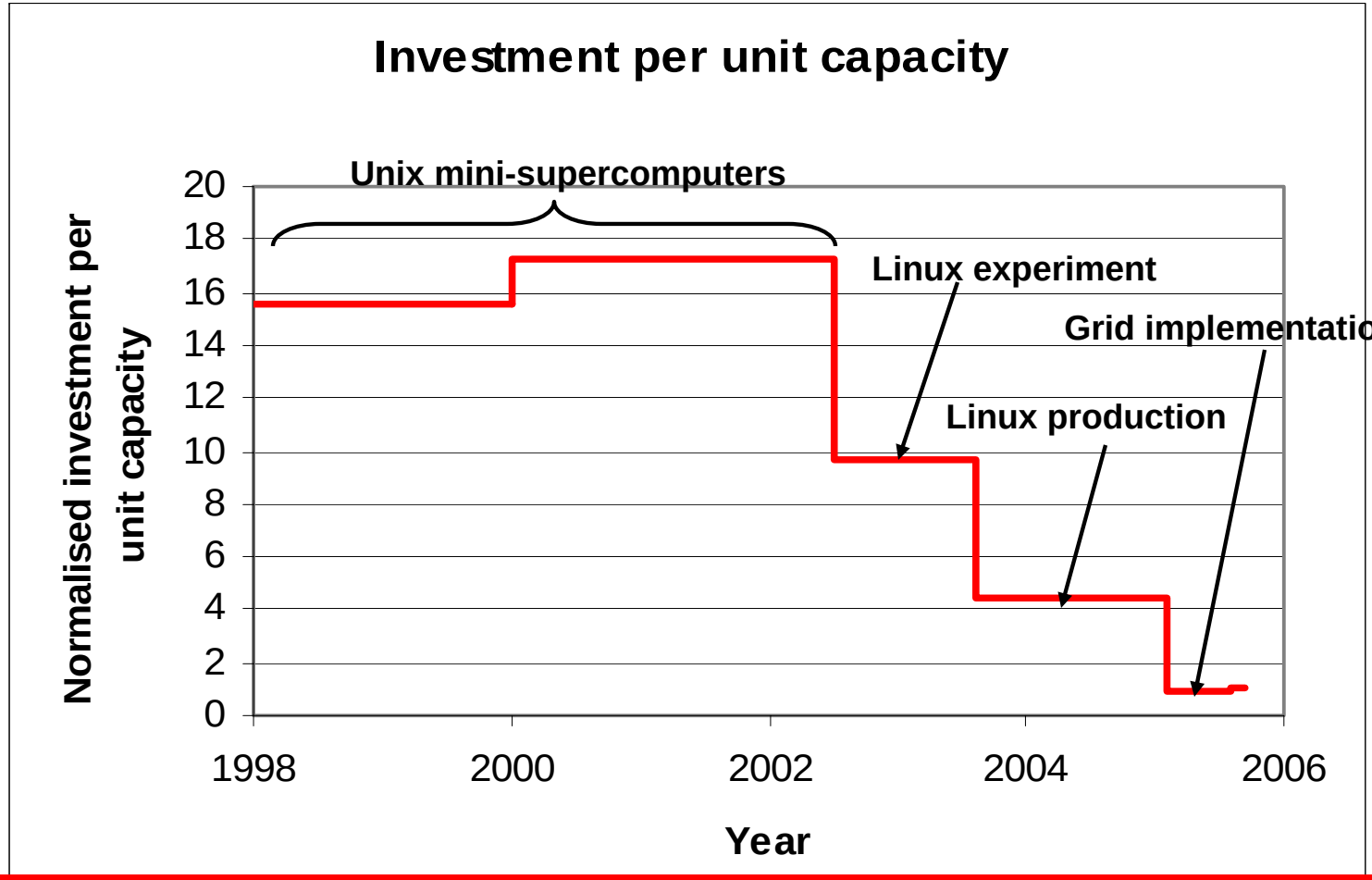
Computing Evolution



Unit capacity cost has reduced by a factor of 17 over 8 years
Mainly due to use of linux on commodity hardware
Continued reduction with Grid implementation demonstrates business case for Grid

Pilot to Production?

