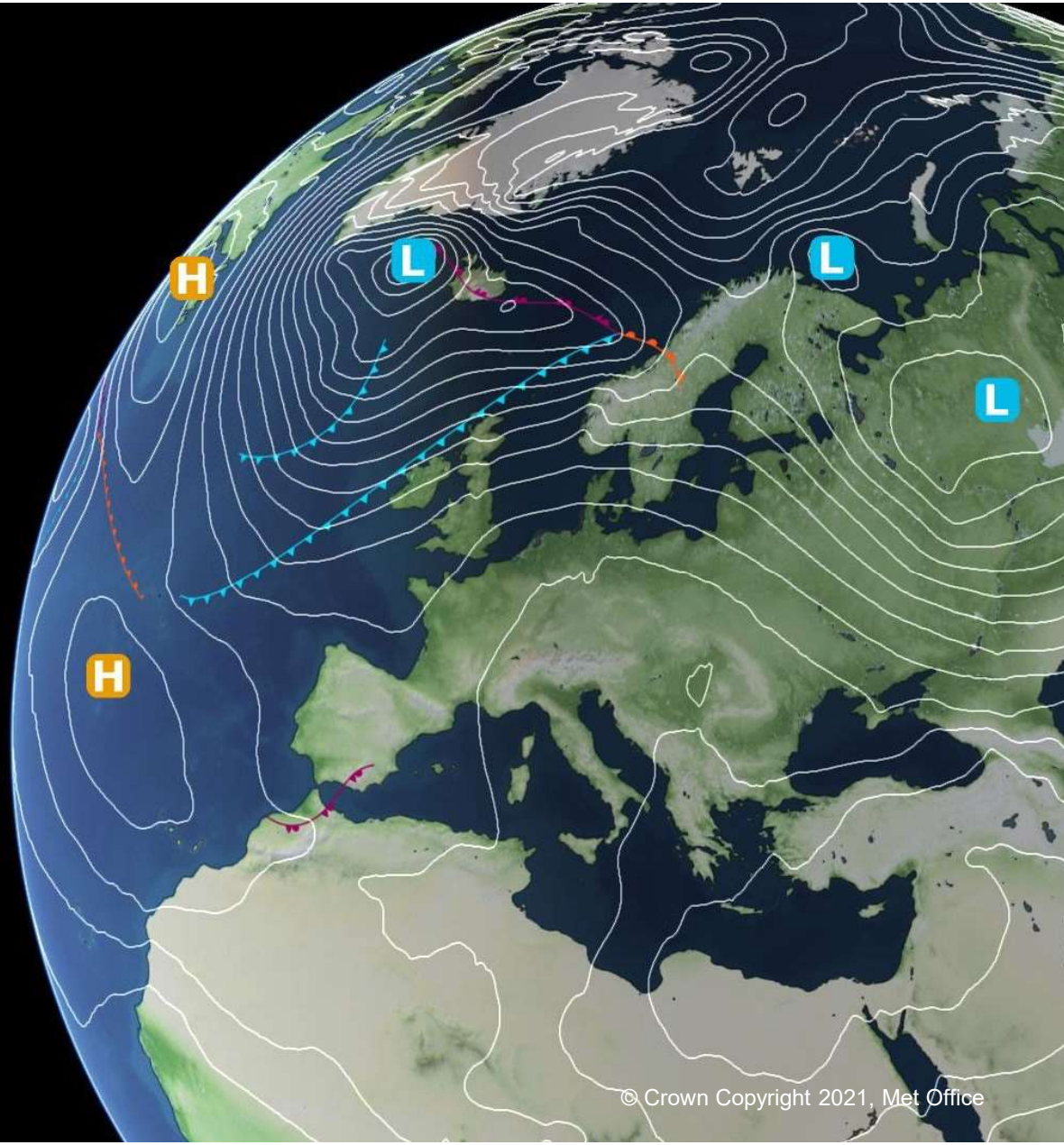
