




National  
Center  
for  
High-performance  
Computing

# Grid Applications and Human Network in SARS Combat

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國家高速網路與計算中心



“Bandwidth” and “degree of connectivity”  
are the new measures of power ...

- Three distinguishing factors to harness power
  - Culture to exploit & share knowledge
  - Competitive setting that embraces change
  - Ability to partner

Thomas Friedman, New York Times, P.11 11/Apr/1998  
--courtesy of Chris Buja

國家高速網路與計算中心

## Twain Advanced Research and Education Network



### Network Steering and Deployment committees

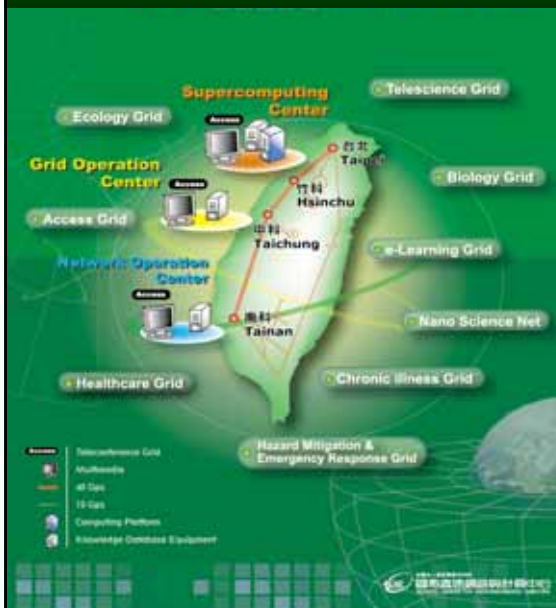
Backbone **40Gbps**  
 Regional Network **10Gbps**  
 Campus Network **1Gbps**

### Technologies & Applications

- Multimedia
- e-learning
- Multicast
- MPLS/VPN
- IPv6
- Measurement

### International Innovation and Collaborations

## Knowledge Innovation National Grid



### KING Steering and Deployment committees

- Supercomputing Center
- Grid Operation Center
- Network Operation Center (NOC)

### Grid applications

- ECO Grid
- Asthma Grid
- SARS Grid
- Access Grid
- Biology Grid
- Hazard Mitigation & Emergency Response Grid
- e-learning Grid

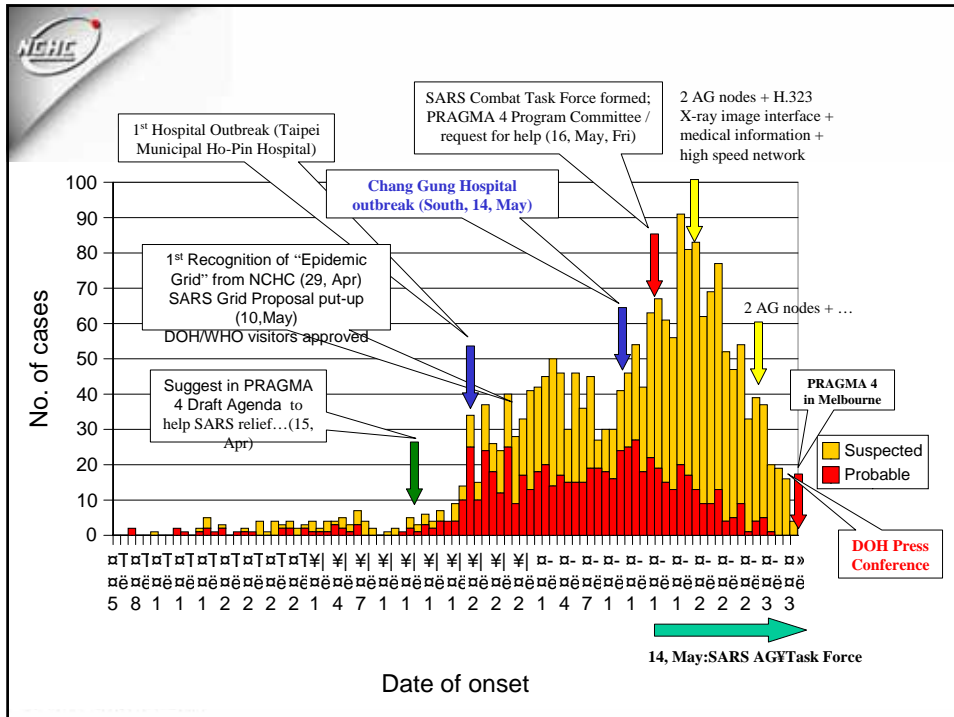
### International Innovation and Collaboration



# The Disease

- The period of incubation for the coronavirus of SARS is 3-7 days. 10 days quarantine is the key to contain the virus.
- Transmission through physical contact or breathing in flying particles of the saliva or phlegm of a sick person.
- Once infected there are symptoms of fever for a few days, then follow with an acute pneumonia.

財團法人國家衛生研究院  
國家流行病學及感染病防治中心





## The situation

- A SARS patient were sent to Ho-Pin Hospital without notifying medical staff.
- Cross infection spread in the hospital. Similar pattern of infection repeated in major hospitals of Taipei and Kaoshung, including medical centers.
- 95% infection is of medical staff and their relatives and friends. The quarantine, exhaustion and fear results in depletion of medical staff.

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國際疾病預防控制中心



## The Temporal Urgency

- Most medical doctors and nurses worked day and night and some with a little protection. Remote and collaborative diagnosis becomes a real issue.
- Due to the gradual depletion of medical staff, we decide to help and racing with time to realize it.

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## Some important Historical Docs

Quick Note: (4/29)

### 防疫格網 (Epidemic Grid 暫訂)

- \* 1-2 white-page proposal
- \* Unique IP Address (如 IPv6 的地址) 以便於追蹤與識別
- \* 感應器Sensors 與手機結合手機 考慮的量測數值 -- 體溫 (e.g. 紅外線) -- 脈搏 -- 位置座標 (GPS)
- \* 居家看護或隔離之電話回報 (Call center) 與網路連結 (以WWW網頁輸入)
- \* 以中心為 testbed, single portal (1 週內) 與上班系統整合 (以中心MIS team 為主)
- \* Access Grid PC 版個人型視訊整合 (以中心為例) \* 期於一週內有初步系統整合成果 (4/30-5/7)



Asthma Grid => SARS Grid (7, May)

[SARS AG Task Force](#) (14, May)

[PRAGMA Urgent Call for Help](#) (16, May)



## SARS Combat Begins

People had been working around the clock to assemble and test a **Grid system**, consisting systems of **Access Grid**, **H.323 VTC**, **medical information management**, **emergency dispatch** and **network monitoring**.








**DAY 6 (22, May)**  
**Remote Diagnosis Test**

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**DAY 13 (29, May)**  
**Mega test for AG**



 **The work**

- Find immediate solution from the current Grid works:
  - Asthma Grid, Access Grid and Ecogrid.
  - Specific medical information network
  - Construct AG nodes for hospitals.
  - Integrate GIS system.
  - Monitor the quarantined rooms.
- 3 Hospitals and CDC have AG nodes setup and in operation. Dedicated network is deployed.
- SARS Grid portal [www.sarshope.org](http://www.sarshope.org) developed
- SARS spread GIS portal developed
- International Supports:
  - [http://www.npaci.edu/Press/03/052903\\_SARS.html](http://www.npaci.edu/Press/03/052903_SARS.html)
  - <http://ncmir.ucsd.edu/news/>

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