

# Chapter-20

## More on CUDA and graphics processing unit computing

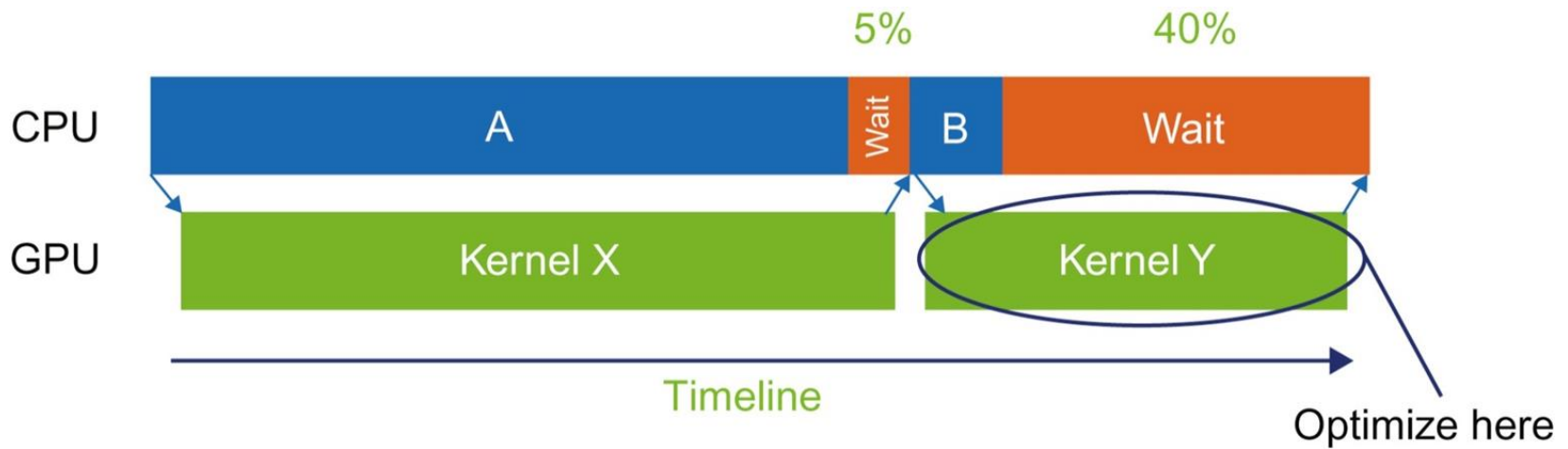
### CPU code

```
void sortfile(FILE *fp, int N) {  
    char *data;  
    data = (char *)malloc(N);  
    fread(data, 1, N, fp);  
    qsort_char(data, N, 1);  
  
    use_data(data);  
    free(data);  
}
```

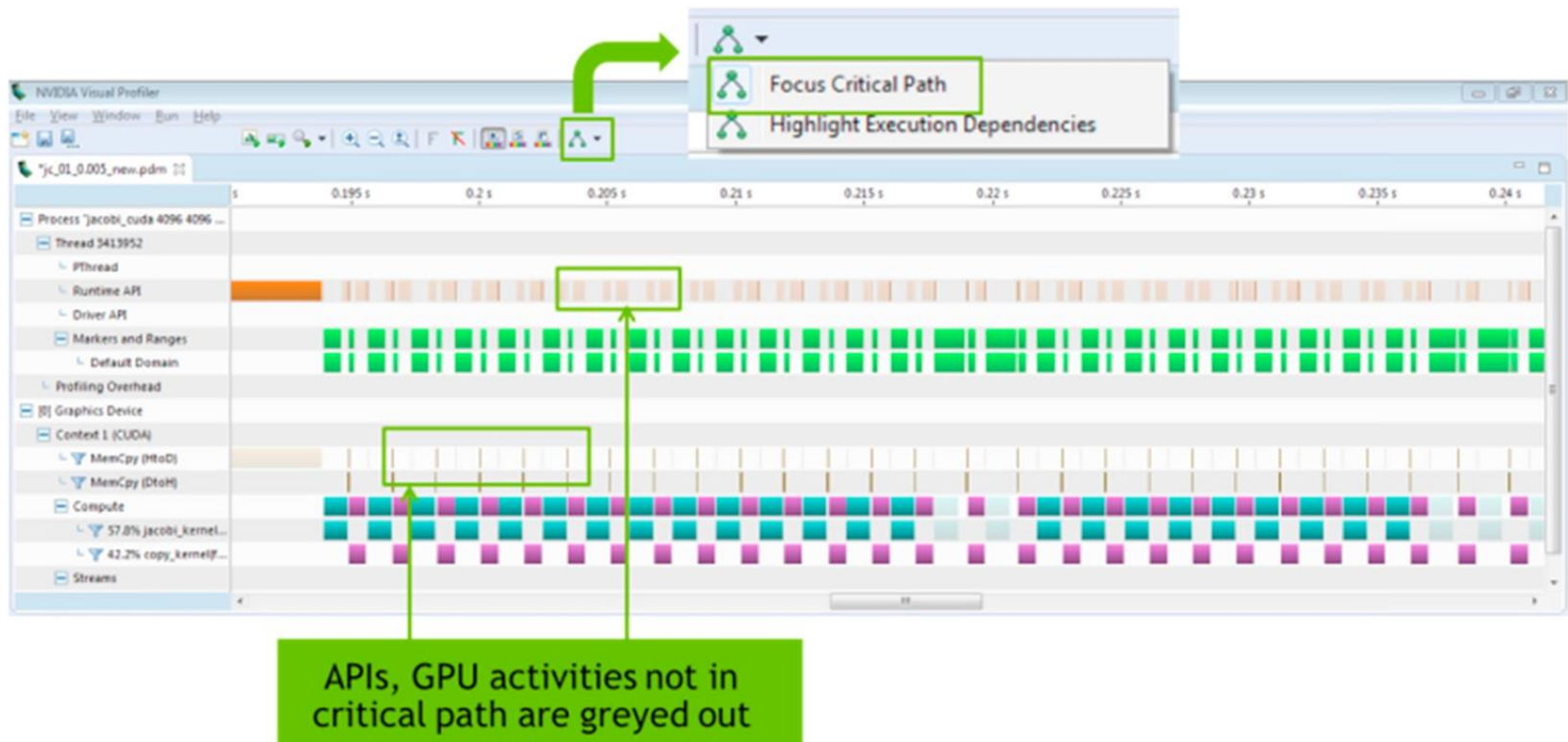
### CUDA 6 code with unified memory

```
void sortfile(FILE *fp, int N) {  
    char *data;  
    cudaMallocManaged(&data, N);  
    fread(data, 1, N, fp);  
    qsort_char<<...>>>(data, N, 1);  
    cudaDeviceSynchronize()  
    use_data(data);  
    cudaFree(data);  
}
```

**FIGURE 20.1:** Unified Memory simplifies porting of CPU code (left) to CUDA code (right).



**FIGURE 20.2:** Importance of critical-path analysis for identifying the key kernels to optimize.



**FIGURE 20.3:** Application critical-path analysis in CUDA 8 Visual Profiler.