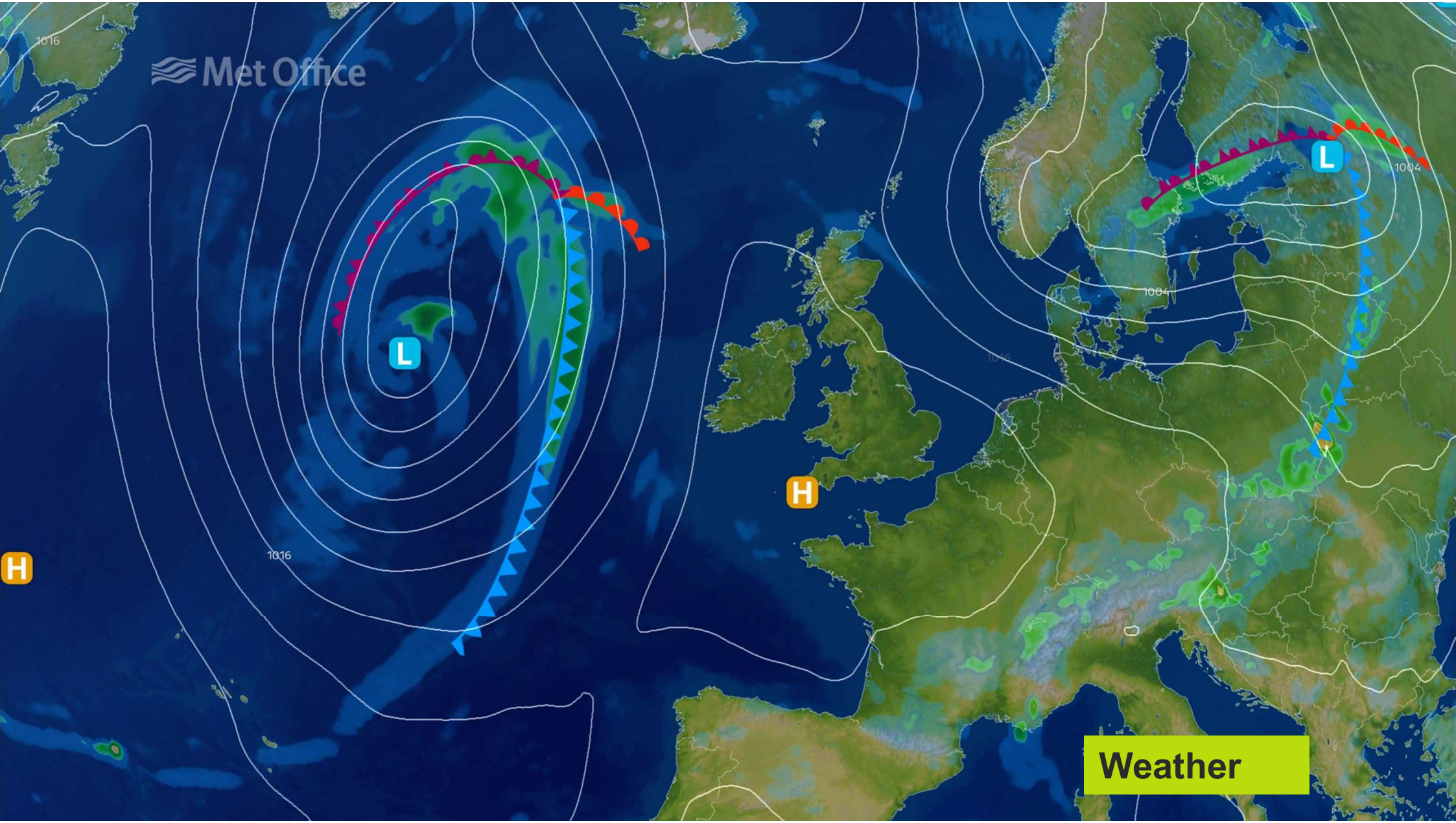