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- Actually we didn't do a Grid pilot
  - Short notice business need to increase computing capacity
  - Job queuing?
    - Insufficient by itself, required more machines
  - Job queue plus more machines?
    - Providing capacity but becoming unmanageable
  - Grid plus job queue plus more machines?
    - Providing capacity, management and monitoring
- High risk option with limited time for design work
  - Minimise risk by supplier selection and focus on core objectives

What did we do?

- System design and hardware selection
  - 24 twin processor HP DL360 servers, 5TB HP SAN upgrade, 8TB backup disc upgrade
- Software selection
  - GridXpert Synergy running on Apache Tomcat web server with SGE scheduler and MySQL database
- Distinct workstreams all in parallel
  - Hardware commissioning
  - Infrastructure upgrades
  - Solver qualification
  - Grid install and commissioning
  - Management education/User Training

8 weeks from business need to production use

What worked well?

- Supplier selection
  - Both hardware and software vendors performed well
  - Both had a great desire to succeed
    - Our production installation could be viewed as a Corus pilot installation
- Aggressive timing plan
  - Everyone bought into the plan
  - Everyone knew the importance to our business
  - An intense and highly focussed but short duration effort

What worked well?

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- Clean cutover
  - A complete solution with all new hardware
  - Avoiding a phased transition (but only by sticking to timescales)
- User ownership
  - Avoiding the grid being an IT Systems owned entity
    - Owned by the users, serviced by IT Systems
  - Grid project leaders
    - Link between IT Systems and Grid Users
    - Focal point for users, conduit for IT Systems

What worked well?

- Enough is enough, but nothing is too much trouble
  - Went live with a limited number of applications and services with suitable functionality
  - We worked hard to improve and enhance services
  - Applications and services added according to user demand and prioritisation
- 6 month user/management survey
  - What's good, what's bad, where do we need to improve?
  - Dealing with perceptions, encouraging feedback, being realistic with what we can and cannot influence

What could have been better?

- Network impact underestimated
  - Grids stress a network in every way and highlight network design bottlenecks
    - Should be an integral part of Grid deployment preparation
    - Currently looking at fibre channel connections for main server traffic and VLAN to reduce network noise
- Application ‘expert’ knowledge overestimated
  - Scripted application launch is a test of application ‘experts’
  - Significant and critical reliance placed on application vendor support teams

What could have been better?

- Resistance to change underestimated
  - Key individuals' 'expert' status eroded by service based application deployment
  - Training, Coaching, Encouragement, Involvement
    - Whilst the Grid represents a major step forward at all levels, significant effort to 'prove' benefit to a minority of users
- Capacity to generate data underestimated
  - Ease of job submission and 24/7 availability meant daily incremental data growth assumptions significantly in error
    - Impact on backup window and suitability of technology

Where did we benefit?

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- Capacity increase
  - ‘Overnight’ 4 fold increase, increased by a further 50% in 6 months after release
- Job submission management
  - Incorporating all User knowledge with IT Systems requirements to provide consistent and true best practice job submission
- Quality Assurance
  - Rigorous access control to only those applications which have been qualified for production use
- Leveraging investments
  - Increased license utilisation, transparent use of older, lower spec machines

Summary

- Biggest challenges are dealing with the load a grid places on systems infrastructure and managing users
  - Difficult to see how a pilot could have really addressed these
- Both need careful planning to deal with
- Impact on Systems Infrastructure
  - Good design and analysis is a starting point, but any upgrades needed will probably be based on a guess on throughput and traffic
- User management
  - A grid represents a change in the way users work, some will embrace it, some will resist
  - Provide good training, Involvement, Encouragement and Support

And don't forget the users are the real owners of the grid