Met Office HPC

Richard Lawrence

May 2021





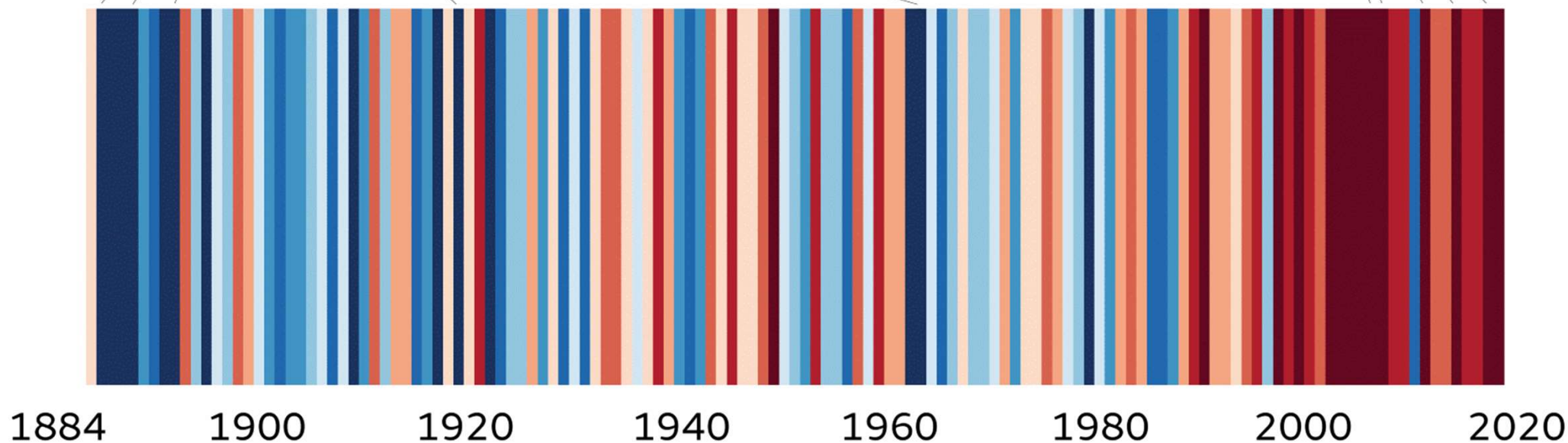
UK annual temperature

5 coolest years

1892, 1888, 1885, 1963, 1919

5 warmest years

2014, 2006, 2011, 2007, 2017





Met Office

CRAY

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UKV and MOGREPS-UK

- 1.5km 70L (40km model top)
- 12hr forecast 16 times/day
- 54hr forecast 6 times/day
- 120hr forecast 2 times/day
- 12-member Ensemble - 2.2km 4x/day 54h

Euro4

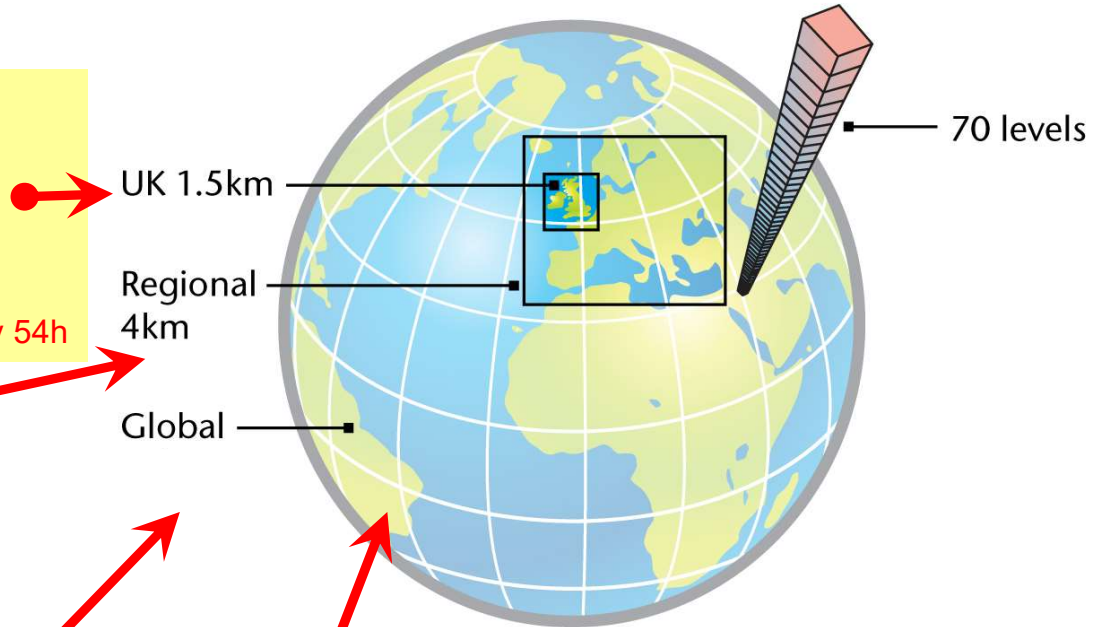
- 4km 70L (40km model top)
- 66hr forecast twice/day
- 144hr forecast twice/day

Global and MOGREPS-G

- 10km 70L (80km model top)
- 66hr forecast twice/day
- 144hr forecast twice/day
- 18-member Ensemble - 20km 4x/day 7d

Seasonal: GloSea5

- 60km 85L (85km model top)
- ¼ degree Ocean
- 14-member Ensemble
- 7month forecast once/week



Deliver our future Supercomputing capability

OUR PURPOSE Helping you make better decisions **to stay safe and thrive**

OUR VISION Recognised as global leaders in weather and climate science and services in our changing world

OUR ANCHORS Excellent **people and culture**

We will lead and invest in our people and culture to make the Met Office a great place to work for all.

Exceptional **science, technology and operations**

We will push the boundaries of scientific, technological and operational expertise to meet current and future grand challenges.

Extraordinary **impact and benefit**

We will focus everything we do on delivering greater benefit and impact to our customers.



**10
years**

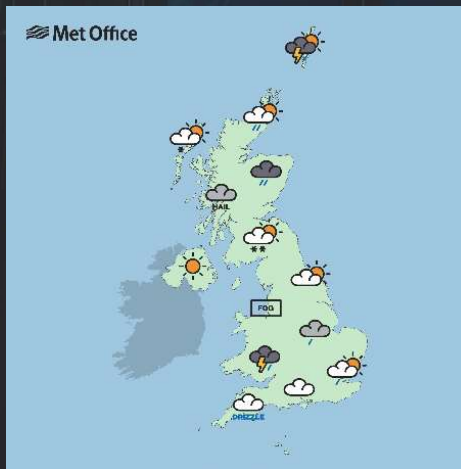
6x

Generation 1

~18x

Generation 2

HPCaaS



**We're a force
for good.**

investment

£1.2bn

10 year investment period

return

£13.7bn

target socio-economic benefits

What we're investing in...

greater
Supercomputing
capacity

next generation
Active Archive
data platform

expanded
HPC
scientific compute platforms

mid-term
Technology refresh
delivered in 2027



```
500  changeGroupState: function(state, btn) {  
501    var doChangeState = function() {  
502      if (cur.changingGroupState) return;  
503      function participate(yes) {  
504        if (yes) {  
505          val('members_count', cur.count, btn,  
506            replaceClass(btn, 'color', 'green'),  
507          val(btn, cur.subscribe, btn,  
508            setStyle('angle', '0deg', btn,  
509          } else {  
510            val('members_count', cur.count, btn,  
511              replaceClass(btn, 'color', 'red'),  
512            val(btn, cur.unsubscribe, btn,  
513              setStyle('angle', '180deg', btn,  
514            }  
515          }  
516          cur.changingGroupState = true;  
517          lockButton(btn);  
518          if (cur.rotate) {  
519            // ...  
520          }  
521        }  
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```

Will help deliver...

...enabling the Met Office to sustain trusted, authoritative weather and climate input for the UK, globally

greater levels of **operational** and research workload resilience

increasingly **detailed & accurate** services supporting UK resilience & safety, defence & security, transport, energy, business

a platform for **innovative science** greater environmental complexity, urban scale modelling, data sciences and new architectures

ability to readily **access & exploit** complex data to support research and UK business

significant opportunities for **partnerships & collaboration** across science, technology and services



```
502   changeGroupState: function(state, btn) {  
503     var doChangeState = function() {  
504       if (cur.changingGroupState) return;  
505       function participate(yes) {  
506         if (yes) {  
507           val('members_count', cur.count_btn);  
508           replaceClass(btn, 'color3_bg', 'color4_bg');  
509           val(btn, cur.unsubscribe_lang);  
510           setStyle('color3_bg', 'color4_bg');  
511         } else {  
512           val('members_count', cur.count_btn);  
513           replaceClass(btn, 'color4_bg', 'color3_bg');  
514           val(btn, cur.subscribe_lang);  
515           setStyle('color4_bg', 'color3_bg');  
516         }  
517         cur.changingGroupState = false;  
518         lockButton(btn);  
519         if (cur.noAuth) {  
520           widgets.noAuth();  
521           window.scrollTo(0, 0);  
522           if (cur.noAuth) {  
523             setStyle('color3_bg', 'color4_bg');  
524             location.href = '#';  
525           }  
526         }  
527       }  
528     }  
529     participate(true);  
530   }  
531 }
```

A new approach...

a new
fully managed
service delivery model

a world class technology
partner
with global reach

round the clock
24x7

integrated operation and support service



HPC1

Name: XCE
Cray XC40
2.8 Petaflops
1.5MW
109,376 Cores*
385TB RAM
4PB Sonnexion

HPC2

Name: XCF
Cray XC40
2.8 Petaflops
1.5MW
109,376 Cores*
385TB RAM
9PB Sonnexion

Total Multi-Site Capability:

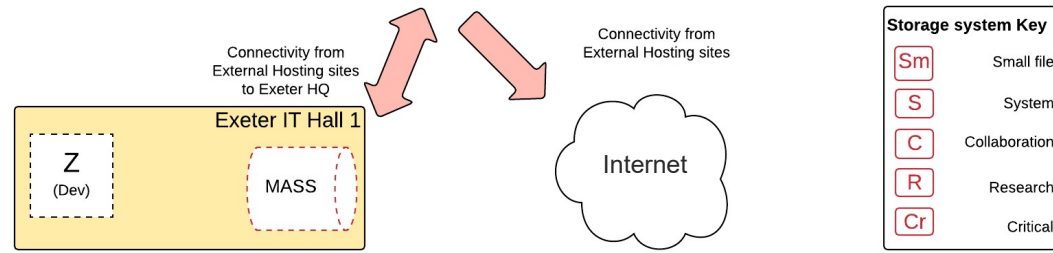
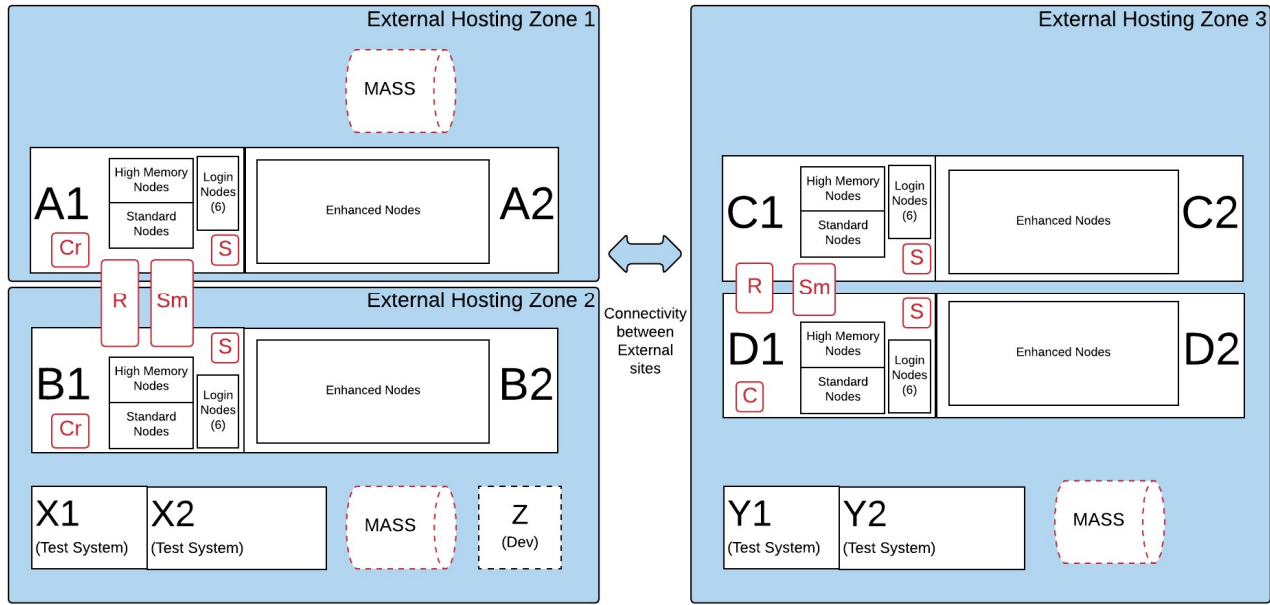
12.6 Petaflops
5.2-5.5MW
460,672 Cores
1.6PB RAM
27PB Sonnexion

HPC3

Name: XCS
Cray XC40
7 Petaflops
2.2-2.5MW
241,920 Cores**
840TB RAM
14PB Sonnexion

*89,856 Broadwell, 19,520 Haswell

**214,920 Broadwell



Are HPC architectures moving in the right direction for meteorology?

**Weather vs
Climate**

**No single
direction**

**~~Peak
flops~~**

**High Memory
bandwidth**

**Its all about
the data**

Small market